Filed by:
Kri Pelletier, Property Specialist - SBA Communications
33 Boston Post Road West, Ste 320, Marlborough, MA 01751
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December 2, 2015

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

Notice of Exempt Modification
157 Chestnut Hill Road, Stafford Springs, CT 06076
41.97739 N
-72.38304 W
T-Mobile#: CT11530B_L700

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 177-foot level of the existing 182-foot Self-Support Tower at 157 Chestnut Hill Road. The tower is owned by SBA Towers V, LLC. The property is owned by Troiano Realty. T-Mobile now intends to install three (3) new L700MHz antennas. These antennas would be installed at the 177-foot level of the tower. T-Mobile also intends to:

Remove:

- Entitlements to (6) EMS panel antennas

Remove and Replace:

- Remove (3) existing antenna mounts and replace with (3) new CommScope SF-HPM3 T-arms
- Remove (3) existing EMS panel antennas and replace with (3) new CommScope LNX-6515DS panel antennas
- Remove (3) Tower Mounted Amplifiers and replace with (3) new Ericsson KRY 112 TMAs

Install:

- (1) Battery Backup Unit
- (6) 1-5/8" Coax Lines
- (3) RFS APXV18 Panel Antennas
- (3) Commscope Smart Bias-T

Existing Equipment to Remain (Entitlements):

- (1) 6201 ODE Equipment cabinet
- (1) Purcell Cabinet
- (6) 1-5/8" Coax Lines
- (3) Tower Mounted Amplifiers

This facility was approved by the Council on September 11, 2001. SBA acquired this site, and does not hold record of the original decision. We are unable to locate same within the CSC's docket database. The mounting of antennas is in keeping with all others on the tower, as is the number of proposed antennas at 177-feet by comparison with the other carriers' arrays.

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

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

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

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

Sincerely,

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

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

Attachments

cc: First Selectman Anthony Frassinelli–as elected official
Troiano Realty–as property owner

POWER DENSITY

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APXV18-206516S-C-A20	Make / Model:	RFS APXV18-206516S-C-A20	Make / Model:	RFS APXV18-206516S-C-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	177	Height (AGL):	177	Height (AGL):	177
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):	6,519.45	ERP (W):	6,519.45	ERP (W):	6,519.45
Antenna A1 MPE%	0.80	Antenna B1 MPE%	0.80	Antenna C1 MPE%	0.80
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):	175	Height (AGL):	175	Height (AGL):	175
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):	676.27	ERP (W):	676.27	ERP (W):	676.27
Antenna A2 MPE%	0.18	Antenna B2 MPE%	0.18	Antenna C2 MPE%	0.18

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	0.98 %
Verizon Wireless	2.96 %
AT&T	1.43 %
Site Total MPE %:	**5.37 %**

T-Mobile Sector 1 Total:	0.98 %
T-Mobile Sector 2 Total:	0.98 %
T-Mobile Sector 3 Total:	0.98 %
Site Total:	5.37 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	2	1629.86	177	4.01	1900	1000	0.40 %
T-Mobile 1900 MHz (PCS) GSM	2	814.93	177	2.00	1900	1000	0.20 %
T-Mobile 1900 MHz (PCS) UMTS	2	814.93	177	2.00	1900	1000	0.20 %
T-Mobile 700 MHz LTE	1	676.27	175	2.06	700	467	0.18 %
						Total:	0.98%

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

T-Mobile Existing Facility

Site ID: CT11530B

Tower Ventures- Stafford
157 Chestnut Street
Stafford, CT 06076

November 18, 2015

EBI Project Number: 6215005809

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	5.37 %

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

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November 18, 2015

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

Emissions Analysis for Site: **CT11530B – Tower Ventures- Stafford**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **157 Chestnut Street, Stafford, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the PCS 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 **157 Chestnut Street, Stafford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM / UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

2) 2 UMTS channels (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) Since the radios are ground mounted there are additional cabling losses accounted for. For each RF path the following losses were calculated. 1.07 dB of additional cable loss at 700 MHz and 1.96 dB of additional cable loss at 1900 MHz. This is based on manufacturers Specifications for 190 feet of 1-5/8" coax cable on each path.

6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

7) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **RFS APXV18-206516S-C-A20** 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 **RFS APXV18-206516S-C-A20** has a maximum gain of **16.3 dBd** at its main lobe at 1900 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe at 700 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerlines of the proposed antennas are **175 & 177 feet** above ground level (AGL).

10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APXV18-206516S-C-A20	Make / Model:	RFS APXV18-206516S-C-A20	Make / Model:	RFS APXV18-206516S-C-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	177	Height (AGL):	177	Height (AGL):	177
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):	6,519.45	ERP (W):	6,519.45	ERP (W):	6,519.45
Antenna A1 MPE%	0.80	Antenna B1 MPE%	0.80	Antenna C1 MPE%	0.80
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):	175	Height (AGL):	175	Height (AGL):	175
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):	676.27	ERP (W):	676.27	ERP (W):	676.27
Antenna A2 MPE%	0.18	Antenna B2 MPE%	0.18	Antenna C2 MPE%	0.18

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**0.98 %**
Verizon Wireless	2.96 %
AT&T	1.43 %
Site Total MPE %:	**5.37 %**

T-Mobile Sector 1 Total:	0.98 %
T-Mobile Sector 2 Total:	0.98 %
T-Mobile Sector 3 Total:	0.98 %
Site Total:	5.37 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	**2**	**1629.86**	**177**	**4.01**	**1900**	**1000**	**0.40 %**
T-Mobile 1900 MHz (PCS) GSM	**2**	**814.93**	**177**	**2.00**	**1900**	**1000**	**0.20 %**
T-Mobile 1900 MHz (PCS) UMTS	**2**	**814.93**	**177**	**2.00**	**1900**	**1000**	**0.20 %**
T-Mobile 700 MHz LTE	**1**	**676.27**	**175**	**2.06**	**700**	**467**	**0.18 %**
						Total:	**0.98%**

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Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	0.98 %
Sector 2:	0.98 %
Sector 3 :	0.98 %
T-Mobile Per Sector Maximum:	0.98 %
Site Total:	5.37 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.37%** 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

9221 Lyndon B. Johnson Freeway, #204, Dallas, TX 75243 ★ PHONE 972-231-8893 ★ FAX 1-866-364-8375
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Tower Structural Analysis Report for
SBA Communications Corporation

Existing 182' Self Supported Tower

SBA Site Name: Troiano Realty
SBA Site ID: CT13617-A-02

Carrier Name: T-Mobile
Carrier Site ID: CT11530B

Site Location:
157 Chestnut Hill Road
Stafford Springs, CT 06076

Latitude: 41.977417°
Longitude: -72.383306°

ACGI Job # 15-4990

ANALYSIS RESULTS		
Tower Components	96.0 %	**Pass**
Tower Base Foundation	63.4 %	**Pass**

Prepared By:
Dejian Xu, EIT

11/11/2015
Approved By:
Joji M. George, P.E.
CT PE # 24444

TABLE OF CONTENTS

1. ANALYSIS SUMMARY

The existing 182' Self Supported Tower located in Stafford Springs, CT was analyzed by Allpro Consulting Group, Inc (ACGI) for the existing loads and the proposed antennas and coaxes as authorized by SBA Communication Corp. Based on the results of the analysis, the existing tower with mentioned proposed and existing loading is found **to be in compliance** with *TIA/EIA-222-F*, *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and IBC 2003 and CSBC 2005.*

2. SCOPE & SOURCE OF INFORMATION

The purpose of this structural analysis is to determine whether the existing structure is capable of supporting additional proposed loads.

SOURCE OF INFORMATION		
Tower Data:	Rohn Industries, Inc. FDH Velocitel	-Original Tower Drawings by Rohn Industries, Inc. (Project # 49944AE, dated 12/17/2001) -Previous Structural Analysis by FDH Velocitel (FDH Project # 15BROJ1400, dated 06/10/2015)
Foundation Data:	Rohn Industries, Inc.	- Existing MAT foundation data is as per original foundation design by Rohn Industries, Inc. (Project # 49944AE, Drawing #A012939, dated 12/18/2001)
Geotechnical Report:	Jaworski Geotech, Inc.	Soil data is as per Geotechnical Report by Jaworski Geotech, Inc. (Project # 01659G, dated 10/19/2001)
Loading Data:	FDH Velocitel SBA and Verizon	-Previous Structural Analysis by FDH Velocitel (FDH Project # 15BROJ1400, dated 06/10/2015) -T-Mobile Collo App # 25382, v4
Authorization:	SBA Communication Corp.	

