10 Industrial Ave, Suite 3
Mahwah, NJ 07430
Phone: (908)447-4716
Kyle Richers
Real Estate Consultant

June 24, 2015

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

CC to Property Owner
American Tower Corporation
10 Presidential Way, Woburn, MA 01801

RE: T-Mobile Northeast LLC ("T-Mobile") notice of intent to modify an existing telecommunications facility located at 864 Opening Hill Road, Madison, CT 06443. Known to T-Mobile as site CT11394A.

Dear Ms. Bachman:

In order to accommodate technological changes, implement Code Division Multiple Access ("CDMA") and/or Long Term Evolution ("LTE") capabilities, 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 its attachments is being sent to the chief elected official of the municipality in which affected cell site is located.

CDMA employs Spread-Spectrum technology and special coding scheme to allow multiple users to be multiplexed over the same physical channel.

LTE is a new high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in T-Mobile's operations at the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

The changes to the facility do not constitute modification as defined Connecticut General Statues ("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 the R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will not be affected.
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 6 decibels or more.
4. Radio Frequency power density may increase due to the use of one or more CDMA transmissions. Moreover, LTE will utilize additional radio frequencies newly licensed by the FCC for cellular mobile communications. However, the changes 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 T-Mobile respectfully submits that the 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 (908)-447-4716 or email krichers@transcendwireless.com with questions concerning this matter.
Thank you for your consideration.

Sincerely,

Kyle Richers
Real Estate Consultant

SECURE DOCUMENT
Standard Register

ENDORSE CHECK HERE

X

DO NOT WRITE / SIGN / STAMP BELOW THIS LINE

DEPOSITORY BANK ENDORSEMENT

4020441

Please look for the following check security features before accepting this document. If not present, do not negotiate the document.

- Fluorescent artificial watermark should appear on the back of this check when it is held at a 45 degree angle or viewed under a UV light.
- Warning Bands
- Enhanced laid lines on the back of this check should be in complete alignment or the check is not authentic.
- Microprinting - under magnification on the front of this check should read: *"T-MOBILE"*
- Thermochromic heat sensitive "Secure" mark on back of check turns from orange to yellow when rubbed.

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11394A

North Madison
864 Opening Hill Road
Madison, CT 06443

May 12, 2015

EBI Project Number: 6215002846

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	41.64 %

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

EBI Consulting
environmental | engineering | due diligence

May 12, 2015

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

Emissions Analysis for Site: **CT11394A – North Madison**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **864 Opening Hill Road, Madison, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is 467 $\mu W/cm^2$, and the general population exposure limit for the PCS band is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **864 Opening Hill Road, Madison, 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 (PCS Band - 1900 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 (PCS Band - 1900 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 **EMS RR90_17_02DP** for 1900 MHz (PCS) 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 **EMS RR90_17_02DP** has a maximum gain of **14.4 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.

8) The antenna mounting height centerline of the proposed antennas is **130 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:	EMS RR90_17_02DP	Make / Model:	EMS RR90_17_02DP	Make / Model:	EMS RR90_17_02DP
Gain:	14.4 dBd	Gain:	14.4 dBd	Gain:	14.4 dBd
Height (AGL):	130	Height (AGL):	130	Height (AGL):	130
Frequency Bands	1900 MHz(PCS)	Frequency Bands	1900 MHz(PCS)	Frequency Bands	1900 MHz(PCS)
Channel Count	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	6,610.15	ERP (W):	6,610.15	ERP (W):	6,610.15
Antenna A1 MPE%	1.55	Antenna B1 MPE%	1.55	Antenna C1 MPE%	1.55
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
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):	130	Height (AGL):	130	Height (AGL):	130
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 A2 MPE%	0.43	Antenna B2 MPE%	0.43	Antenna C2 MPE%	0.43

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**5.94**
Verizon Wireless	10.62 %
Fire Company	0.55 %
Police Dept	0.37 %
AT&T	16.40 %
Sprint	5.53 %
Nextel	2.23 %
Site Total MPE %:	**41.64 %**

T-Mobile Sector 1 Total:	1.98 %
T-Mobile Sector 2 Total:	1.98 %
T-Mobile Sector 3 Total:	1.98 %
Site Total:	41.64 %

EBI Consulting
environmental | engineering | due diligence

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.98 %
Sector 2:	1.98 %
Sector 3 :	1.98 %
T-Mobile Total:	5.94 %
Site Total:	41.64 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **41.64%** 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

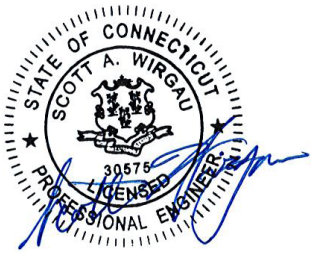
EBI Consulting
21 B Street
Burlington, MA 01803

AMERICAN TOWER®
CORPORATION

Structural Analysis Report

Structure	:	**180 ft Self Supported Tower**
GTP Site Name	:	**North Madison Volunteer FD, CT**
GTP Site Number	:	**CT-9014**
Engineering Number	:	**61768322**
Proposed Carrier	:	**T-Mobile**
Carrier Site Name	:	**North Madison**
Carrier Site Number	:	**CT11394A**
Site Location	:	**864 Opening Hill Road** **Madison, CT 06443-0000** **41.35694000, -72.64013000**
County	:	**New Haven**
Date	:	**June 11, 2015**
Max Usage	:	**100%**
Result	:	**Pass**

Reviewed by:
Scott Wirgau, PE
Structural Team Leader



Prepared By:
Robert D. Barrett, E.I.
Structural Engineer I

Robert D. Barrett

Jun 12 2015 8:41 AM

COA: PEC.0001553

AMERICAN TOWER®
CORPORATION

Table of Contents

Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 180 ft self supported tower to reflect the change in loading by T-Mobile.

Supporting Documents

Tower Drawings	Rohn Drawing #C981756, dated December 2, 1998
Foundation Drawing	Rohn Drawing #A992935-1, dated July 21, 1999
Geotechnical Report	Clarence Welti Assoc. Job #35130AE, dated June 9, 1997

Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/EIA-222.

Basic Wind Speed:	100 mph (Fastest Mile)
Basic Wind Speed w/ Ice:	87 mph (Fastest Mile)w/ 1/2" radial ice concurrent
Code:	ANSI/TIA/EIA-222-F / 2003 IBC , Sec. 1609.1.1, Exception (5) & Sec. 3108.4 w/ 2005 CT Supplement & 2009 CT Amendment

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at Engineering@americantower.com. Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

Existing and Reserved Equipment

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
180.0	190.8	2	RFS PD455	Side Arms	(3) 7/8" Coax (1) 1/2" Coax (1) 2" Conduit (1) 1" Conduit	Town Of Madison
	186.0	1	4-Bay Dipole			
	183.0	1	2-Bay Dipole			
168.0	170.0	2	Antel BXA-70063/4CF	Sector Frames	(12) 1 5/8" Coax (1) 1 5/8" Hybrid (1) 1 1/4" Coax	Verizon
		1	Antel BXA-70063/6CF			
		6	RFS FD9R6004/2C-3L			
		3	ALU RRH2x60 AWS			
		1	RFS DB-T1-6Z-8AB-0Z			
		6	Commscope HBXX 6517DS-VTM			
		3	Commscope LNX 6514DS-VTM			
160.0	160.0	12	Andrew DB844H90E-XY	Sector Frames	(12) 1 5/8" Coax	Sprint Nextel
150.0	150.0	3	ALU 800MHz 2X50W RRH w/ Filter	Sector Frames	(4) 1 1/4" Hybriflex	
		3	ALU 1900MHz 4X45 RRH			
		3	ALU TD-RRH8X20			
		3	RFS APXVSPP18-C-A20			
		3	RFS APXVTM14-C-I20			
140.0	140.0	1	Raycap DC6-48-60-18-8F	Sector Frames	(12) 1 1/4" Coax (2) 0.76" 8 AWG 6 (1) 0.39" Fiber	AT&T Mobility
		6	Ericsson RRUS-11			
		6	KMW AM-X-CD-16-65-00T-RET			
		6	Powerwave LGP21901			
		6	Powerwave LGP21401			
		6	Powerwave 7770			
130.0	130.0	3	RFS ATMAP1412D-1A120	T-Arms	(6) 1 5/8" Coax	T-Mobile
		3	EMS RR90_17_02DP			
75.0	75.0	1	PCTEL GPS-TMG-HR-26N	Standoff	(1) 1/2" Coax	Sprint Nextel

Equipment to be Removed

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
No loading considered as to be removed						

Proposed Equipment

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
130.0	130.0	3	Commscope LNX-6515DS-VTM	T-Arms	(6) 1 5/8" Coax	T-Mobile

[1]Mount elevation is defined as height above bottom of steel structure to the bottom of mount, RAD elevation is defined as center of antenna above ground level (AGL).

Install proposed coax stacked on top of existing T-Mobile coax.

Structure Usages*

Structural Component	Controlling Usage	Pass/Fail
Legs	75%	Pass
Diagonals	94%	Pass
Horizontals	72%	Pass
Anchor Bolts	45%	Pass
Leg Bolts	69%	Pass

***Anchorages have a factor of safety greater than 2.**

Foundations*

Reaction Component	Analysis Reactions	% of Usage
Uplift (Kips)	350.0	100%
Axial (Kips)	410.0	49%
Shear (Kips)	46.7	19%

***Foundations have a factor of safety greater than 2.**

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

Deflection, Twist and Sway*

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Twist (°)	Sway (Rotation) (°)
130.0	Commscope LNX-6515DS-VTM	T-Mobile	0.135	0.008	0.139

***Deflection, Twist and Sway was evaluated considering a design wind speed of 50 mph (Fastest Mile) per ANSI/TIA/EIA-222-F.**

AMERICAN TOWER®
CORPORATION

Standard Conditions

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessary limited, to:

-- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.

-- Information from drawings in the possession of American Tower Corporation, or generated by field inspections or measurements of the structure.

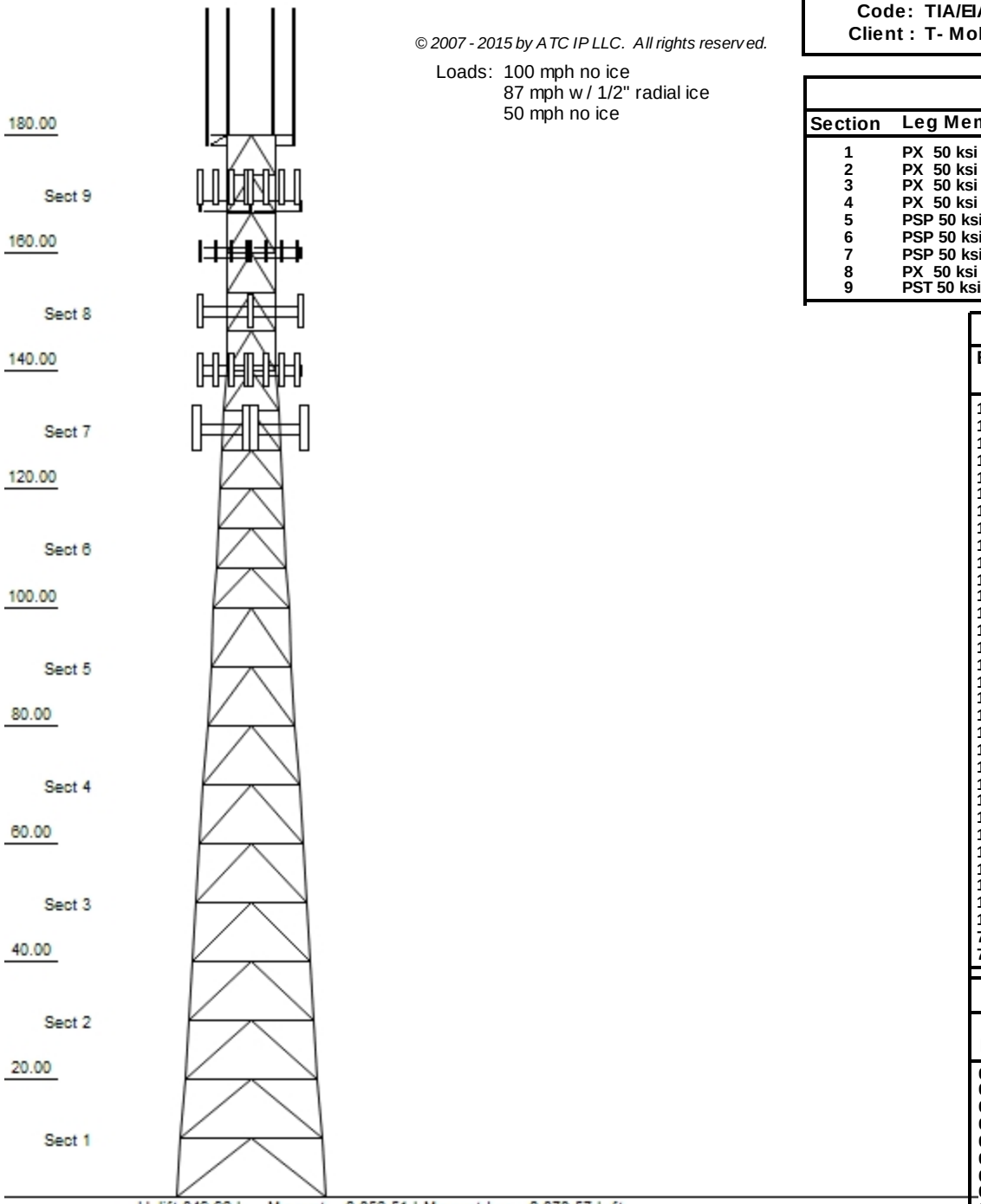
It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and American Tower Corporation, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

© 2007 - 2015 by ATC IP LLC. All rights reserved.