3. ANALYSIS METHODS & DATA

The analysis was performed in accordance with Telecommunication Industry Association specification TIA/EIA-222-F. The tower was modeled using TNX Tower, a 3-D finite element program. TNX Tower is a general-purpose modeling, analysis, and design program created specifically for communication towers using the EIA-222-C, EIA-222-D, TIA/EIA-222-F or TIA/EIA-222-G standards. The 3-D model included the tower, with existing appurtenances and all proposed loads.

SITE DATA	
SBA Site Name:	Troiano Realty
SBA Site Number:	CT13617-A-02
Carrier Site ID:	T-Mobile, CT11530B
City, State:	Stafford Springs, CT
County:	Tolland County
Code Wind Load Requirement:	ANSI/TIA-222-F (85 mph basic wind speed) IBC 2003/CSBC 2005 (85 mph basic wind speed)
Wind Load Used:	ANSI/TIA-222-F Code: • Basic wind speed of 85 mph (3 second gust wind speed) • A wind speed of 74 mph is used in combination with ice. • Nominal ice thickness of 0.5 in.

TOWER DATA	
Tower Type:	Self-Supported Tower
Height:	182'
Cross Section:	Triangular
Steel Strength:	Legs – 50 ksi , Braces – 36 ksi
Type of Foundation:	Mat Foundation with Pedestals

TOWER HISTORY	
Tower Manufacturer / Model:	Rohn Industries, Inc.
Date of Original Design:	12/17/2001
Previous Modifications:	N/A
Original Design Code Requirements:	ANSI/TIA-222-F

4. CONCLUSIONS

RESULT SUMMARY		
MEMBER	***% Capacity***	***Result***
Legs	**96.0 %**	**Pass**
Diagonals	**80.2 %**	**Pass**
Girt	**9.6 %**	**Pass**
Bolt Checks	**80.2 %**	**Pass**
Foundation (see attached MathCAD for details)	**Safety Factor against Overturning: SF: 2.365 > 1.5 (63.4 %)**	**Pass**
	Soil Pressure: 1.561 ksf < 8.0 ksf (Soil Bearing Capacity) (19.5 %)	**Pass**
	Shear: 38 kips < 65.32 kips (Shear Capacity) (58.2 %)	**Pass**
OVERALL TOWER RATING = 96.0 %		

As per the results of the analysis, the existing tower **is in code compliance** for the proposed and existing antenna loads.

Maximum tower member stress **is less than allowable,** making **it in code compliance** under the EIA/TIA-222-F code and IBC 2003 and CSBC 2005 requirements.

5. DISCLAIMER

Installation procedures and related loading are not within the scope of this analysis. A contractor experienced in similar work should perform all installation work. The engineering services provided by Allpro Consulting Group, Inc. (ACGI) are limited to the computer analysis and calculations of the structure with the proposed and existing loads. This analysis is considered void if the loading mentioned in this report is changed or is different as installed. It is assumed that the existing structure is properly maintained and is in good condition free of any defects. Scope of this analysis does not include existing connections, except as noted in this report. It is assumed that the tower is in good condition and free from damage and defects.

ACGI does not make any warranties, expressed or implied in connection with this engineering analysis report and disclaims any liability arising from deficiencies or any existing conditions of the original structure. ACGI will not be responsible for consequential or incidental damages sustained by any parties as a result of any data or conclusions included in this Report. The maximum liability of ACGI pursuant to this report shall be limited to the consulting fee received for the preparation of the report.

6. APPURTENANCE LISTING

EXISTING LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
177'±	12	EMS RR90-17-02DP	(3) 12' T-Frames	(12) 1-5/8"	T-Mobile
	6	Allen Telecom FE15501P77/75			
169.52'±	9	Powerwave P65-17-XLH	(3) 15' T-Frames	(12) 1-5/8" (1) 3/8" RET Cable (1) 3" Flex Conduit (2) DC Cables	AT&T
	3	KMW AM-X-CD-16-6500T			
	12	ADC ClearGain TMAs			
	6	Ericsson RRUS11 RRUs			
	1	Raycap DC-48-60-18-8F Surge Arrestor			
150'±	6	Commscope SBNHH-1D65B	(3) 12.75' T-Frames	(13) 1-5/8" (2) 1-5/8" Hybrid	Verizon
	4	Antel LPA-80080-4CF-EDIN-2			
	2	Antel LPA-80063-4CF-EDIN-5			
	3	Alcatel Lucent RRH2x60-700U			
	3	Alcatel Lucent RRH2x60-PCS			
	3	Alcatel Lucent RRH2x60-AWS			
	6	RFS FD9R6004/2C-3L Diplexers			
	1	Alcatel Lucent KS24019-L112A			
	1	RFS DB-T1-6Z-8AB-0Z			

FINAL T-MOBILE LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
177'±	**3**	**RFS APXV18-206516S-C-A20**	**(3) SF-HPM3-96 T-Arms**	(12) 1-5/8"	T-Mobile
175'±	**3**	**Commscope LNX-6515DS-VTM**			
	3	Allen Telecom FE15501P77/75M TMA			
	3	**RFS ATMAA1412D-1A20 TMA**			
	3	**Bias T's Kathrein 782 11056**			

Notes:

1. ACGI should be notified of any discrepancies found in the data listed in this report.

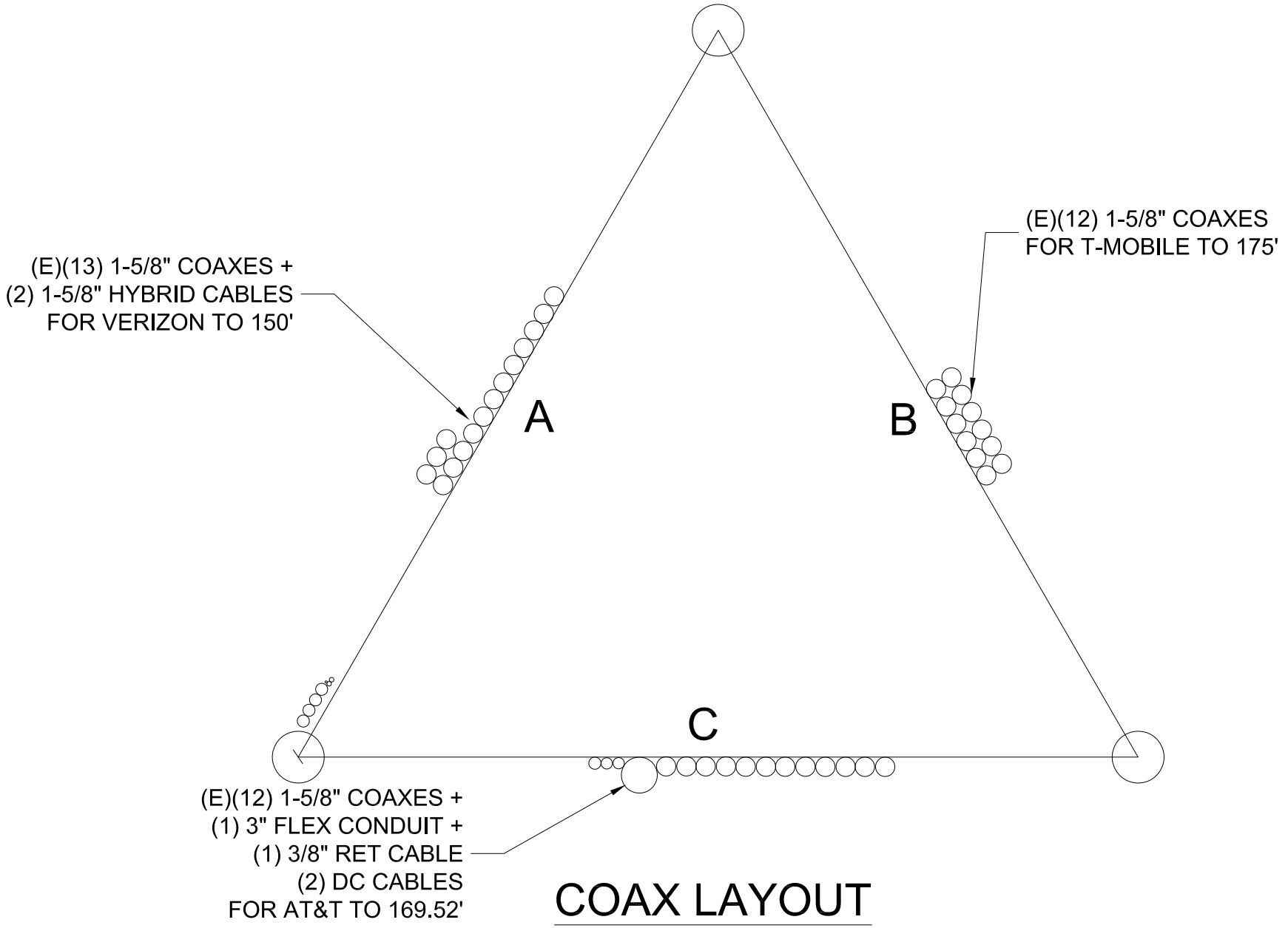
7. SUMMARY OF WORKING PERCENTAGE OF STRUCTURAL COMPONENTS

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
T1	182 - 161.9	Leg	ROHN 2.5 STD	3	-18.02	54.99	32.8	Pass
		Diagonal	L1 3/4x1 3/4x3/16	9	-3.89	10.36	37.6	Pass
							57.3 (b)	
		Top Girt	L1 3/4x1 3/4x3/16	4	-0.20	5.83	3.4	Pass
T2	161.9 - 141.8	Leg	ROHN 3 STD	37	-73.09	76.12	96.0	Pass
		Diagonal	L2x2x1/4	44	-6.89	17.07	40.4	Pass
							80.2 (b)	
T3	141.8 - 121.6	Leg	ROHN 4 EH	70	-114.81	157.39	72.9	Pass
		Diagonal	L2x2x3/16	81	-3.41	11.24	30.3	Pass
							52.3 (b)	
		Top Girt	L1 3/4x1 3/4x3/16	73	-0.55	5.66	9.6	Pass
T4	121.6 - 101.4	Leg	ROHN 5 EH	106	-143.61	218.13	65.8	Pass
							72.1 (b)	
		Diagonal	L2x2x3/16	114	-3.67	7.21	50.9	Pass
							51.9 (b)	
T5	101.4 - 81.1	Leg	ROHN 5 EH	133	-169.04	205.51	82.3	Pass
		Diagonal	L2 1/2x2 1/2x3/16	141	-4.06	10.70	38.0	Pass
							47.3 (b)	
T6	81.1 - 60.9	Leg	ROHN 6 EHS	154	-195.25	235.63	82.9	Pass
		Diagonal	L2 1/2x2 1/2x3/16	162	-4.61	8.35	55.2	Pass
T7	60.9 - 40.7	Leg	ROHN 6 EH	175	-221.33	294.25	75.2	Pass
		Diagonal	L2 1/2x2 1/2x1/4	182	-4.78	6.55	73.0	Pass
T8	40.7 - 20.3	Leg	ROHN 8 EHS	196	-244.03	331.01	73.7	Pass
		Diagonal	L3x3x1/4	204	-5.46	7.84	69.7	Pass
T9	20.3 - 0	Leg	ROHN 8 EH	211	-269.08	433.70	62.0	Pass
		Diagonal	L3 1/2x3 1/2x1/4	224	-7.31	11.58	63.1	Pass
							75.9 (b)	
							Summary	
						Leg (T2)	96.0	Pass
						Diagonal (T2)	80.2	Pass
						Top Girt (T3)	9.6	Pass
						Bolt Checks	80.2	Pass
						RATING =	**96.0**	**Pass**

APPENDIX

COAX LAYOUT

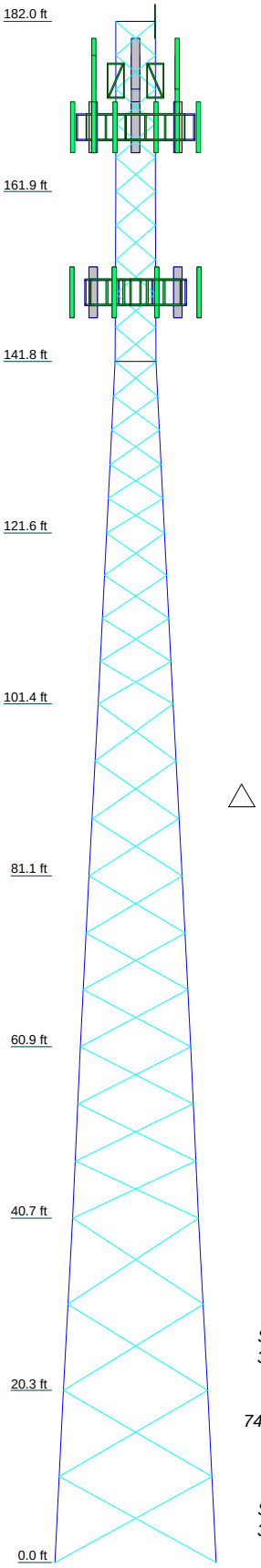


COAX LAYOUT

N.T.S

TOWER ELEVATION DRAWING

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9		
Legs	ROHN 2.5 STD	ROHN 3 STD	ROHN 4 EH	ROHN 5 EH		ROHN 6 EHS	ROHN 6 EH	ROHN 8 EHS	ROHN 8 EH		
Leg Grade	A572-50										
Diagonals	L1 3/4x1 3/4x3/16	L2x2x1/4	L2x2x3/16		L2 1/2x2 1/2x3/16		L2 1/2x2 1/2x1/4	L3x3x1/4	L3 1/2x3 1/2x1/4		
Diagonal Grade	A36										
Top Girts	L1 3/4x1 3/4x3/16	N.A.	L1 3/4x1 3/4x3/16		N.A.						
Face Width (ft)	4.6458	4.6875	4.7604	6.8333	8.8333	10.9167	12.9167	14.8986	16.9896	18.9896	
# Panels @ (ft)	10 @ 4.02		5 @ 4.04	4 @ 5.05	3 @ 6.76667		6 @ 6.73333	2 @ 10.2	2 @ 10.15		
Weight (K)	0.8	1.1	1.5	1.8	2.1	2.4	2.9	3.1	4.1	19.7	