Loads: 100 mph no ice
87 mph w / 1/2" radial ice
50 mph no ice



Uplift 349.96 k Moment 8,056.51 k Moment Ice 8,370.57 k-ft
Vert 410.02 k Tot Down 56.43 k Tot Down Ice 85.45 k
Horiz 46.69 k Tot Shear 73.75 k Tot Shear Ice 76.37 k

Job Information

Tower : CT-9014	Location : North Madison Volunteer FD, CT	
Code: TIA/EIA-222-F	Shape : Triangle	Base Width : 25.33 ft
Client : T- Mobile		Top Width : 8.54 ft

Sections Properties

Section	Leg Members	Diagonal Members	Horizontal Members
1	PX 50 ksi 10" DIA PIPE	PX 50 ksi 3-1/2" DIA PIPE	PST 50 ksi 3" DIA PIPE
2	PX 50 ksi 10" DIA PIPE	PST 50 ksi 3" DIA PIPE	PST 50 ksi 2-1/2" DIA PIPE
3	PX 50 ksi 8" DIA PIPE	PST 50 ksi 3" DIA PIPE	PST 50 ksi 2-1/2" DIA PIPE
4	PX 50 ksi 8" DIA PIPE	PST 50 ksi 3" DIA PIPE	PST 50 ksi 2" DIA PIPE
5	PSP 50 ksi ROHN 8 EHS	PST 50 ksi 3" DIA PIPE	PST 50 ksi 2" DIA PIPE
6	PSP 50 ksi ROHN 6 EHS	PST 50 ksi 2-1/2" DIA PIPE	PST 50 ksi 2" DIA PIPE
7	PSP 50 ksi ROHN 5 EH	PX 50 ksi 2" DIA PIPE	PST 50 ksi 1-1/2" DIA PIPE
8	PX 50 ksi 4" DIA PIPE	PX 50 ksi 2" DIA PIPE	PST 50 ksi 1-1/2" DIA PIPE
9	PST 50 ksi 3" DIA PIPE	PST 50 ksi 2" DIA PIPE	PST 50 ksi 1-1/2" DIA PIPE

Discrete Appurtenance

Elev (ft)	Type	Qty	Description
180.00	Whip	1	2-Bay Dipole
180.00	Whip	1	4-Bay Dipole
180.00	Whip	2	RFS PD455
180.00	Straight Arm	3	Flat Side Arm
168.00	Mounting Frame	3	Flat Light Sector Frame
168.00	Panel	2	Antel BXA-70063/4CF
168.00	Panel	1	Antel BXA-70063/6CF
168.00		6	RFS FD9R6004/2C-3L
168.00		3	ALU RRH2x60 AWS
168.00		1	RFS DB-T1-6Z-8AB-0Z
168.00	Panel	6	Commscope HBXX 6517DS-VTM
168.00	Panel	3	Commscope LNX 6514DS-VTM
160.00	Panel	12	Andrew DB844H90E-XY
160.00	Mounting Frame	3	Flat Light Sector Frame
150.00		3	ALU 800 MHz 2X50W RRH w/ Filte
150.00		3	ALU 1900 MHz 4X45 RRH
150.00		3	ALU TD-RRH8X20
150.00	Panel	3	RFS APXVSPP18-C-A20
150.00	Panel	3	RFS APXVTM14-C-I20
150.00	Mounting Frame	3	Flat Light Sector Frame
140.00		1	Raycap DC6-48-60-18-8F
140.00		6	Ericsson RRUS-11
140.00	Panel	6	KMW AM-X-CD-16-65-00T-RET
140.00		6	Powerwave LGP21901
140.00		6	Powerwave LGP21401
140.00	Panel	6	Powerwave 7770
140.00	Mounting Frame	3	Flat Light Sector Frame
130.00		3	RFS ATMAP1412D-1A120
130.00	Panel	3	Commscope LNX-6515DS-VTM
130.00	Panel	3	EMS RR90_17_02DP
130.00	Straight Arm	3	Flat T-Arm
75.00		1	PCTEL GPS-TMG-HR-26N
75.00	Straight Arm	1	Standoff

Linear Appurtenance

Elev (ft) From	To	Qty	Description
0.000	180.00	3	7/8" Coax
0.000	180.00	1	2" Conduit
0.000	180.00	1	1/2" Coax
0.000	180.00	1	1" Conduit
0.000	168.00	1	Waveguide
0.000	168.00	1	1 5/8" Hybrid
0.000	168.00	12	1 5/8" Coax
0.000	168.00	1	1 1/4" Coax
0.000	160.00	1	Waveguide
0.000	160.00	1	Waveguide
0.000	160.00	12	1 5/8" Coax

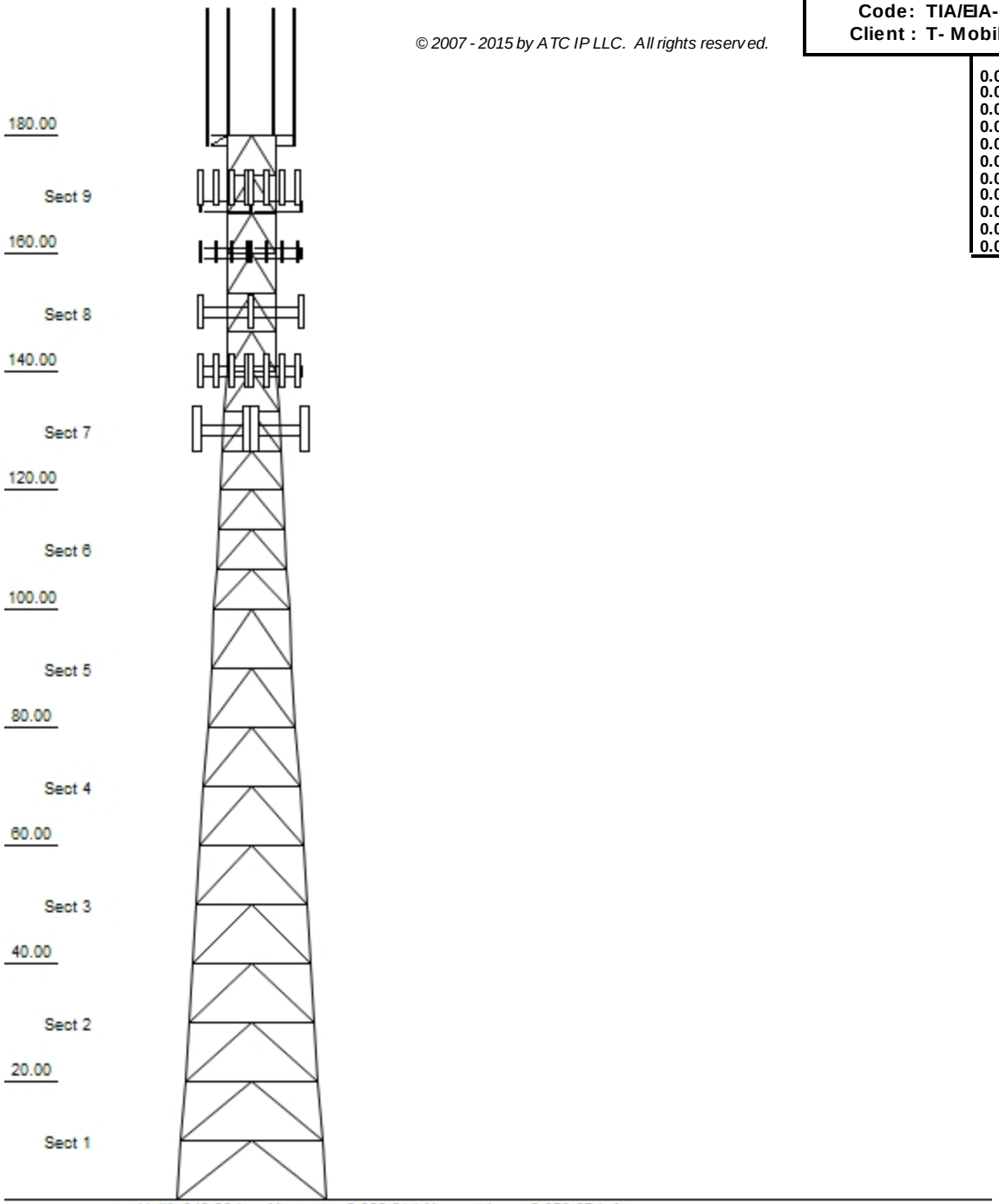
© 2007 - 2015 by ATC IP LLC. All rights reserved.

Job Information

Tower :	**CT-9014**	**Location :**	**North Madison Volunteer FD, CT**
Code:	**TIA/EIA-222-F**	**Shape :**	**Triangle**
Client :	**T- Mobile**		

Base Width : 25.33 ft
Top Width : 8.54 ft

0.000	150.00	1	Waveguide
0.000	150.00	3	1 1/4" Hybriflex
0.000	150.00	1	1 1/4" Hybriflex
0.000	140.00	1	Waveguide
0.000	140.00	12	1 1/4" Coax
0.000	140.00	2	0.76" 8 AWG 6
0.000	140.00	1	0.39" Fiber
0.000	130.00	1	Waveguide
0.000	130.00	6	1 5/8" Coax
0.000	130.00	6	1 5/8" Coax
0.000	75.000	1	1/2" Coax



Site Number:	**CT-9014**	**Code:**	**TIA/EIA-222-F**	*© 2007 - 2015 by ATC IP LLC. All rights reserved.*
Site Name:	**North Madison Volunteer FD, CT**	**Engineering Number:**	**61768322**	6/11/2015 2:55:35 PM
Customer:	**T- Mobile**			

Analysis Parameters

Tower Loading

Location:	**New Haven County, CT**	**Height:**	**180**
Code:	**TIA/EIA-222-F**	**Base Elevation:**	**0.00 ft**
Shape:	**Triangle**	**Base Face Width:**	**25.33 ft**
Tower Manufacturer:	**Rohn**	**Top Face Width:**	**8.54 ft**
Tower Type:	**Self Support**		

Ice & Wind Parameters

Exposure Category:	**B**	**Design Windspeed Without Ice:**	**100 mph**
Design Ice Thickness:	**0.50 in**	**Design Windspeed With Ice:**	**87 mph**

Load Cases

Normal No Ice	**100 mph Wind Normal To Face with No Ice**
60 deg No Ice	**100 mph Wind at 60 degree From Face with No Ice**
90 deg No Ice	**100 mph Wind at 90 degree From Face with No Ice**
Normal Ice	**87 mph Wind Normal To Face with Ice**
60 deg Ice	**87 mph Wind at 60 degree From Face with Ice**
90 deg Ice	**87 mph Wind at 90 degree From Face with Ice**
Normal Twist/Sway	**50 mph Wind Normal To Face with No Ice**
60 deg Twist/Sway	**50 mph Wind at 60 degree From Face with No Ice**
90 deg Twist/Sway	**50 mph Wind at 90 degree From Face with No Ice**

Site Number: CT-9014 Code: TIA/EIA-222-F © 2007 - 2015 by ATC IP LLC. All rights reserved.