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(E) Lighting Rod	182	(E) Pirod 15' T-Frame Sector Mount (1) (ATI)	169.52
(P) APXV18-206516S-C-A20 (T-Mobile)	177	(3) (E) P65-17-XLH (ATI)	169.52
(P) APXV18-206516S-C-A20 (T-Mobile)	177	(3) (E) P65-17-XLH (ATI)	169.52
(P) APXV18-206516S-C-A20 (T-Mobile)	177	(3) (E) P65-17-XLH (ATI)	169.52
(P) LNX-6515DS-A1M (T-Mobile)	175	(E) AM-X-CD-16-65-00T-RET (ATI)	169.52
(P) LNX-6515DS-A1M (T-Mobile)	175	(2) (E) LPA-80080-4CF-EDIN-2 (Verizon)	150
(E) FE15501P77/75 (T-Mobile)	175	(2) (E) LPA-80080-4CF-EDIN-5 (Verizon)	150
(E) FE15501P77/75 (T-Mobile)	175	(3) (E) RRH2x60 (Verizon)	150
(E) FE15501P77/75 (T-Mobile)	175	(3) (E) RRH2x60 (Verizon)	150
(P) ATMAA1412D-1A20 (T-Mobile)	175	(3) (E) RRH2x60 (Verizon)	150
(P) ATMAA1412D-1A20 (T-Mobile)	175	(2) (E) FD9R6004/1C-3L Diplexer (Verizon)	150
(P) ATMAA1412D-1A20 (T-Mobile)	175	(2) (E) FD9R6004/1C-3L Diplexer (Verizon)	150
(P) Kathrein (T-Mobile)	175	(2) (E) FD9R6004/1C-3L Diplexer (Verizon)	150
(P) Kathrein (T-Mobile)	175	(E) KS24019-L112A GPS (Verizon)	150
(P) Kathrein (T-Mobile)	175	(E) DB-T1-6Z-8AB-0Z (Verizon)	150
(P) LNX-6515DS-A1M (T-Mobile)	175	(E) Pirod 12' PCS T-Frame (1) 104569 (Verizon)	150
(P) SF-HPM3-96 (T-Mobile)	175	(E) Pirod 12' PCS T-Frame (1) 104569 (Verizon)	150
(P) SF-HPM3-96 (T-Mobile)	175	(E) Pirod 12' PCS T-Frame (1) 104569 (Verizon)	150
(P) SF-HPM3-96 (T-Mobile)	175	(2) (E) SBNHH-1D65B (Verizon)	150
(E) AM-X-CD-16-65-00T-RET (ATI)	169.52	(2) (E) SBNHH-1D65B (Verizon)	150
(E) AM-X-CD-16-65-00T-RET (ATI)	169.52	(2) (E) SBNHH-1D65B (Verizon)	150
(4) (E) ADC ClearGain TMAs (ATI)	169.52	(2) (E) LPA-80080-4CF-EDIN-2 (Verizon)	150
(4) (E) ADC ClearGain TMAs (ATI)	169.52		
(4) (E) ADC ClearGain TMAs (ATI)	169.52		
(2) (E) RRUS 11 (ATI)	169.52		
(2) (E) RRUS 11 (ATI)	169.52		
(2) (E) RRUS 11 (ATI)	169.52		
(E) DC6-48-60-18-8F (ATI)	169.52		
(E) Pirod 15' T-Frame Sector Mount (1) (ATI)	169.52		
(E) Pirod 15' T-Frame Sector Mount (1) (ATI)	169.52		

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 Tolland 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 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 60 mph wind.
5. TOWER RATING: 96%

MAX. CORNER REACTIONS AT BASE:
DOWN: 274 K
SHEAR: 22 K

UPLIFT: -234 K
SHEAR: 22 K

AXIAL
57 K
SHEAR 39 K *MOMENT 4184 kip-ft*

TORQUE 1 kip-ft
74 mph WIND - 0.5000 in ICE
AXIAL
35 K
SHEAR 38 K *MOMENT 4115 kip-ft*

TORQUE 2 kip-ft
REACTIONS - 85 mph WIND

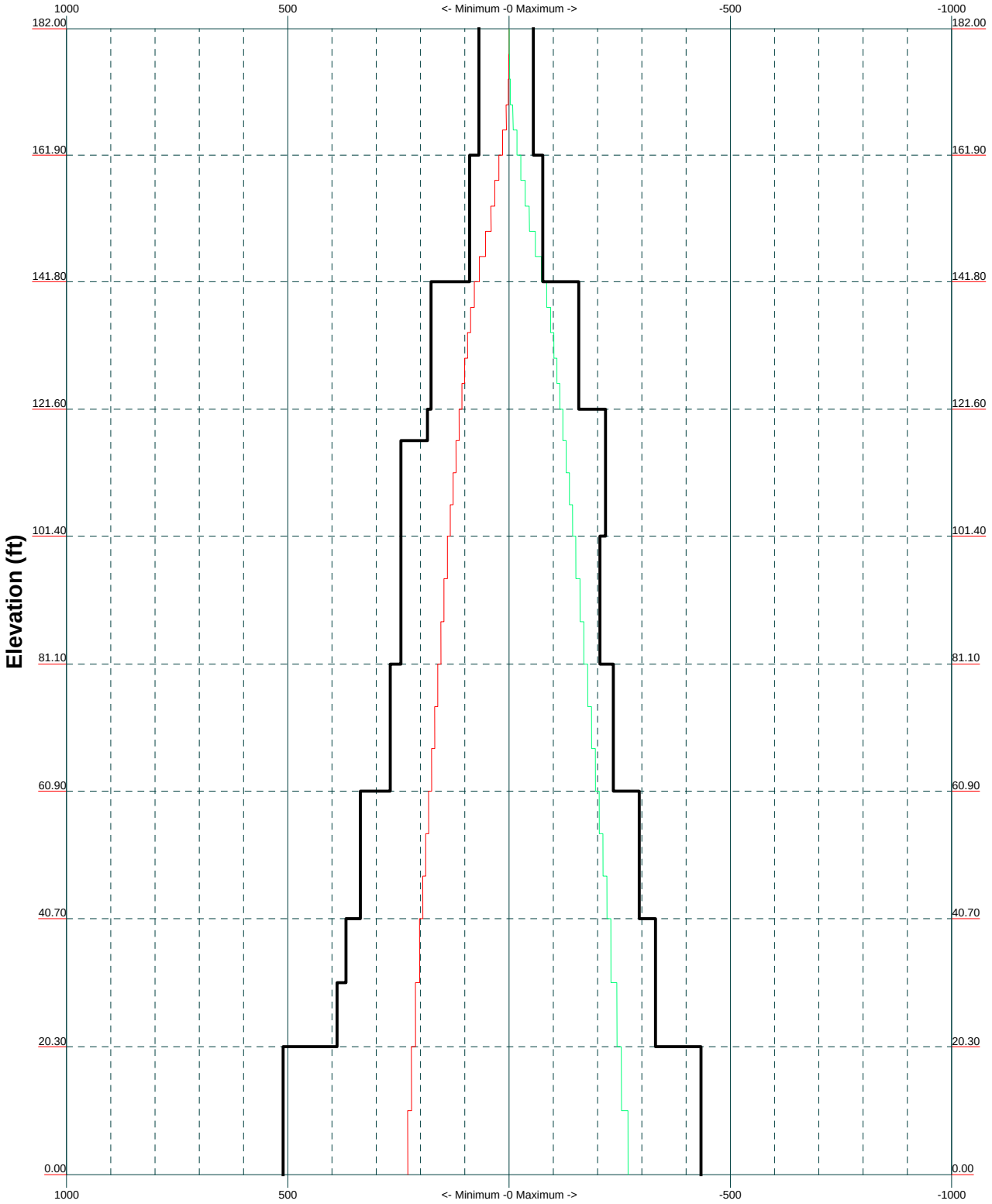
Allpro Consulting Group, Inc.
9221 Lyndon B. Johnson Fwy, Suite# 204
Dallas, TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

Job: **15-4990**			
Project: **CT13617-A-02**			
Client: SBA	Drawn by: Dejian Xu, EIT	App'd:	
Code: TIA/EIA-222-F	Date: 11/11/15	Scale: NTS	
Path:		Dwg No. E-1	

MISCELLANEOUS PLOTS

TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Leg Capacity ——— **Leg Compression (K)**



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Job: ***15-4990***			
Project: ***CT13617-A-02***			
Client: SBA	Drawn by: Dejian Xu, EIT		App'd:
Code: TIA/EIA-222-F	Date: 11/11/15		Scale: NTS
Path:			Dwg No. E-3