Site Name: North Madison Volunteer FD, CT Engineering Number: 61768322 6/11/2015 2:55:35 PM

Customer: T- Mobile

Tower Loading

Discrete Appurtenance Properties Normal No Ice

Elevation (ft)	Description	Qty	Weight (lb)	CaAa (sf)	CaAa Factor	Dist. From Face (ft)	X Angle (deg)	Vert Ecc (ft)	Mom (lb-ft)	Qz (psf)	Total Force (lb)	Pu (lb)
180.00	2-Bay Dipole	1	18	2.0	1.00	0.0	0.00	3.0	273.8	41.76	91	18
180.00	4-Bay Dipole	1	35	3.9	1.00	0.0	0.00	6.0	1100.5	41.96	183	35
180.00	Flat Side Arm	3	150	6.3	0.67	0.0	0.00	0.0	0.0	41.57	590	450
180.00	RFS PD455	2	24	6.0	1.00	0.0	0.00	10.8	6131.0	42.26	570	48
168.00	ALU RRH2x60 AWS	3	44	2.5	0.67	0.0	0.00	2.0	464.3	40.89	232	132
168.00	Antel BXA-70063/4CF	2	10	5.2	0.74	0.0	0.00	2.0	701.4	40.89	351	20
168.00	Antel BXA-70063/6CF	1	17	7.7	0.77	0.0	0.00	2.0	545.6	40.89	273	17
168.00	Commscope HBXX	6	14	5.2	0.81	0.0	0.00	2.0	2334.5	40.89	1167	82
168.00	Commscope LNX	3	39	8.4	0.82	0.0	0.00	2.0	1896.6	40.89	948	116
168.00	Flat Light Sector	3	400	17.9	0.75	0.0	0.00	0.0	0.0	40.76	1840	1200
168.00	RFS DB-T1-6Z-8AB-0Z	1	44	5.6	1.00	0.0	0.00	2.0	513.4	40.89	257	44
168.00	RFS FD9R6004/2C-3L	6	3	0.4	0.50	0.0	0.00	2.0	101.8	40.89	51	16
160.00	Andrew DB844H90E-XY	12	14	3.7	0.81	0.0	0.00	0.0	0.0	40.19	1633	168
160.00	Flat Light Sector	3	400	17.9	0.75	0.0	0.00	0.0	0.0	40.19	1814	1200
150.00	ALU 1900 MHz 4X45	3	60	2.7	0.67	0.0	0.00	0.0	0.0	39.46	241	180
150.00	ALU 800 MHz 2X50W	3	64	2.4	0.67	0.0	0.00	0.0	0.0	39.46	213	192
150.00	ALU TD-RRH8X20	3	66	4.3	0.67	0.0	0.00	0.0	0.0	39.46	382	198
150.00	Flat Light Sector	3	400	17.9	0.75	0.0	0.00	0.0	0.0	39.46	1781	1200
150.00	RFS APXVSPP18-C-A20	3	57	8.3	0.82	0.0	0.00	0.0	0.0	39.46	899	171
150.00	RFS APXVTM14-C-I20	3	53	6.9	0.76	0.0	0.00	0.0	0.0	39.46	696	159
140.00	Ericsson RRUS-11	6	55	4.4	0.67	0.0	0.00	0.0	0.0	38.69	770	330
140.00	Flat Light Sector	3	400	17.9	0.75	0.0	0.00	0.0	0.0	38.69	1746	1200
140.00	KMW AM-X-CD-16-65-	6	49	8.3	0.78	0.0	0.00	0.0	0.0	38.69	1676	291
140.00	Powerwave 7770	6	35	5.9	0.75	0.0	0.00	0.0	0.0	38.69	1147	210
140.00	Powerwave LGP21401	6	18	0.9	0.50	0.0	0.00	0.0	0.0	38.69	124	105
140.00	Powerwave LGP21901	6	6	0.2	0.50	0.0	0.00	0.0	0.0	38.69	30	33
140.00	Raycap DC6-48-60-18-	1	19	1.5	1.00	0.0	0.00	0.0	0.0	38.69	64	19
130.00	Commscope LNX-	3	50	11.4	0.84	0.0	0.00	0.0	0.0	37.88	1225	151
130.00	EMS RR90_17_02DP	3	14	4.4	0.73	0.0	0.00	0.0	0.0	37.88	405	41
130.00	Flat T-Arm	3	250	12.9	0.67	0.0	0.00	0.0	0.0	37.88	1101	750
130.00	RFS ATMAP1412D-	3	13	1.2	0.50	0.0	0.00	0.0	0.0	37.88	75	39
75.00	PCTEL GPS-TMG-HR-	1	1	0.2	1.00	0.0	0.00	0.0	0.0	32.37	6	1
75.00	Standoff	1	75	2.5	1.00	0.0	0.00	0.0	0.0	32.37	91	75
	Totals	113	8889	672.4								

Discrete Appurtenance Properties Normal Ice

Elevation (ft)	Description	Qty	Weight (lb)	CaAa (sf)	CaAa Factor	Dist. From Face (ft)	X Angle (deg)	Vert Ecc (ft)	Mom (lb-ft)	Qz (psf)	Total Force (lb)	Pu (lb)
180.00	2-Bay Dipole	1	39	2.1	1.00	0.0	0.00	3.0	224.3	31.32	75	39
180.00	4-Bay Dipole	1	62	5.4	1.00	0.0	0.00	6.0	1144.9	31.47	191	62
180.00	Flat Side Arm	3	230	7.0	0.67	0.0	0.00	0.0	0.0	31.17	492	690
180.00	RFS PD455	2	68	8.2	1.00	0.0	0.00	10.8	6262.9	31.69	583	135
168.00	ALU RRH2x60 AWS	3	61	2.9	0.67	0.0	0.00	2.0	396.6	30.67	198	184
168.00	Antel BXA-70063/4CF	2	39	5.8	0.74	0.0	0.00	2.0	585.1	30.67	293	78
168.00	Antel BXA-70063/6CF	1	59	8.5	0.77	0.0	0.00	2.0	452.1	30.67	226	59
168.00	Commscope HBXX	6	41	5.9	0.81	0.0	0.00	2.0	1988.0	30.67	994	246

© 2007 - 2015 by ATC IP LLC. All rights reserved.

Tower Loading

168.00	Commscope LNX	3	89	9.2	0.82	0.0	0.00	2.0	1562.7	30.67	781	268
168.00	Flat Light Sector	3	510	22.2	0.75	0.0	0.00	0.0	0.0	30.56	1711	1530
168.00	RFS DB-T1-6Z-8AB-0Z	1	61	3.5	1.00	0.0	0.00	2.0	238.6	30.67	119	61
168.00	RFS FD9R6004/2C-3L	6	5	0.5	0.50	0.0	0.00	2.0	103.1	30.67	52	29
160.00	Andrew DB844H90E-XY	12	37	4.3	0.81	0.0	0.00	0.0	0.0	30.14	1409	439
160.00	Flat Light Sector	3	510	22.2	0.75	0.0	0.00	0.0	0.0	30.14	1688	1530
150.00	ALU 1900 MHz 4X45	3	83	1.8	0.67	0.0	0.00	0.0	0.0	29.59	117	249
150.00	ALU 800 MHz 2X50W	3	86	1.6	0.67	0.0	0.00	0.0	0.0	29.59	104	258
150.00	ALU TD-RRH8X20	3	90	2.7	0.67	0.0	0.00	0.0	0.0	29.59	180	270
150.00	Flat Light Sector	3	510	22.2	0.75	0.0	0.00	0.0	0.0	29.59	1657	1530
150.00	RFS APXVSPP18-C-A20	3	107	9.1	0.82	0.0	0.00	0.0	0.0	29.59	741	320
150.00	RFS APXVTM14-C-I20	3	92	7.6	0.76	0.0	0.00	0.0	0.0	29.59	573	277
140.00	Ericsson RRUS-11	6	81	2.8	0.67	0.0	0.00	0.0	0.0	29.01	362	485
140.00	Flat Light Sector	3	510	22.2	0.75	0.0	0.00	0.0	0.0	29.01	1624	1530
140.00	KMW AM-X-CD-16-65-	6	95	9.1	0.78	0.0	0.00	0.0	0.0	29.01	1382	570
140.00	Powerwave 7770	6	68	6.5	0.75	0.0	0.00	0.0	0.0	29.01	956	406
140.00	Powerwave LGP21401	6	23	0.7	0.50	0.0	0.00	0.0	0.0	29.01	65	140
140.00	Powerwave LGP21901	6	8	0.2	0.50	0.0	0.00	0.0	0.0	29.01	19	46
140.00	Raycap DC6-48-60-18-	1	37	1.7	1.00	0.0	0.00	0.0	0.0	29.01	54	37
130.00	Commscope LNX-	3	116	12.4	0.84	0.0	0.00	0.0	0.0	28.41	993	349
130.00	EMS RR90_17_02DP	3	36	5.0	0.73	0.0	0.00	0.0	0.0	28.41	348	108
130.00	Flat T-Arm	3	314	15.3	0.67	0.0	0.00	0.0	0.0	28.41	979	942
130.00	RFS ATMAP1412D-	3	21	1.4	0.50	0.0	0.00	0.0	0.0	28.41	66	62
75.00	PCTEL GPS-TMG-HR-	1	2	0.1	1.00	0.0	0.00	0.0	0.0	24.27	4	2
75.00	Standoff	1	175	5.9	1.00	0.0	0.00	0.0	0.0	24.27	161	175
	Totals	113	13108	754.7								

Discrete Appurtenance Properties Normal Twist/Sway

Elevation (ft)	Description	Qty	Weight (lb)	CaAa (sf)	CaAa Factor	Dist. From Face (ft)	X Angle (deg)	Vert Ecc (ft)	Mom (lb-ft)	Qz (psf)	Total Force (lb)	Pu (lb)
180.00	2-Bay Dipole	1	18	2.0	1.00	0.0	0.00	3.0	68.5	10.44	23	18
180.00	4-Bay Dipole	1	35	3.9	1.00	0.0	0.00	6.0	275.1	10.49	46	35
180.00	Flat Side Arm	3	150	6.3	0.67	0.0	0.00	0.0	0.0	10.39	147	450
180.00	RFS PD455	2	24	6.0	1.00	0.0	0.00	10.8	1532.7	10.57	143	48
168.00	ALU RRH2x60 AWS	3	44	2.5	0.67	0.0	0.00	2.0	116.1	10.22	58	132
168.00	Antel BXA-70063/4CF	2	10	5.2	0.74	0.0	0.00	2.0	175.4	10.22	88	20
168.00	Antel BXA-70063/6CF	1	17	7.7	0.77	0.0	0.00	2.0	136.4	10.22	68	17
168.00	Commscope HBXX	6	14	5.2	0.81	0.0	0.00	2.0	583.6	10.22	292	82
168.00	Commscope LNX	3	39	8.4	0.82	0.0	0.00	2.0	474.1	10.22	237	116
168.00	Flat Light Sector	3	400	17.9	0.75	0.0	0.00	0.0	0.0	10.19	460	1200
168.00	RFS DB-T1-6Z-8AB-0Z	1	44	5.6	1.00	0.0	0.00	2.0	128.3	10.22	64	44
168.00	RFS FD9R6004/2C-3L	6	3	0.4	0.50	0.0	0.00	2.0	25.4	10.22	13	16
160.00	Andrew DB844H90E-XY	12	14	3.7	0.81	0.0	0.00	0.0	0.0	10.05	408	168
160.00	Flat Light Sector	3	400	17.9	0.75	0.0	0.00	0.0	0.0	10.05	454	1200
150.00	ALU 1900 MHz 4X45	3	60	2.7	0.67	0.0	0.00	0.0	0.0	9.86	60	180
150.00	ALU 800 MHz 2X50W	3	64	2.4	0.67	0.0	0.00	0.0	0.0	9.86	53	192
150.00	ALU TD-RRH8X20	3	66	4.3	0.67	0.0	0.00	0.0	0.0	9.86	96	198
150.00	Flat Light Sector	3	400	17.9	0.75	0.0	0.00	0.0	0.0	9.86	445	1200
150.00	RFS APXVSPP18-C-A20	3	57	8.3	0.82	0.0	0.00	0.0	0.0	9.86	225	171
150.00	RFS APXVTM14-C-I20	3	53	6.9	0.76	0.0	0.00	0.0	0.0	9.86	174	159
140.00	Ericsson RRUS-11	6	55	4.4	0.67	0.0	0.00	0.0	0.0	9.67	193	330
140.00	Flat Light Sector	3	400	17.9	0.75	0.0	0.00	0.0	0.0	9.67	437	1200
140.00	KMW AM-X-CD-16-65-	6	49	8.3	0.78	0.0	0.00	0.0	0.0	9.67	419	291

© 2007 - 2015 by ATC IP LLC. All rights reserved.

Tower Loading

140.00	Powerwave 7770	6	35	5.9	0.75	0.0	0.00	0.0	0.0	9.67	287	210
140.00	Powerwave LGP21401	6	18	0.9	0.50	0.0	0.00	0.0	0.0	9.67	31	105
140.00	Powerwave LGP21901	6	6	0.2	0.50	0.0	0.00	0.0	0.0	9.67	7	33
140.00	Raycap DC6-48-60-18-	1	19	1.5	1.00	0.0	0.00	0.0	0.0	9.67	16	19
130.00	Commscope LNX-	3	50	11.4	0.84	0.0	0.00	0.0	0.0	9.47	306	151
130.00	EMS RR90_17_02DP	3	14	4.4	0.73	0.0	0.00	0.0	0.0	9.47	101	41
130.00	Flat T-Arm	3	250	12.9	0.67	0.0	0.00	0.0	0.0	9.47	275	750
130.00	RFS ATMAP1412D-	3	13	1.2	0.50	0.0	0.00	0.0	0.0	9.47	19	39
75.00	PCTEL GPS-TMG-HR-	1	1	0.2	1.00	0.0	0.00	0.0	0.0	8.09	1	1
75.00	Standoff	1	75	2.5	1.00	0.0	0.00	0.0	0.0	8.09	23	75
	Totals	113	8889	672.4								

© 2007 - 2015 by ATC IP LLC. All rights reserved.

Tower Loading

Linear Appurtenance Properties

Elev From (ft)	Elev To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Wind	Spread On Faces	Bundling Arrangement
0.00	180.0	1" Conduit	1	1.30	1.68	100.00	2	Separate
0.00	180.0	1/2" Coax	1	0.63	0.15	100.00	2	Separate
0.00	180.0	2" Conduit	1	2.38	3.65	100.00	2	Separate
0.00	180.0	7/8" Coax	3	1.09	0.33	100.00	2	Separate
0.00	168.0	1 1/4" Coax	1	1.55	0.63	100.00	2	Separate
0.00	168.0	1 5/8" Coax	12	1.98	0.82	100.00	2	Separate
0.00	168.0	1 5/8" Hybrid	1	1.63	1.61	0.00	2	Separate
0.00	168.0	Waveguide	1	2.00	6.00	100.00	2	Separate
0.00	160.0	1 5/8" Coax	12	1.98	0.82	100.00	1	Separate
0.00	160.0	Waveguide	1	2.00	6.00	100.00	1	Separate
0.00	160.0	Waveguide	1	2.00	6.00	100.00	1	Separate
0.00	150.0	1 1/4" Hybriflex	1	1.54	1.00	100.00	2	Separate
0.00	150.0	1 1/4" Hybriflex	3	1.54	1.00	100.00	2	Separate
0.00	150.0	Waveguide	1	2.00	6.00	100.00	2	Separate
0.00	140.0	0.39" Fiber	1	0.39	0.07	100.00	3	Separate
0.00	140.0	0.76" 8 AWG 6	2	0.76	0.53	100.00	3	Separate
0.00	140.0	1 1/4" Coax	12	1.55	0.63	100.00	3	Separate
0.00	140.0	Waveguide	1	2.00	6.00	100.00	3	Separate
0.00	130.0	1 5/8" Coax	6	1.98	0.82	100.00	3	Separate
0.00	130.0	1 5/8" Coax	6	1.98	0.82	0.00	3	Separate
0.00	130.0	Waveguide	1	2.00	6.00	100.00	3	Separate
0.00	75.00	1/2" Coax	1	0.63	0.15	100.00	2	Separate

© 2007 - 2015 by ATC IP LLC. All rights reserved.

Force/Stress Summary

Section: 1 1 Bot Elev (ft): 0.00 Height (ft): 20.000

Max Compression Member	Force (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fa (ksi)	Member Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PX - 10" DIA PIPE	-393.67	Normal Ice	10.03	100	100	100	33.1	35.7	574.34	0	0	0.00	0.00	68	Member X
HORIZ PST - 3" DIA PIPE	-10.50	90 deg No Ice	12.04	100	100	100	124.6	12.8	28.61	2	0	0.00	33.70	36	Member X
DIAG PX - 3-1/2" DIA PIPE	-15.25	90 deg Ice	16.14	100	100	100	147.9	9.1	33.51	3	0	0.00	74.41	45	Member X

Max Tension Member	Force (kip)	Load Case	Fy (ksi)	Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PX - 10" DIA PIPE	337.04	60 deg Ice	50	643.98	0	0	0.00	0.00	52	Member
HORIZ PST - 3" DIA PIPE	11.92	90 deg Ice	50	89.20	2	0	0.00	27.38	43	Bolt Bear
DIAG PX - 3-1/2" DIA PIPE	14.46	90 deg No Ice	50	147.20	3	0	0.00	65.11	22	Bolt Bear

Max Splice Forces	Force (kip)	Load Case	Capacity (kip)	Use %	Num Bolts	Bolt Type
Top Tension	320.21	60 deg Ice	0.00	0		
Top Compression	373.46	Normal Ice	0.00	0		
Bot Tension	352.92	60 deg Ice	785.47	45	16	1" A354-BC
Bot Compression	411.45	Normal Ice	0.00	0		

Section: 2 2 Bot Elev (ft): 20.00 Height (ft): 20.000

Max Compression Member	Force (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fa (ksi)	Member Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PX - 10" DIA PIPE	-355.56	Normal Ice	10.03	100	100	100	33.1	35.7	574.34	0	0	0.00	0.00	61	Member X
HORIZ PST - 2-1/2" DIA PIP	-10.62	90 deg Ice	10.79	100	100	100	136.7	10.6	18.14	2	0	0.00	26.39	58	Member X
DIAG PST - 3" DIA PIPE	-15.85	90 deg Ice	15.18	100	100	100	157.0	8.1	18.00	3	0	0.00	42.12	88	Member X

Max Tension Member	Force (kip)	Load Case	Fy (ksi)	Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PX - 10" DIA PIPE	305.97	60 deg Ice	50	643.98	0	0	0.00	0.00	47	Member
HORIZ PST - 2-1/2" DIA PIP	11.26	90 deg Ice	50	68.16	2	0	0.00	21.44	52	Bolt Bear
DIAG PST - 3" DIA PIPE	14.46	90 deg Ice	50	89.20	3	0	0.00	36.85	39	Bolt Bear

Max Splice Forces	Force (kip)	Load Case	Capacity (kip)	Use %	Num Bolts	Bolt Type
Top Tension	288.61	60 deg Ice	0.00	0		
Top Compression	334.37	Normal Ice	0.00	0		
Bot Tension	320.21	60 deg Ice	552.95	58	12	1 A325
Bot Compression	373.46	Normal Ice	0.00	0		

© 2007 - 2015 by ATC IP LLC. All rights reserved.

Force/Stress Summary

Section: 3 3 Bot Elev (ft): 40.00 Height (ft): 20.000

Max Compression Member	Force (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fa (ksi)	Member Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PX - 8" DIA PIPE	-316.16	Normal Ice	10.03	100	100	100	41.8	34.1	436.53	0	0	0.00	0.00	72	Member X
HORIZ PST - 2-1/2" DIA PIP	-9.76	90 deg Ice	9.503	100	100	100	120.4	13.7	23.40	2	0	0.00	26.39	41	Member X
DIAG PST - 3" DIA PIPE	-15.20	90 deg Ice	14.26	100	100	100	147.6	9.1	20.39	3	0	0.00	42.12	74	Member X

Max Tension Member	Force (kip)	Load Case	Fy (ksi)	Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PX - 8" DIA PIPE	273.84	60 deg Ice	50	511.99	0	0	0.00	0.00	53	Member
HORIZ PST - 2-1/2" DIA PIP	10.09	90 deg Ice	50	68.16	2	0	0.00	21.44	47	Bolt Bear
DIAG PST - 3" DIA PIPE	14.02	90 deg Ice	50	89.20	3	0	0.00	36.85	38	Bolt Bear

Max Splice Forces	Force (kip)	Load Case	Capacity (kip)	Use %	Num Bolts	Bolt Type
Top Tension	255.85	60 deg Ice	0.00	0		
Top Compression	294.78	Normal Ice	0.00	0		
Bot Tension	288.61	60 deg Ice	552.95	52	12	1 A325
Bot Compression	334.37	Normal Ice	0.00	0		

Section: 4 4 Bot Elev (ft): 60.00 Height (ft): 20.000

Max Compression Member	Force (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fa (ksi)	Member Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PX - 8" DIA PIPE	-273.58	Normal Ice	10.03	100	100	100	41.8	34.1	436.56	0	0	0.00	0.00	62	Member X
HORIZ PST - 2" DIA PIPE	-9.85	90 deg Ice	8.214	100	100	100	125.2	12.7	13.58	2	0	0.00	20.02	72	Member X
DIAG PST - 3" DIA PIPE	-16.36	90 deg Ice	13.35	100	100	100	138.1	10.4	23.28	3	0	0.00	42.12	70	Member X

Max Tension Member	Force (kip)	Load Case	Fy (ksi)	Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PX - 8" DIA PIPE	237.90	60 deg Ice	50	511.99	0	0	0.00	0.00	46	Member
HORIZ PST - 2" DIA PIPE	10.07	90 deg Ice	50	42.80	2	0	0.00	16.27	61	Bolt Bear
DIAG PST - 3" DIA PIPE	15.61	90 deg Ice	50	89.20	3	0	0.00	36.85	42	Bolt Bear

Max Splice Forces	Force (kip)	Load Case	Capacity (kip)	Use %	Num Bolts	Bolt Type
Top Tension	216.97	60 deg Ice	0.00	0		
Top Compression	249.40	Normal Ice	0.00	0		
Bot Tension	255.85	60 deg Ice	368.63	69	8	1 A325
Bot Compression	294.78	Normal Ice	0.00	0		

© 2007 - 2015 by ATC IP LLC. All rights reserved.