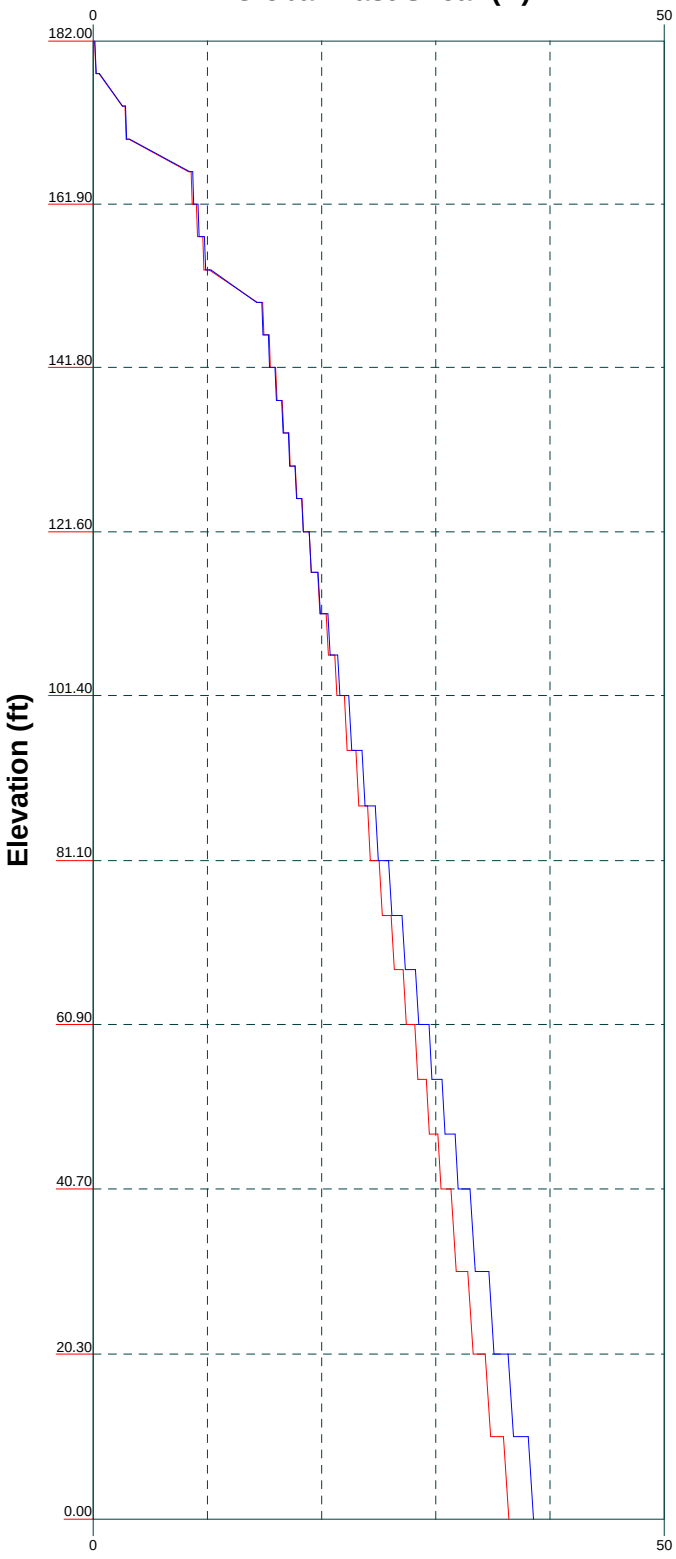
TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Vx Vz

Maximum Values

Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)

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Dallas, TX 75243
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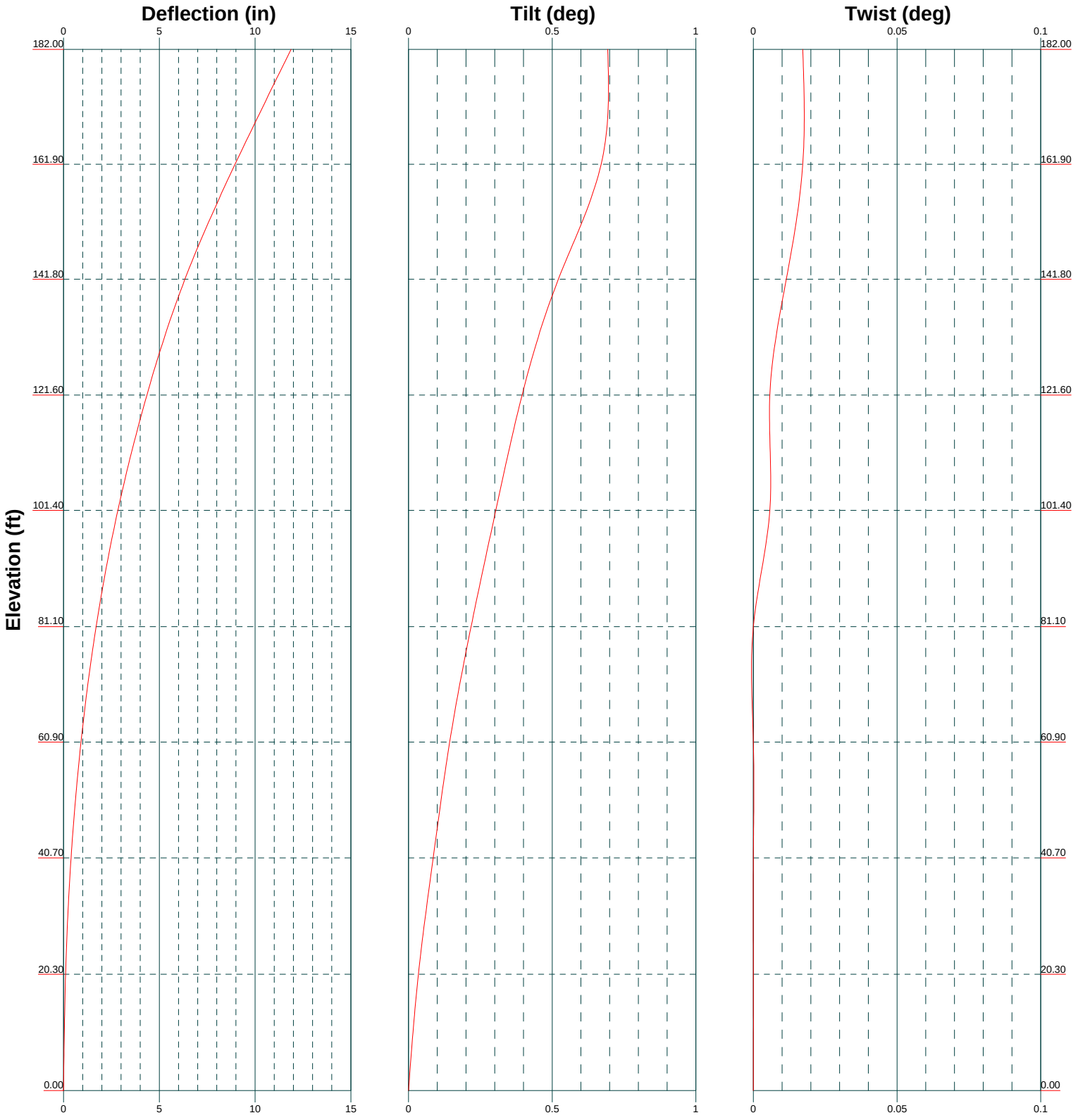
FAX: 866-364-8375

Job: ***15-4990***			
Project: ***CT13617-A-02***			
Client: SBA	Drawn by: Dejian Xu, EIT	App'd:	
Code: TIA/EIA-222-F	Date: 11/11/15	Scale: NTS	
Path:		Dwg No. E-4	