Force/Stress Summary

Section: 5 5 Bot Elev (ft): 80.00 Height (ft): 20.000

Max Compression Member	Force (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fa (ksi)	Member Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PSP - ROHN 8 EHS	-224.02	Normal Ice	10.02	100	100	100	41.2	34.2	332.61	0	0	0.00	0.00	67	Member X
HORIZ PST - 2" DIA PIPE	-10.24	90 deg Ice	7.026	100	100	100	107.1	17.3	18.56	2	0	0.00	20.02	55	Member X
DIAG PST - 3" DIA PIPE	-18.40	90 deg Ice	12.55	100	100	100	129.9	11.8	26.31	3	0	0.00	42.12	69	Member X

Max Tension Member	Force (kip)	Load Case	Fy (ksi)	Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PSP - ROHN 8 EHS	194.59	60 deg Ice	50	388.79	0	0	0.00	0.00	50	Member
HORIZ PST - 2" DIA PIPE	10.34	90 deg Ice	50	42.80	2	0	0.00	16.27	63	Bolt Bear
DIAG PST - 3" DIA PIPE	17.86	90 deg Ice	50	89.20	3	0	0.00	36.85	48	Bolt Bear

Max Splice Forces	Force (kip)	Load Case	Capacity (kip)	Use %	Num Bolts	Bolt Type
Top Tension	169.25	60 deg No Ice	0.00	0		
Top Compression	195.78	Normal Ice	0.00	0		
Bot Tension	216.97	60 deg Ice	368.63	59	8	1 A325
Bot Compression	249.40	Normal Ice	0.00	0		

Section: 6 6 Bot Elev (ft): 100.0 Height (ft): 20.000

Max Compression Member	Force (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fa (ksi)	Member Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PSP - ROHN 6 EHS	-177.29	Normal Ice	6.68	100	100	100	36.0	35.2	235.98	0	0	0.00	0.00	75	Member X
HORIZ PST - 2" DIA PIPE	-9.76	90 deg Ice	6.108	100	100	100	93.1	21.7	23.19	2	0	0.00	20.02	48	Bolt Bear
DIAG PST - 2-1/2" DIA PIP	-15.00	90 deg Ice	9.288	100	100	100	117.7	14.4	24.49	3	0	0.00	39.58	61	Member X

Max Tension Member	Force (kip)	Load Case	Fy (ksi)	Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PSP - ROHN 6 EHS	153.64	60 deg No Ice	50	268.39	0	0	0.00	0.00	57	Member
HORIZ PST - 2" DIA PIPE	9.89	90 deg Ice	50	42.80	2	0	0.00	16.27	60	Bolt Bear
DIAG PST - 2-1/2" DIA PIP	14.64	90 deg Ice	50	68.16	3	0	0.00	34.64	42	Bolt Bear

Max Splice Forces	Force (kip)	Load Case	Capacity (kip)	Use %	Num Bolts	Bolt Type
Top Tension	116.79	60 deg No Ice	0.00	0		
Top Compression	135.91	Normal Ice	0.00	0		
Bot Tension	169.25	60 deg No Ice	368.63	46	8	1 A325
Bot Compression	195.78	Normal Ice	0.00	0		

© 2007 - 2015 by ATC IP LLC. All rights reserved.

Force/Stress Summary

Section: 7 7 Bot Elev (ft): 120.0 Height (ft): 20.000

Max Compression Member	Force (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fa (ksi)	Member Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PSP - ROHN 5 EH	-115.27	Normal Ice	6.68	100	100	100	43.6	33.8	206.29	0	0	0.00	0.00	55	Member X
HORIZ PST - 1-1/2" DIA PIP	-9.20	90 deg Ice	5.049	100	100	100	97.2	20.4	16.34	2	0	0.00	18.85	56	Member X
DIAG PX - 2" DIA PIPE	-15.67	90 deg Ice	8.579	99	99	99	133.1	11.2	16.64	3	0	0.00	42.51	94	Member X

Max Tension Member	Force (kip)	Load Case	Fy (ksi)	Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PSP - ROHN 5 EH	97.99	60 deg No Ice	50	244.39	0	0	0.00	0.00	40	Member
HORIZ PST - 1-1/2" DIA PIP	9.32	90 deg Ice	50	31.96	2	0	0.00	15.32	60	Bolt Bear
DIAG PX - 2" DIA PIPE	15.20	90 deg Ice	50	59.20	3	0	0.00	37.20	40	Bolt Bear

Max Splice Forces	Force (kip)	Load Case	Capacity (kip)	Use %	Num Bolts	Bolt Type
Top Tension	58.55	60 deg No Ice	0.00	0		
Top Compression	72.46	Normal Ice	0.00	0		
Bot Tension	116.79	60 deg No Ice	276.47	42	6	1 A325
Bot Compression	135.91	Normal Ice	0.00	0		

Section: 8 8 Bot Elev (ft): 140.0 Height (ft): 20.000

Max Compression Member	Force (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fa (ksi)	Member Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PX - 4" DIA PIPE	-50.35	Normal Ice	6.67	100	100	100	54.1	31.6	139.39	0	0	0.00	0.00	36	Member X
HORIZ PST - 1-1/2" DIA PIP	-7.39	90 deg No Ice	4.340	100	100	100	83.6	24.4	19.48	2	0	0.00	18.85	39	Bolt Bear
DIAG PX - 2" DIA PIPE	-14.54	90 deg Ice	7.963	100	100	100	124.7	12.8	18.94	3	0	0.00	42.51	76	Member X

Max Tension Member	Force (kip)	Load Case	Fy (ksi)	Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PX - 4" DIA PIPE	39.66	60 deg No Ice	50	176.40	0	0	0.00	0.00	22	Member
HORIZ PST - 1-1/2" DIA PIP	7.52	90 deg Ice	50	31.96	2	0	0.00	15.32	49	Bolt Bear
DIAG PX - 2" DIA PIPE	14.23	90 deg Ice	50	59.20	3	0	0.00	37.20	38	Bolt Bear

Max Splice Forces	Force (kip)	Load Case	Capacity (kip)	Use %	Num Bolts	Bolt Type
Top Tension	11.94	60 deg No Ice	0.00	0		
Top Compression	19.17	Normal Ice	0.00	0		
Bot Tension	58.55	60 deg No Ice	184.32	32	4	1 A325
Bot Compression	72.46	Normal Ice	0.00	0		

© 2007 - 2015 by ATC IP LLC. All rights reserved.

Force/Stress Summary

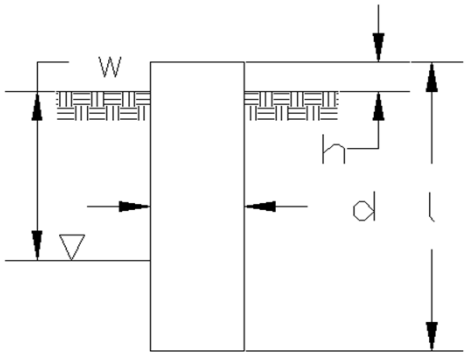
Section: 9 9 **Bot Elev (ft): 160.0** **Height (ft): 20.000**

Max Compression Member	Force (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fa (ksi)	Member Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PST - 3" DIA PIPE	-8.98	Normal Ice	6.67	100	100	100	69.0	28.2	62.82	0	0	0.00	0.00	14	Member X
HORIZ PST - 1-1/2" DIA PIP	-3.56	Normal No Ice	4.299	100	100	100	82.8	24.6	19.65	2	0	0.00	18.85	18	Bolt Bear
DIAG PST - 2" DIA PIPE	-5.87	Normal No Ice	7.940	100	100	100	121.1	13.6	14.53	3	0	0.00	30.03	40	Member X

Max Tension Member	Force (kip)	Load Case	Fy (ksi)	Cap (kip)	Num Bolts	Num Holes	Shear Cap (kip)	Bear Cap (kip)	Use %	Controls
LEG PST - 3" DIA PIPE	3.99	60 deg No Ice	50	89.20	0	0	0.00	0.00	4	Member
HORIZ PST - 1-1/2" DIA PIP	3.14	60 deg No Ice	50	31.96	2	0	0.00	15.32	20	Bolt Bear
DIAG PST - 2" DIA PIPE	5.77	Normal No Ice	50	42.80	3	0	0.00	26.28	21	Bolt Bear

Max Splice Forces	Force (kip)	Load Case	Capacity (kip)	Use %	Num Bolts	Bolt Type
Top Tension	0.00		0.00	0		
Top Compression	0.44	Normal Ice	0.00	0		
Bot Tension	11.94	60 deg No Ice	141.12	8	4	7/8 A325
Bot Compression	19.17	Normal Ice	0.00	0		

Site Name:	North Madison Volunteer FD, CT	*Program Last Updated:*	*5/13/2014*
Site Number:	CT-9014	*American Tower Corporation*	
Engineer:	R. Barrett		
Engineering Number:	61768322		
Date:	06/11/15		



Design Base Loads (Unfactored) - Analysis per TIA-222-F Standards

Analyze or Design a Foundation?	Analyze	
Foundation Mapped:	N	
Moment (M):	0.0	k-ft
Shear/Leg (V):	46.7	k
Compression/Leg (P):	410.0	k
Uplift/Leg (U):	350.0	k
Tower Type (GT / SST / MP):	SST	
Diameter of Caisson (d):	6.0	ft
Caisson Embedment (L-h):	18.0	ft
Caisson Height Above Ground (h):	0.5	ft
Depth Below Ground Surface to Water Table (w):	2.5	ft
Unit Weight of Concrete:	150.0	pcf
Unit Weight of Water:	62.4	pcf
Tension Skin Friction/Compression Skin Friction:	1.00	
Pullout Angle:	35.0	degrees

Engineer Notes

Soil Mechanical Properties

Depth (ft) Top	Depth (ft) Bottom	γ_{Soil} (pcf)	Cohesion (psf)	ϕ (degree)	Allowable Skin Friction (psf)	Allowable Bearing Pressure (psf)
0.0	2.0	125	0	0	0	0
2.0	10.0	125	625		156.5	
10.0	14.0	135	6250		1562.5	18359.5
14.0	19.0	145	8000		2500	18359.5

Volume of Concrete:	523.1	ft^3 =	19.4 yd^3
Weight of Concrete (Buoyancy Effect Considered):	51.1	k	
Average Soil Unit Weight:	91.8	pcf	
Skin Friction Resistance:	329.9	k	
Compressive Bearing Resistance:	519.1	k	
Pullout Weight (Minus Concrete Weight):	647.7	k	
Allowable Uplift Capacity (U_{Allow}):	349.4	k	
Allowable Compressive Capacity (P_{Allow}):	849.0	k	
Compressive Design Load (P):	412.3	k	
U / U_{Allow}:	1.00	Result:	Acceptable Overstress
P / P_{Allow}:	0.49	Result:	OK
Total Lateral Resistance:	2200.6	k	
Inflection Point (Below Ground Surface):	14.3	ft	
Design Overturning Moment At Inflection Point (M_D):	692.8	k-ft	
Nominal Moment Capacity (M_{Allow}):	5658.9	k-ft	
M_{Allow} / M_D Factor of Safety:	8.17	Result:	OK

Lateral Capacity

Depth (ft)		γ_{Soil}	Cohesion	ϕ
Top	Bottom	(pcf)	(psf)	(degree)
0.0	2.3	125	0	0
2.3	4.5	125	625	0
4.5	6.8	63	625	0
6.8	9.0	63	625	0
9.0	11.3	63	625	0
11.3	13.5	73	6250	0
13.5	15.8	73	6250	0
15.8	18.0	83	8000	0

Overburden (psf)		Bearing Pressure (psf)		Resistance
Top	Bottom	Top	Bottom	(k)
0	281	0	675	4.56
281	563	4675	5350	67.67
563	703	5350	5688	74.51
703	844	5688	6026	79.07
844	985	6026	6364	83.63
985	1148	42364	42756	574.56
1148	1312	42756	43148	579.85
1312	1498	54348	54794	736.71

	Σ Forces		IP Section
(k)	(k)	(k)	
-2247.3	0.0	2200.56	N
-2238.1	4.6	2196.01	N
-2102.8	72.2	2128.34	N
-1953.8	146.7	2053.83	N
-1795.6	225.8	1974.76	N
-1628.4	309.4	1891.13	N
-479.3	884.0	1316.57	Y
680.5	1463.9	736.71	N

	Add. Force	Add. Length	IP
	(k)	(ft)	(ft)
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00
147.29	216.28	0.84	14.34
0.00	0.00	0.00	0.00

		Force / Sec.	
(k)	(k)	(k)	(k)
4.56	0.00	0.00	0.00
67.67	0.00	0.00	0.00
74.51	0.00	0.00	0.00
79.07	0.00	0.00	0.00
83.63	0.00	0.00	0.00
574.56	0.00	0.00	0.00
0.00	0.00	216.28	363.57
0.00	736.71	0.00	0.00

	Distance to Inflection Point			Σ RM
(ft)	(ft)	(ft)	(ft)	(k-ft)
13.21	0.00	0.00	0.00	60.2
10.96	0.00	0.00	0.00	741.9
8.71	0.00	0.00	0.00	649.3
6.46	0.00	0.00	0.00	511.1
4.21	0.00	0.00	0.00	352.5
1.96	0.00	0.00	0.00	1128.6
0.00	0.00	0.42	0.71	347.2
0.00	2.54	0.00	0.00	1868.1

Total Lateral Resistance:	2200.6	k
Inflection Point (Below G	14.3	ft
Design Overturning Mon	692.8	k-ft
Nominal Moment Capac	5658.9	k-ft
M_{Allow} / M_D:	8.2	Result: OK

Negative V_u	Positive V_u	Depth (ft)	Σ V_u (k)	Σ M_u (k-ft)	Σ V_u (k)	M_u (k-ft)
-46.69		0.0	46.69	6130.1	46.69	23.3
0.00	4.56	-2.3	-4.56	6177.5	-0.02	23.5
0.00	67.67	-4.5	-72.23	6091.1	-0.28	23.2
0.00	74.51	-6.8	-146.73	5844.8	-0.56	22.3
0.00	79.07	-9.0	-225.80	5425.7	-0.86	20.7
0.00	83.63	-11.3	-309.44	4823.5	-1.18	18.4
0.00	574.56	-13.5	-884.00	3480.9	-3.37	13.3
-363.57	216.28	-15.8	-736.71	1657.6	-2.81	6.3
-736.71	0.00	-18.0	0.00	0	0.00	0.0

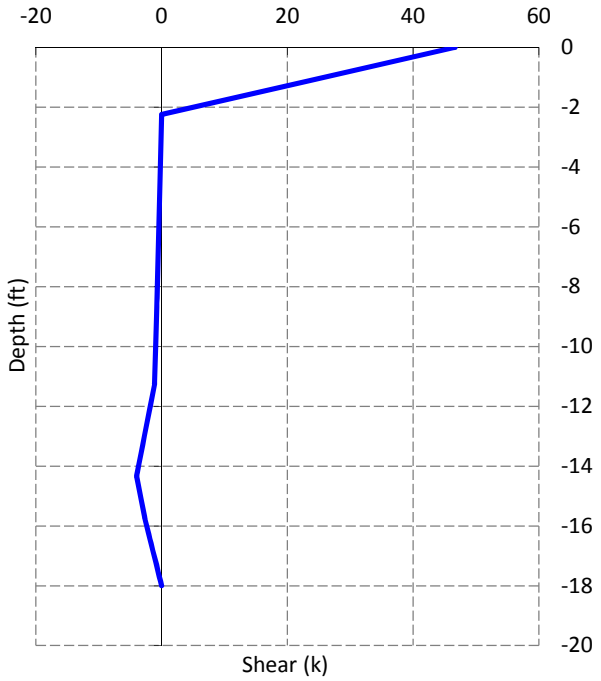
0.0		
0.0		
0.0		
-2.3	0	
-2.3		
-2.3		
-4.5	0	
-4.5		
-4.5		
-6.8	0	
-6.8		
-6.8		
-9.0	0	
-9.0		
-9.0		
-11.3	0	
-11.3		
-11.3		
-13.5	0	
-14.3		
-14.3		-363.5704
-15.8	0.00	
-15.8		
-15.8		
-18.0	-736.71	

Negative V_u

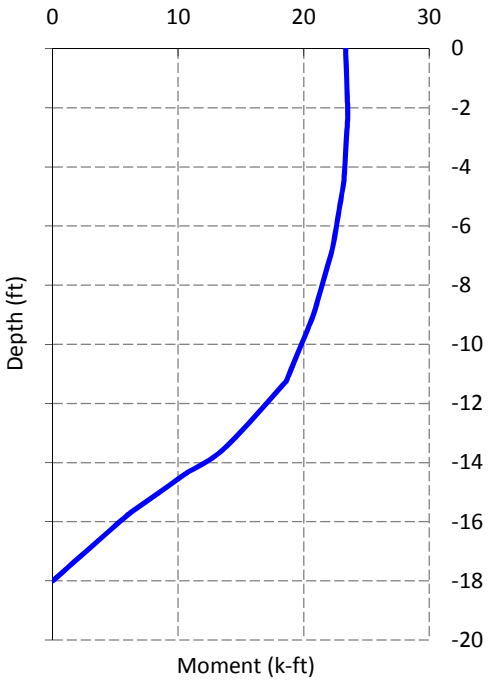
Caisson Strength Capacity

Concrete Compressive Strength (f'_c):	3000	psi
Vertical Steel Rebar Size #:	9	
Vertical Steel Rebar Area:	1.00	in^2
Design # of Vertical Steel Rebars:	28	
Vertical Steel Rebar Yield Strength (F_y):	60	ksi
Horizontal Tie / Stirrup Size #:	5	
Horizontal Tie / Stirrup Area:	0.31	in^2
Design Horizontal Tie / Stirrup Spacing:	10.0	in
Horizontal Tie / Stirrup Steel Yield Strength (F_y):	60	ksi
Rebar Cage Diameter:	64.0	in
Strength Bending/Tension Reduction Factor (ϕ_B):	0.90	ACI318-05 - 9.3.2.1
Strength Shear Reduction Factor (ϕ_V):	0.75	ACI318-05 - 9.3.2.3
Strength Compression Reduction Factor (ϕ_V):	0.65	ACI318-05 - 9.3.2.2
Wind Design Factor:	1.30	ACI318-05 - 9.2.1
Steel Elastic Modulus:	29000	ksi
Design Moment (M_u):	303.5	k-ft
Nominal Moment Capacity ($\phi_B M_n$):	3944.2	k-ft - ACI318-005 - 10.2
$M_u/\phi_B M_n$:	0.08	Result: OK
Design Shear (V_u):	60.7	k
Nominal Shear Capacity ($\phi_V V_n$):	320.1	k - ACI318-05 - 11.3.1.1 or 11.5.7.2
$V_u/\phi_V V_n$:	0.19	Result: OK
Design Tension (T_u):	454.9	k
Nominal Tension Capacity ($\phi_T T_n$):	1512.0	k - ACI318-05 - 10.2
$T_u/\phi_T T_n$:	0.30	Result: OK
Design Compression (P_u):	536.0	k
Nominal Compression Capacity ($\phi_P P_n$):	5361.7	k - ACI318-05 - 10.3.6.2
$P_u/\phi_P P_n$:	0.10	Result: OK
Bending Reinforcement Ratio:	0.007	ACI318-05 - 10.8.4 & 10.9.1
$M_u/\phi_B M_n + T_u/\phi_T T_n$:	0.38	Result: OK

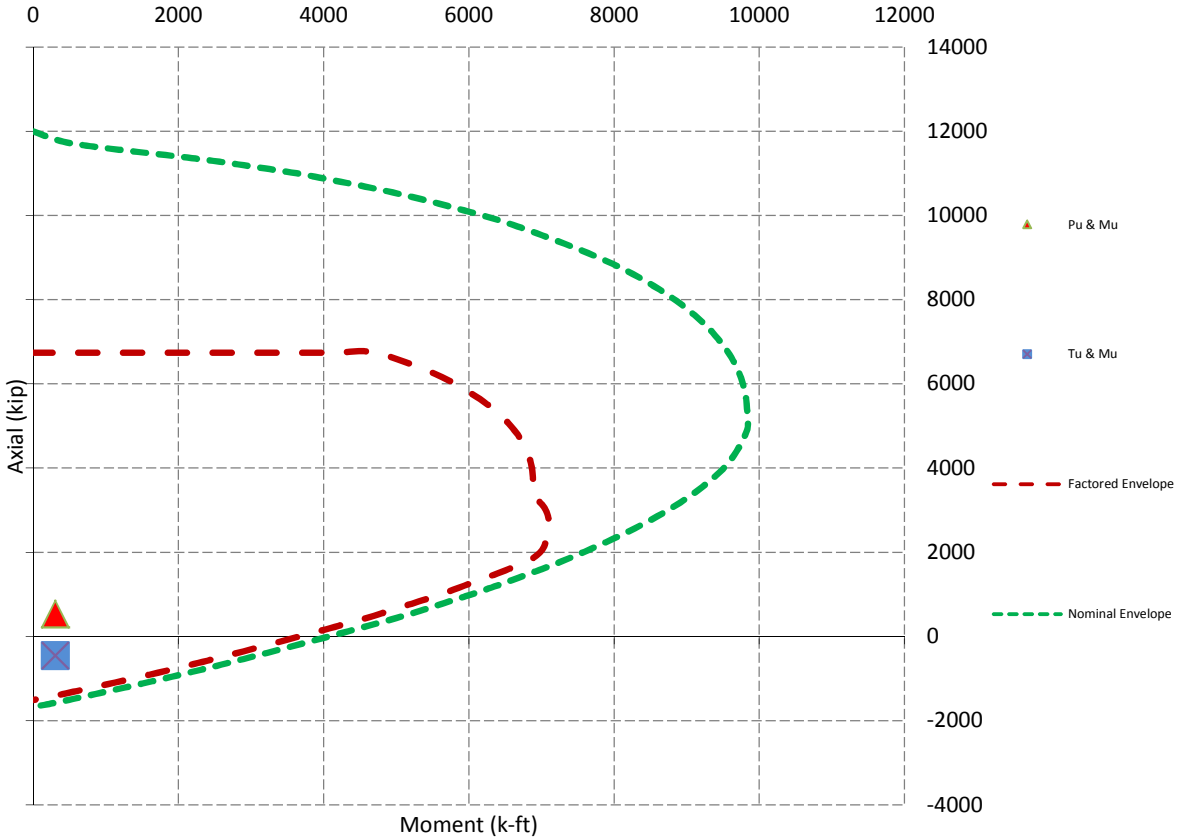
Design Unfactored Shear / Depth



Design Unfactored Moment / Depth



Nominal and Factored Moment Capacity and Factored Design Loads



SITE NAME: NORTH MADISON

846 OPENING HILL ROAD
MADISON, CT 06443

SITE NUMBER: CT11394A
L700 - 704G CONFIGURATION

T-MOBILE TECHNICIAN SITE SAFETY NOTES

LOCATION	SPECIAL RESTRICTIONS
SECTOR A:	ACCESS NOT PERMITTED
SECTOR B:	ACCESS NOT PERMITTED
SECTOR C:	ACCESS NOT PERMITTED
GPS/LMU:	UNRESTRICTED
RADIO CABINETS:	UNRESTRICTED
PPC DISCONNECT:	UNRESTRICTED
MAIN CIRCUIT D/C:	UNRESTRICTED
NIU/T DEMARC:	UNRESTRICTED
OTHER/SPECIAL:	NONE

GENERAL NOTES

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

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

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

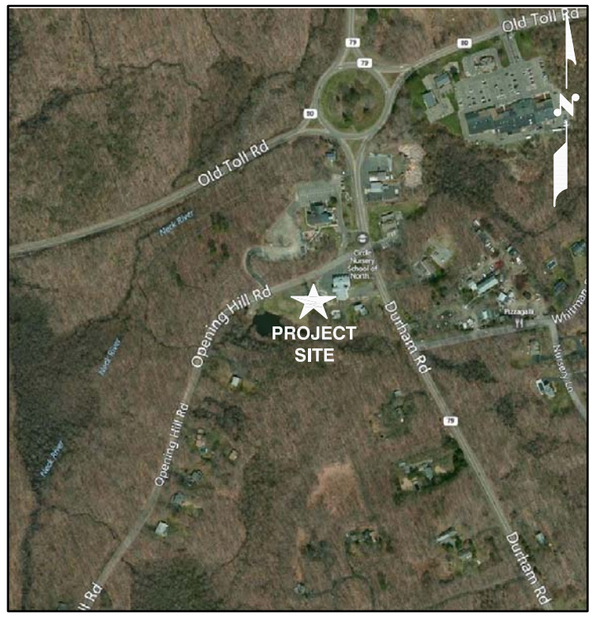
SPECIAL STRUCTURAL NOTES

1. **STRUCTURAL DESIGNS AND DETAILS FOR ANTENNA MOUNTS COMPLETED BY HUDSON DESIGN ON BEHALF OF T–MOBILE ARE INCLUSIVE OF THE ENTIRE ANTENNA SUPPORT STRUCTURE (GLOBAL STRUCTURAL STABILITY ANALYSIS BY OTHERS), EXISTING TOWER PLATFORM, EXISTING ANTENNA MOUNTS AND ALL OTHER ASPECTS OF THE STRUCTURE THAT WILL SUPPORT THE T–MOBILE MODERNIZATION EQUIPMENT DEPLOYMENT AS DEPICTED HEREIN.**