TIA/EIA-222-F - Service - 60 mph

Maximum Values



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Phone: 972-231-8893
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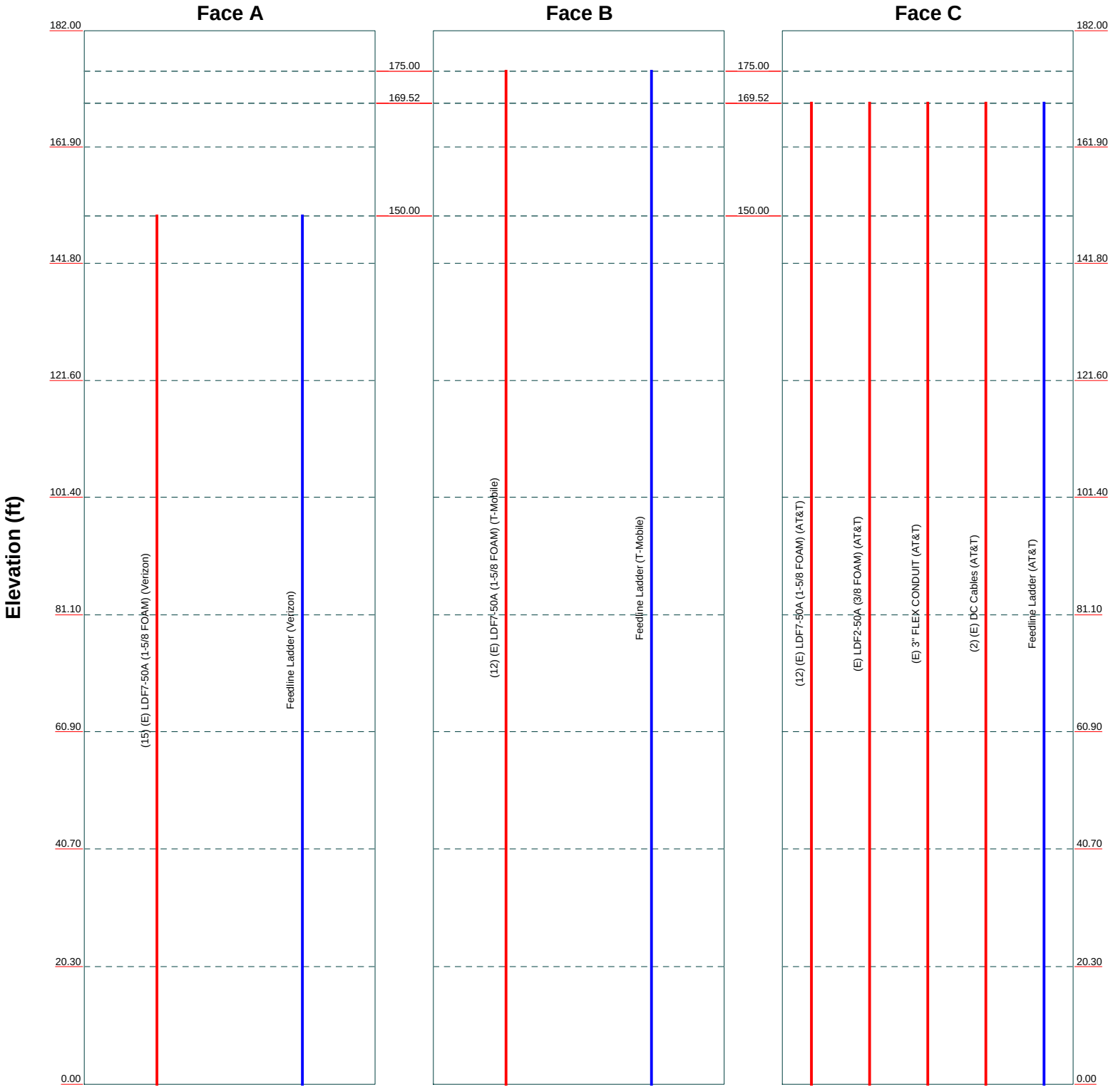
Job: ***15-4990***			
Project: ***CT13617-A-02***			
Client: SBA	Drawn by: Dejian Xu, EIT	App'd:	
Code: TIA/EIA-222-F	Date: 11/11/15	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 182'

Round | Flat | App In Face | App Out Face | Truss Leg



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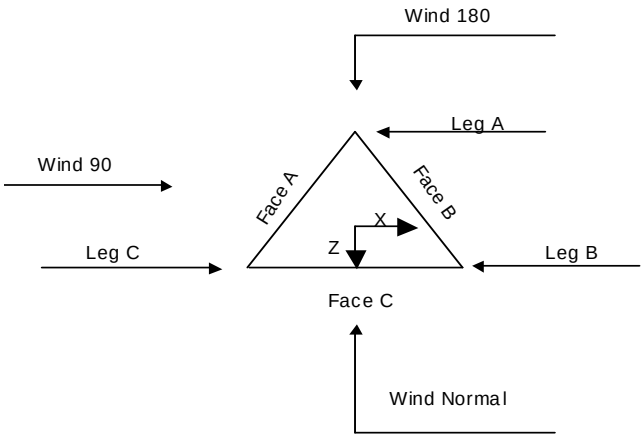
Job: ***15-4990***			
Project: ***CT13617-A-02***			
Client: SBA	Drawn by: Dejian Xu, EIT	App'd:	
Code: TIA/EIA-222-F	Date: 11/11/15	Scale: NTS	
Path:		Dwg No. E-7	

CALCULATION PRINTOUT

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 182.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.65 ft at the top and 18.99 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Tolland County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	182.00-161.90			4.65	1	20.10
T2	161.90-141.80			4.69	1	20.10
T3	141.80-121.60			4.76	1	20.20
T4	121.60-101.40			6.83	1	20.20
T5	101.40-81.10			8.83	1	20.30
T6	81.10-60.90			10.92	1	20.20
T7	60.90-40.70			12.92	1	20.20
T8	40.70-20.30			14.90	1	20.40
T9	20.30-0.00			16.99	1	20.30

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	182.00-161.90	4.02	X Brace	No	No	0.0000	0.0000
T2	161.90-141.80	4.02	X Brace	No	No	0.0000	0.0000
T3	141.80-121.60	4.04	X Brace	No	No	0.0000	0.0000
T4	121.60-101.40	5.05	X Brace	No	No	0.0000	0.0000
T5	101.40-81.10	6.77	X Brace	No	No	0.0000	0.0000
T6	81.10-60.90	6.73	X Brace	No	No	0.0000	0.0000
T7	60.90-40.70	6.73	X Brace	No	No	0.0000	0.0000
T8	40.70-20.30	10.20	X Brace	No	No	0.0000	0.0000
T9	20.30-0.00	10.15	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 182.00-161.90	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 161.90-141.80	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T3 141.80-121.60	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 121.60-101.40	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T5 101.40-81.10	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 81.10-60.90	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 60.90-40.70	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T8 40.70-20.30	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T9 20.30-0.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 182.00-161.90	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T3 141.80-121.60	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 182.00-161.90	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 161.90-141.80	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 141.80-121.60	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 121.60-101.40	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 101.40-81.10	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 81.10-60.90	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 60.90-40.70	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 40.70-20.30	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 20.30-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 182.00-161.90	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 161.90-141.80	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 141.80-121.60	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 121.60-101.40	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5	Yes	Yes	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
101.40-81.10				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
81.10-60.90				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
60.90-40.70				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
40.70-20.30				1	1	1	1	1	1	1
T9 20.30-0.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 182.00-161.90	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 161.90-141.80	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 141.80-121.60	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 121.60-101.40	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 101.40-81.10	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 81.10-60.90	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 60.90-40.70	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 40.70-20.30	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 20.30-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1	Flange	0.7500	4	0.6250	1	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0
182.00-161.90		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T2	Flange	0.8750	4	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
161.90-141.80		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T3	Flange	1.0000	4	0.6250	1	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0
141.80-121.60		A325N		A325N		A325N		A325N		A325N		A325N		A325N	

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T4 121.60-101.40	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 101.40-81.10	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 81.10-60.90	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 60.90-40.70	Flange	1.0000 A325N	8	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 40.70-20.30	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 20.30-0.00	Flange	1.0000 A325N	0	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(E) LDF7-50A (1-5/8 FOAM) (Verizon)	A	Yes	Ar (CfAe)	150.00 - 0.00	15	12	0.5000	1.9800		0.82
**********										
(E) LDF7-50A (1-5/8 FOAM) (T-Mobile)	B	Yes	Ar (CfAe)	175.00 - 0.00	12	6	0.5000	1.9800		0.82
**********										
(E) LDF7-50A (1-5/8 FOAM) (AT&T)	C	Yes	Ar (CfAe)	169.52 - 0.00	12	12	0.5000	1.9800		0.82
(E) LDF2-50A (3/8 FOAM) (AT&T)	C	Yes	Ar (CfAe)	169.52 - 0.00	1	1	0.4400	0.4400		0.08
(E) 3" FLEX CONDUIT (AT&T)	C	Yes	Ar (CfAe)	169.52 - 0.00	1	1	0.5000	3.0000		0.50
(E) DC Cables (AT&T)	C	Yes	Ar (CfAe)	169.52 - 0.00	2	2	0.4800	0.4800		0.20

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
**********								
Feedline Ladder (Verizon)	A	No	CaAa (In Face)	150.00 - 0.00	1	No Ice	0.00	8.40
						1/2" Ice	0.00	13.50
Feedline Ladder (T-Mobile)	B	No	CaAa (In Face)	175.00 - 0.00	1	No Ice	0.00	8.40
						1/2" Ice	0.00	13.50
Feedline Ladder (AT&T)	C	No	CaAa (In Face)	169.52 - 0.00	1	No Ice	0.00	8.40
						1/2" Ice	0.00	13.50

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	182.00-161.90	A	0.000	0.000	0.000	0.000	0.00
		B	12.969	0.000	0.000	0.000	0.24
		C	17.882	0.000	0.000	0.000	0.15
T2	161.90-141.80	A	16.236	0.000	0.000	0.000	0.17
		B	19.899	0.000	0.000	0.000	0.37
		C	47.168	0.000	0.000	0.000	0.39
T3	141.80-121.60	A	39.996	0.000	0.000	0.000	0.42
		B	19.998	0.000	0.000	0.000	0.37
		C	47.403	0.000	0.000	0.000	0.39
T4	121.60-101.40	A	39.996	0.000	0.000	0.000	0.42
		B	19.998	0.000	0.000	0.000	0.37
		C	47.403	0.000	0.000	0.000	0.39
T5	101.40-81.10	A	40.194	0.000	0.000	0.000	0.42
		B	20.097	0.000	0.000	0.000	0.37
		C	47.637	0.000	0.000	0.000	0.39
T6	81.10-60.90	A	39.996	0.000	0.000	0.000	0.42
		B	19.998	0.000	0.000	0.000	0.37
		C	47.403	0.000	0.000	0.000	0.39
T7	60.90-40.70	A	39.996	0.000	0.000	0.000	0.42
		B	19.998	0.000	0.000	0.000	0.37
		C	47.403	0.000	0.000	0.000	0.39
T8	40.70-20.30	A	40.392	0.000	0.000	0.000	0.42
		B	20.196	0.000	0.000	0.000	0.37
		C	47.872	0.000	0.000	0.000	0.39
T9	20.30-0.00	A	40.194	0.000	0.000	0.000	0.42
		B	20.097	0.000	0.000	0.000	0.37
		C	47.637	0.000	0.000	0.000	0.39

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	182.00-161.90	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		3.253	13.537	0.000	0.000	0.54
		C		6.287	17.932	0.000	0.000	0.37
T2	161.90-141.80	A	0.500	2.036	18.641	0.000	0.000	0.41
		B		4.992	20.770	0.000	0.000	0.82
		C		16.583	47.302	0.000	0.000	0.97
T3	141.80-121.60	A	0.500	5.016	45.921	0.000	0.000	1.00
		B		5.016	20.873	0.000	0.000	0.83
		C		16.665	47.537	0.000	0.000	0.97
T4	121.60-101.40	A	0.500	5.016	45.921	0.000	0.000	1.00
		B		5.016	20.873	0.000	0.000	0.83
		C		16.665	47.537	0.000	0.000	0.97
T5	101.40-81.10	A	0.500	5.041	46.149	0.000	0.000	1.01
		B		5.041	20.977	0.000	0.000	0.83
		C		16.747	47.773	0.000	0.000	0.98
T6	81.10-60.90	A	0.500	5.016	45.921	0.000	0.000	1.00
		B		5.016	20.873	0.000	0.000	0.83
		C		16.665	47.537	0.000	0.000	0.97
T7	60.90-40.70	A	0.500	5.016	45.921	0.000	0.000	1.00
		B		5.016	20.873	0.000	0.000	0.83
		C		16.665	47.537	0.000	0.000	0.97
T8	40.70-20.30	A	0.500	5.066	46.376	0.000	0.000	1.01

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		5.066	21.080	0.000	0.000	0.83
		C		16.830	48.008	0.000	0.000	0.98
T9	20.30-0.00	A	0.500	5.041	46.149	0.000	0.000	1.01
		B		5.041	20.977	0.000	0.000	0.83
		C		16.747	47.773	0.000	0.000	0.98

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	182.00-161.90	A	0.000	0.000	0.000	0.000
		B	0.000	0.988	1.336	1.730
		C	0.000	1.426	1.842	2.495
T2	161.90-141.80	A	0.000	1.126	1.768	2.251
		B	0.000	1.402	2.167	2.805
		C	0.000	3.478	5.136	6.956
T3	141.80-121.60	A	0.000	2.783	4.329	5.514
		B	0.000	1.415	2.165	2.802
		C	0.000	3.508	5.131	6.949
T4	121.60-101.40	A	0.000	2.004	3.147	4.008
		B	0.000	1.019	1.574	2.037
		C	0.000	2.526	3.730	5.052
T5	101.40-81.10	A	0.000	1.531	3.004	3.826
		B	0.000	0.778	1.502	1.945
		C	0.000	1.929	3.561	4.823
T6	81.10-60.90	A	0.000	1.449	2.845	3.623
		B	0.000	0.737	1.422	1.841
		C	0.000	1.827	3.371	4.566
T7	60.90-40.70	A	0.000	1.401	2.751	3.503
		B	0.000	0.712	1.375	1.781
		C	0.000	1.766	3.260	4.416
T8	40.70-20.30	A	0.000	0.998	2.351	2.995
		B	0.000	0.507	1.176	1.522
		C	0.000	1.258	2.787	3.774
T9	20.30-0.00	A	0.000	0.965	2.653	3.379
		B	0.000	0.491	1.326	1.717
		C	0.000	1.217	3.144	4.259