2. **HUDSON DESIGN ASSUMES THAT THE TOWER IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES**

APPROVALS

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



CALL
BEFORE YOU DIG
CALL TOLL FREE 800–922–4455
OR CALL 811
UNDERGROUND SERVICE ALERT

PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T–MOBILE EQUIPMENT MODERNIZATION
ZONING JURISDICTION:	BASED ON INFORMATION PROVIDED BY T–MOBILE, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS AN ELIGIBLE FACILITY UNDER THE TAX RELIEF ACT OF 2012, 47 USC 1455(A), AND IS SUBJECT TO AN EXPEDITED ELIGIBLE FACILITIES REQUEST/REVIEW AND ZONING PRE–EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW).
SITE ADDRESS:	864 OPENING HILL ROAD MADISON, CT 06443
LATITUDE:	41° 21' 26.38" N
LONGITUDE:	72° 38' 19.54" W
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

DRAWING INDEX

		REV
T-1	TITLE SHEET	1
GN-1	GENERAL NOTES	1
A-1	COMPOUND & ELEVATION PLAN	1
A-2	ANTENNA PLAN & DETAILS	1
G-1	GROUNDING DETAILS	1

T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 648–1116

Transcend Wireless

TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH, NJ 07430
TEL: (201) 684-0055
FAX:(201) 684-0066

Hudson Design Group LLC

1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

Daniel P. Hamm

APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE

PROJECT NO:	CT11394A
DRAWN BY:	MH
CHECKED BY:	DR

1	05/05/15	ISSUED FOR CONSTRUCTION
0	02/17/15	ISSUED FOR REVIEW

SITE NUMBER: CT11394A
SITE NAME:
NORTH MADISON
864 OPENING HILL ROAD
MADISON, CT 06443

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T–1

GROUNDING NOTES

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

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

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

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

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

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

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

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

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

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

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

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

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

CONTRACTOR – TRANSCEND WIRELESS
SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
OWNER – T-MOBILE

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

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

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

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

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

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

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

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

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

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

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

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

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

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

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

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

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

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

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

BUILDING CODE: IBC 2003 W/ 2005 CT SUPPLEMENT + 2009 & 2013 AMENDMENT
ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS

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

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

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL

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

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

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	G.C.	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
AWG	AMERICAN WIRE GAUGE	MGB	MASTER GROUND BUS		
BCW	BARE COPPER WIRE	MIN	MINIMUM	TBD	TO BE DETERMINED
BTS	BASE TRANSCEIVER STATION	PROPOSED	NEW	TBR	TO BE REMOVED
EXISTING	EXISTING	N.T.S.	NOT TO SCALE	TBRR	TO BE REMOVED AND REPLACED
EG	EQUIPMENT GROUND	REF	REFERENCE	TYP	TYPICAL
EGR	EQUIPMENT GROUND RING	REQ	REQUIRED		

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

Transcend Wireless
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH, NJ 07430
TEL: (201) 684-0055
FAX:(201) 684-0066

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

Daniel P. Hamm

APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE

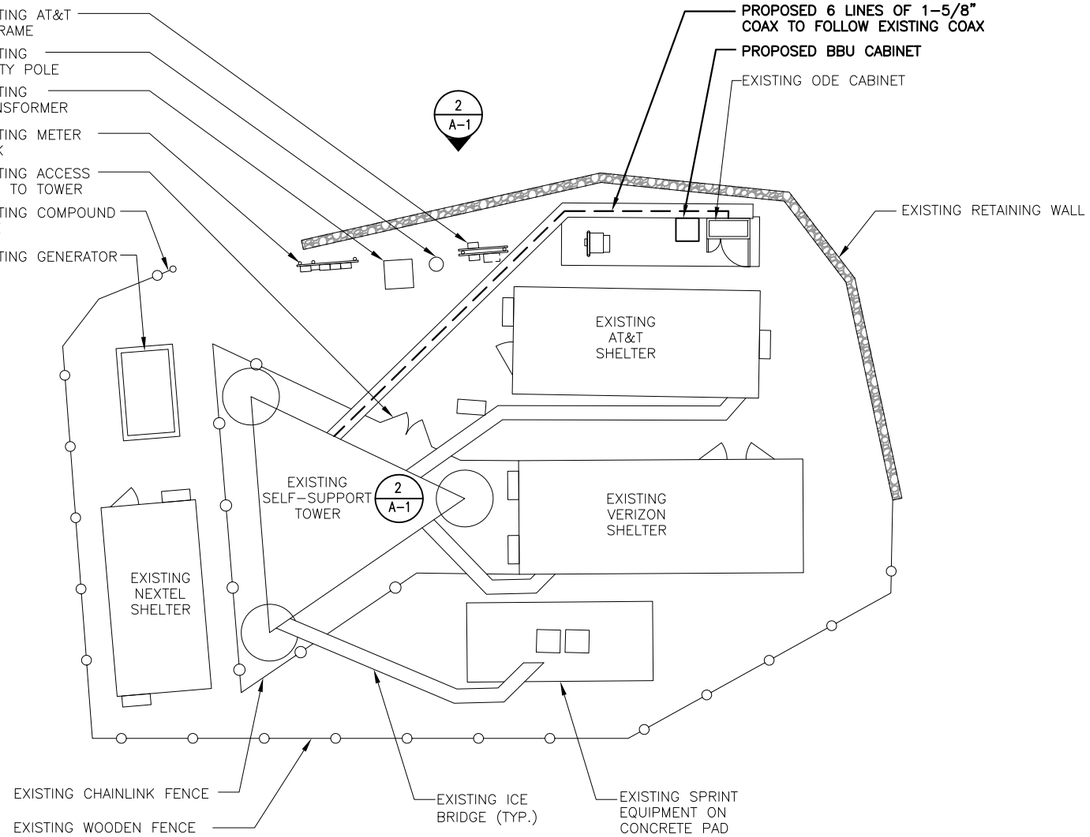
PROJECT NO: CT11394A
DRAWN BY: MH
CHECKED BY: DR

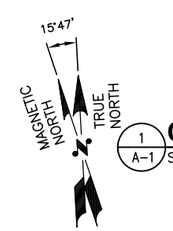
1	05/05/15	ISSUED FOR CONSTRUCTION
0	02/17/15	ISSUED FOR REVIEW

SITE NUMBER: CT11394A
SITE NAME:
NORTH MADISON
864 OPENING HILL ROAD
MADISON, CT 06443

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-1

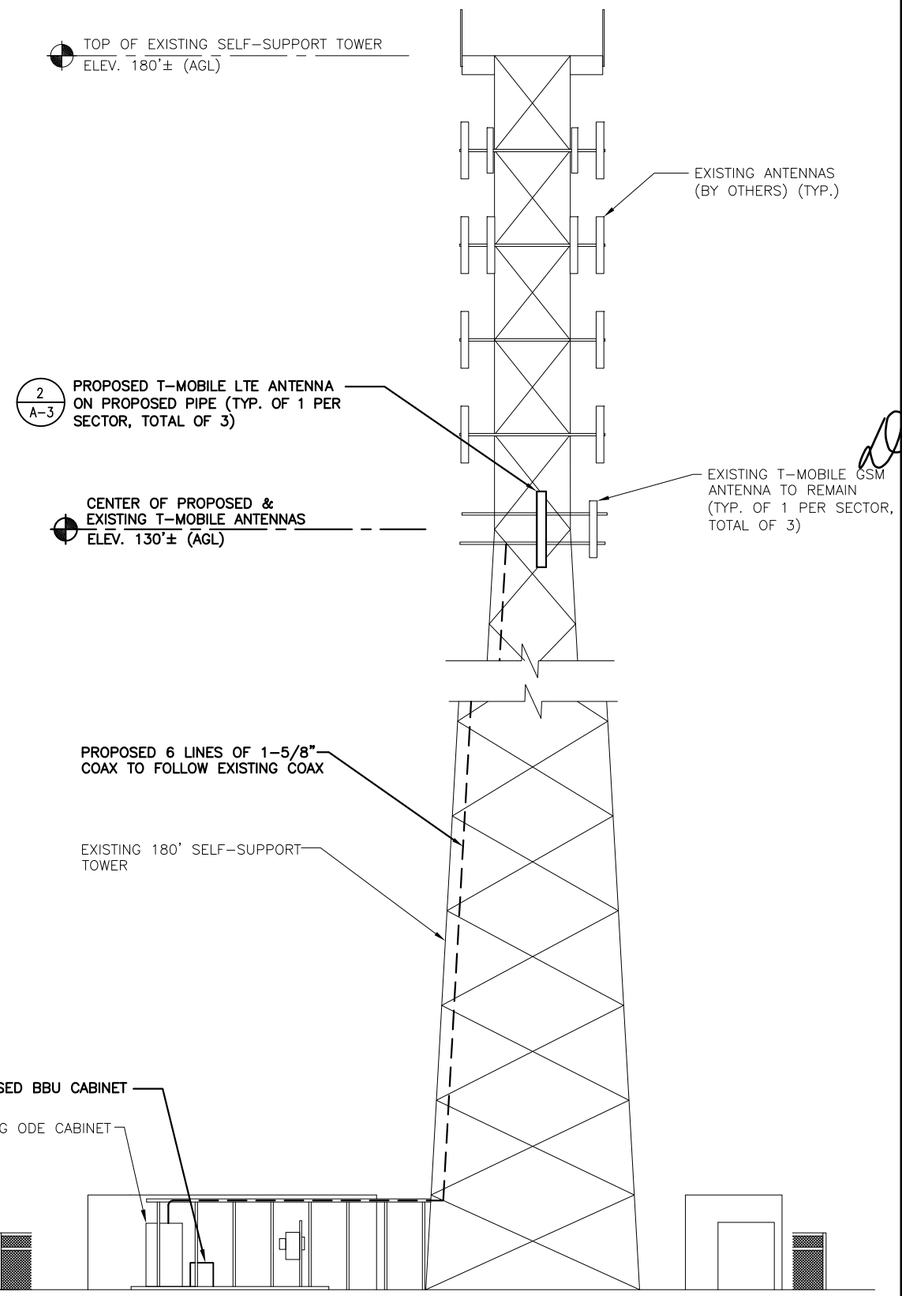




1 A-1 **COMPOUND PLAN**
SCALE: 1/8"=1'-0"

0 4'-0" 8'-0" 16'-0" 24'-0"

STRUCTURAL NOTE:
ADDITIONAL TOWER MAPPING AND STRUCTURAL ANALYSIS ARE REQUIRED PRIOR TO CONSTRUCTION. DRAWINGS ARE SUBJECT TO CHANGE PENDING OUTCOME OF STRUCTURAL ANALYSIS.



2 A-1 **SOUTHWEST ELEVATION**
SCALE: 1/8"=1'-0"

0 4'-0" 8'-0" 16'-0" 24'-0"

L700 - 704G CONFIGURATION

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

Transcend Wireless
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH, NJ 07430
TEL: (201) 684-0055
FAX:(201) 684-0066

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

Daniel P. Hamm

APPROVALS

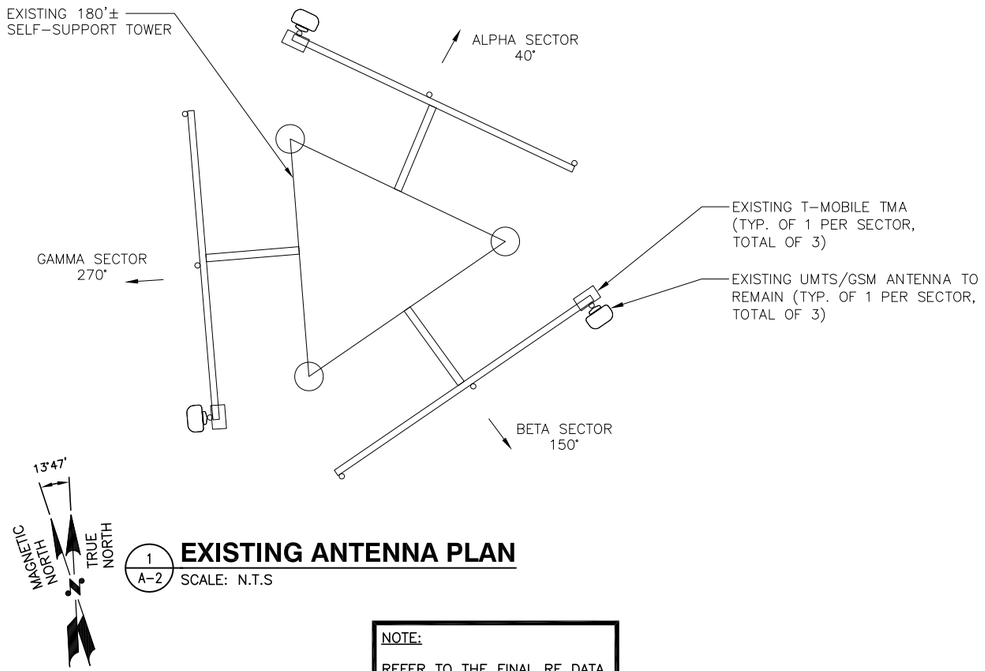
CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE
PROJECT NO:	CT11394A
DRAWN BY:	MH
CHECKED BY:	DR

1	05/05/15	ISSUED FOR CONSTRUCTION
0	02/17/15	ISSUED FOR REVIEW

SITE NUMBER: CT11394A
SITE NAME:
NORTH MADISON
864 OPENING HILL ROAD
MADISON, CT 06443

SHEET TITLE
COMPOUND PLAN & ELEVATION

SHEET NUMBER
A-1

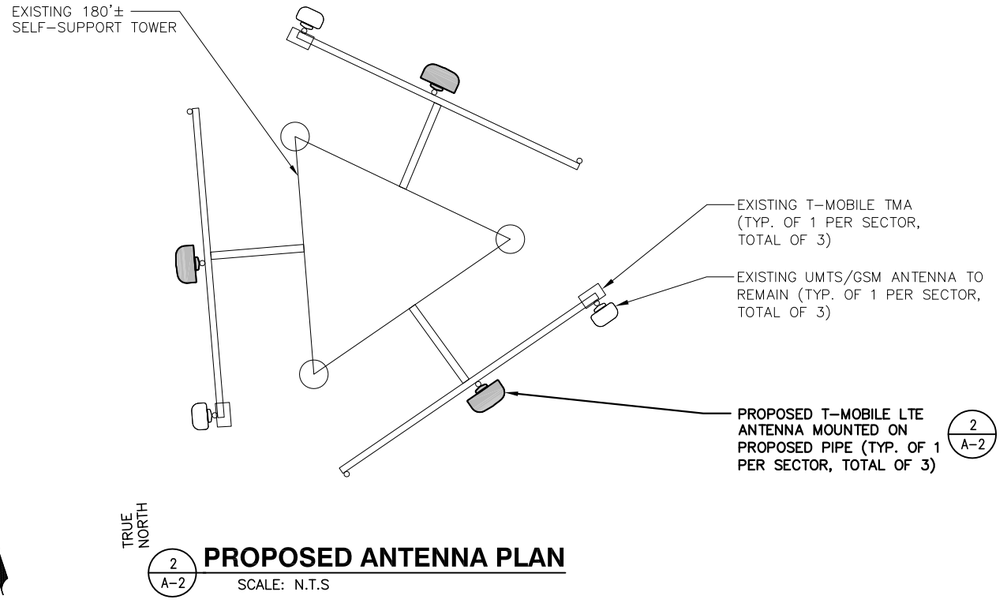


1 / A-2 **EXISTING ANTENNA PLAN**

SCALE: N.T.S

NOTE:

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



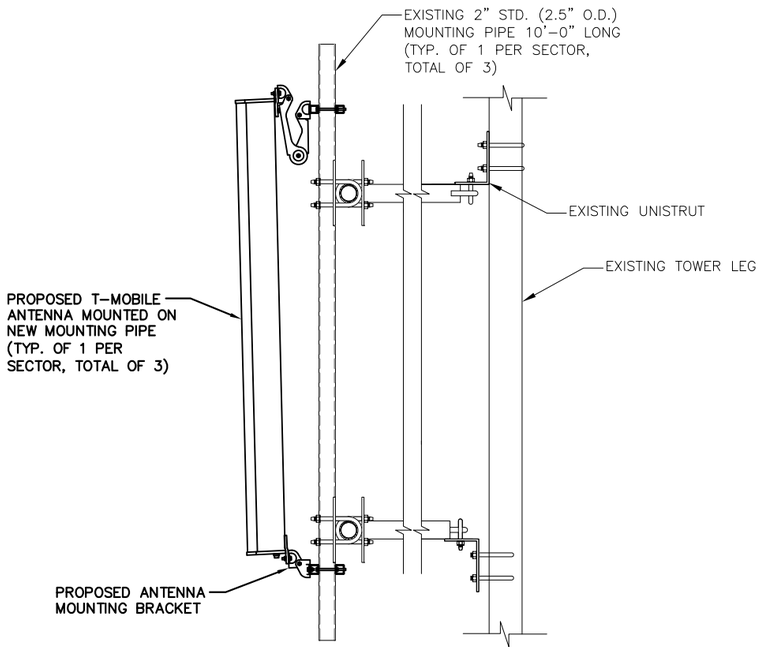
2 / A-2 **PROPOSED ANTENNA PLAN**

SCALE: N.T.S

STRUCTURAL NOTE:
ADDITIONAL TOWER MAPPING AND STRUCTURAL ANALYSIS ARE REQUIRED PRIOR TO CONSTRUCTION. DRAWINGS ARE SUBJECT TO CHANGE PENDING OUTCOME OF STRUCTURAL ANALYSIS.

PROPOSED ANTENNA SCHEDULE

SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA:	COMMSCOPE	LNX-6515DS-VTM	96.4x11.9x7.1
BETA:	COMMSCOPE	LNX-6515DS-VTM	96.4X11.9X7.1
GAMMA:	COMMSCOPE	LNX-6515DS-VTM	96.4X11.9X7.1



2 / A-2 **ANTENNA MOUNT (TYP.)**

SCALE: N.T.S.

T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 648-1116

Transcend Wireless

TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH, NJ 07430
TEL: (201) 684-0055
FAX:(201) 684-0066

Hudson Design Group LLC

1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

Daniel P. Hamm

APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE
PROJECT NO:	CT11394A
DRAWN BY:	MH
CHECKED BY:	DR

1	05/05/15	ISSUED FOR CONSTRUCTION
0	02/17/15	ISSUED FOR REVIEW

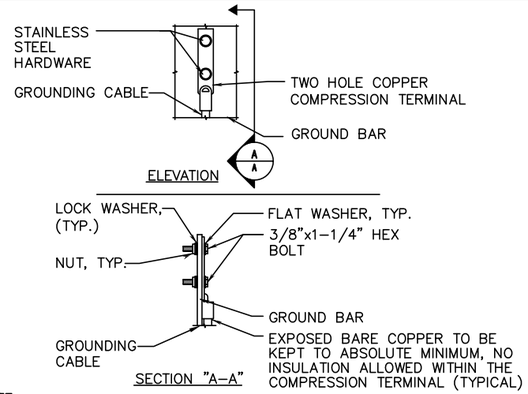
SITE NUMBER: CT11394A
SITE NAME:
NORTH MADISON
864 OPENING HILL ROAD
MADISON, CT 06443

SHEET TITLE

ANTENNA PLAN & DETAILS

SHEET NUMBER

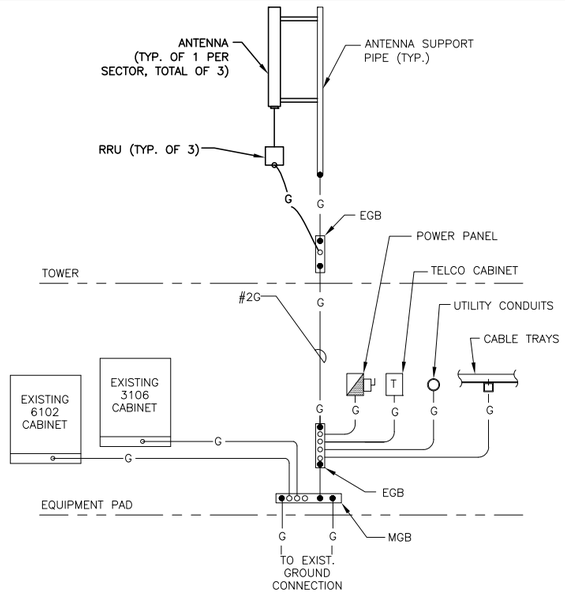
A-2



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

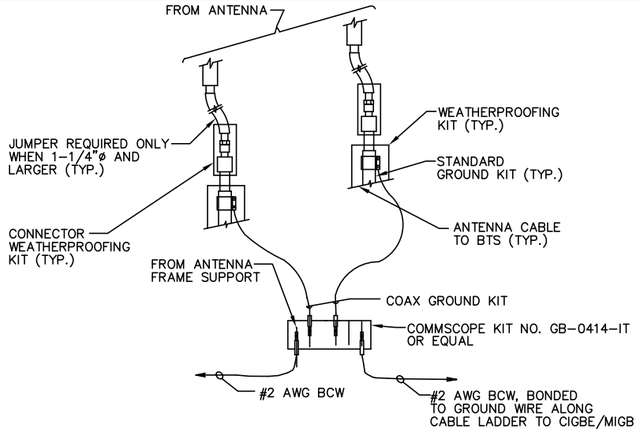
TYPICAL GROUND BAR CONNECTION DETAIL

1 / G-1 N.T.S.



GROUNDING RISER DIAGRAM

2 / G-1 N.T.S.

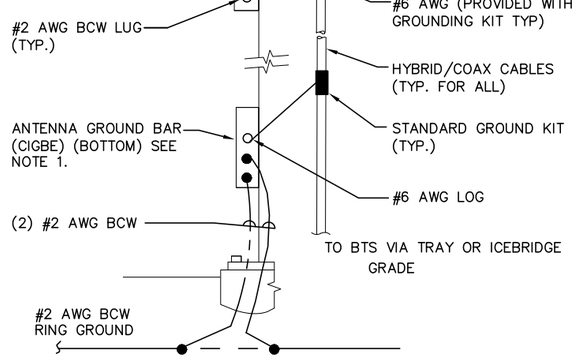


NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

3 / G-1 N.T.S.



NOTE:

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

ANTENNA CABLE GROUNDING

5 / G-1 N.T.S.

T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 648-1116

Transcend Wireless

TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH, NJ 07430
TEL: (201) 684-0055
FAX:(201) 684-0066

Hudson Design Group LLC

1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

Daniel P. Hamm

APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE
PROJECT NO:	CT11394A
DRAWN BY:	MH
CHECKED BY:	DR

1	05/05/15	ISSUED FOR CONSTRUCTION
0	02/17/15	ISSUED FOR REVIEW

SITE NUMBER: CT11394A
SITE NAME: NORTH MADISON
864 OPENING HILL ROAD
MADISON, CT 06443

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

G-1