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(P) APXV18-206516S-C-A20	A	From Leg	3.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice	3.62 3.97	2.01 2.33	0.02 0.04
(T-Mobile)									
(P) APXV18-206516S-C-A20	B	From Leg	3.00	0.0000	177.00	No Ice	3.62	2.01	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(T-Mobile)			0.00 0.00			1/2" Ice	3.97	2.33	0.04
(P) APXV18-206516S-C-A20	C	From Leg	3.00	0.0000	177.00	No Ice	3.62	2.01	0.02
(T-Mobile)			0.00 0.00			1/2" Ice	3.97	2.33	0.04
(P) LNX-6515DS-A1M	A	From Leg	3.00	0.0000	175.00	No Ice	11.45	7.70	0.05
(T-Mobile)			0.00 0.00			1/2" Ice	12.06	8.29	0.12
(P) LNX-6515DS-A1M	B	From Leg	3.00	0.0000	175.00	No Ice	11.45	7.70	0.05
(T-Mobile)			0.00 0.00			1/2" Ice	12.06	8.29	0.12
(P) LNX-6515DS-A1M	C	From Leg	3.00	0.0000	175.00	No Ice	11.45	7.70	0.05
(T-Mobile)			0.00 0.00			1/2" Ice	12.06	8.29	0.12
(E) FE15501P77/75	A	From Leg	3.00	0.0000	175.00	No Ice	0.62	0.29	0.02
(T-Mobile)			0.00 0.00			1/2" Ice	0.73	0.36	0.02
(E) FE15501P77/75	B	From Leg	3.00	0.0000	175.00	No Ice	0.62	0.29	0.02
(T-Mobile)			0.00 0.00			1/2" Ice	0.73	0.36	0.02
(E) FE15501P77/75	C	From Leg	3.00	0.0000	175.00	No Ice	0.62	0.29	0.02
(T-Mobile)			0.00 0.00			1/2" Ice	0.73	0.36	0.02
(P) ATMAA1412D-1A20	A	From Leg	3.00	0.0000	175.00	No Ice	0.47	1.17	0.01
(T-Mobile)			0.00 0.00			1/2" Ice	0.57	1.31	0.02
(P) ATMAA1412D-1A20	B	From Leg	3.00	0.0000	175.00	No Ice	0.47	1.17	0.01
(T-Mobile)			0.00 0.00			1/2" Ice	0.57	1.31	0.02
(P) ATMAA1412D-1A20	C	From Leg	3.00	0.0000	175.00	No Ice	0.47	1.17	0.01
(T-Mobile)			0.00 0.00			1/2" Ice	0.57	1.31	0.02
(P) Kathrein	A	From Leg	3.00	0.0000	175.00	No Ice	0.10	0.17	0.00
(T-Mobile)			0.00 0.00			1/2" Ice	0.15	0.23	0.00
(P) Kathrein	B	From Leg	3.00	0.0000	175.00	No Ice	0.10	0.17	0.00
(T-Mobile)			0.00 0.00			1/2" Ice	0.15	0.23	0.00
(P) Kathrein	C	From Leg	3.00	0.0000	175.00	No Ice	0.10	0.17	0.00
(T-Mobile)			0.00 0.00			1/2" Ice	0.15	0.23	0.00
**********									
(3) (E) P65-17-XLH	A	From Leg	3.00	0.0000	169.52	No Ice	11.47	6.80	0.08
(AT&T)			0.00 0.00			1/2" Ice	12.08	7.38	0.14
(3) (E) P65-17-XLH	B	From Leg	3.00	0.0000	169.52	No Ice	11.47	6.80	0.08
(AT&T)			0.00 0.00			1/2" Ice	12.08	7.38	0.14
(3) (E) P65-17-XLH	C	From Leg	3.00	0.0000	169.52	No Ice	11.47	6.80	0.08
(AT&T)			0.00 0.00			1/2" Ice	12.08	7.38	0.14
(E)	A	From Leg	3.00	0.0000	169.52	No Ice	6.62	4.13	0.03
AM-X-CD-16-65-00T-RET			0.00			1/2" Ice	7.05	4.54	0.07
(AT&T)			0.00						
(E)	B	From Leg	3.00	0.0000	169.52	No Ice	6.62	4.13	0.03
AM-X-CD-16-65-00T-RET			0.00			1/2" Ice	7.05	4.54	0.07
(AT&T)			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E)	C	From Leg	3.00	0.0000	169.52	No Ice	6.62	4.13	0.03
AM-X-CD-16-65-00T-RET			0.00			1/2" Ice	7.05	4.54	0.07
(AT&T)			0.00						
(4) (E) ADC ClearGain	A	From Leg	3.00	0.0000	169.52	No Ice	1.54	0.80	0.03
TMAs			0.00			1/2" Ice	1.76	0.98	0.04
(AT&T)			0.00						
(4) (E) ADC ClearGain	B	From Leg	3.00	0.0000	169.52	No Ice	1.54	0.80	0.03
TMAs			0.00			1/2" Ice	1.76	0.98	0.04
(AT&T)			0.00						
(4) (E) ADC ClearGain	C	From Leg	3.00	0.0000	169.52	No Ice	1.54	0.80	0.03
TMAs			0.00			1/2" Ice	1.76	0.98	0.04
(AT&T)			0.00						
(2) (E) RRUS 11	A	From Leg	3.00	0.0000	169.52	No Ice	0.32	1.33	0.05
(AT&T)			0.00			1/2" Ice	0.35	1.51	0.07
			0.00						
(2) (E) RRUS 11	B	From Leg	3.00	0.0000	169.52	No Ice	0.32	1.33	0.05
(AT&T)			0.00			1/2" Ice	0.35	1.51	0.07
			0.00						
(2) (E) RRUS 11	C	From Leg	3.00	0.0000	169.52	No Ice	0.32	1.33	0.05
(AT&T)			0.00			1/2" Ice	0.35	1.51	0.07
			0.00						
(E) DC6-48-60-18-8F	A	From Leg	3.00	0.0000	169.52	No Ice	4.32	2.57	0.03
(AT&T)			0.00			1/2" Ice	4.60	2.80	0.06
			0.00						
(E) Pirod 15' T-Frame Sector	A	From Leg	0.00	0.0000	169.52	No Ice	15.00	8.00	0.30
Mount (1)			0.00			1/2" Ice	20.60	12.80	0.40
(AT&T)			0.00						
(E) Pirod 15' T-Frame Sector	B	From Leg	0.00	0.0000	169.52	No Ice	15.00	8.00	0.30
Mount (1)			0.00			1/2" Ice	20.60	12.80	0.40
(AT&T)			0.00						
(E) Pirod 15' T-Frame Sector	C	From Leg	0.00	0.0000	169.52	No Ice	15.00	8.00	0.30
Mount (1)			0.00			1/2" Ice	20.60	12.80	0.40
(AT&T)			0.00						
**********									
(2) (E) SBNHH-1D65B	A	From Leg	3.00	0.0000	150.00	No Ice	8.29	5.34	0.04
(Verizon)			0.00			1/2" Ice	8.84	5.79	0.09
			0.00						
(2) (E) SBNHH-1D65B	B	From Leg	3.00	0.0000	150.00	No Ice	8.29	5.34	0.04
(Verizon)			0.00			1/2" Ice	8.84	5.79	0.09
			0.00						
(2) (E) SBNHH-1D65B	C	From Leg	3.00	0.0000	150.00	No Ice	8.29	5.34	0.04
(Verizon)			0.00			1/2" Ice	8.84	5.79	0.09
			0.00						
(2) (E)	A	From Leg	3.00	0.0000	150.00	No Ice	2.62	6.06	0.01
LPA-80080-4CF-EDIN-2			0.00			1/2" Ice	2.92	6.45	0.05
(Verizon)			0.00						
(2) (E)	B	From Leg	3.00	0.0000	150.00	No Ice	2.62	6.06	0.01
LPA-80080-4CF-EDIN-2			0.00			1/2" Ice	2.92	6.45	0.05
(Verizon)			0.00						
(2) (E)	C	From Leg	3.00	0.0000	150.00	No Ice	7.01	6.08	0.02
LPA-80080-4CF-EDIN-5			0.00			1/2" Ice	7.42	6.48	0.07
(Verizon)			0.00						
(3) (E) RRH2x60	A	From Leg	3.00	0.0000	150.00	No Ice	2.05	3.77	0.06
(Verizon)			0.00			1/2" Ice	2.32	4.08	0.08
			0.00						
(3) (E) RRH2x60	B	From Leg	3.00	0.0000	150.00	No Ice	2.05	3.77	0.06
(Verizon)			0.00			1/2" Ice	2.32	4.08	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
(3) (E) RRH2x60	C	From Leg	3.00	0.0000	150.00	No Ice	2.05	3.77	0.06
(Verizon)			0.00			1/2" Ice	2.32	4.08	0.08
			0.00						
(2) (E) FD9R6004/1C-3L	A	From Leg	3.00	0.0000	150.00	No Ice	0.08	0.37	0.00
Diplexer			0.00			1/2" Ice	0.14	0.45	0.01
(Verizon)			0.00						
(2) (E) FD9R6004/1C-3L	B	From Leg	3.00	0.0000	150.00	No Ice	0.08	0.37	0.00
Diplexer			0.00			1/2" Ice	0.14	0.45	0.01
(Verizon)			0.00						
(2) (E) FD9R6004/1C-3L	C	From Leg	3.00	0.0000	150.00	No Ice	0.08	0.37	0.00
Diplexer			0.00			1/2" Ice	0.14	0.45	0.01
(Verizon)			0.00						
(E) KS24019-L112A GPS	A	From Leg	3.00	0.0000	150.00	No Ice	0.16	0.16	0.01
(Verizon)			0.00			1/2" Ice	0.25	0.25	0.01
			0.00						
(E) DB-T1-6Z-8AB-0Z	A	From Leg	3.00	0.0000	150.00	No Ice	2.33	5.60	0.05
(Verizon)			0.00			1/2" Ice	2.63	6.01	0.09
			0.00						
(E) Pirod 12' PCS T-Frame	A	From Leg	0.00	0.0000	150.00	No Ice	9.80	5.00	0.26
(1) 104569			0.00			1/2" Ice	14.80	8.00	0.36
(Verizon)			0.00						
(E) Pirod 12' PCS T-Frame	B	From Leg	0.00	0.0000	150.00	No Ice	9.80	5.00	0.26
(1) 104569			0.00			1/2" Ice	14.80	8.00	0.36
(Verizon)			0.00						
(E) Pirod 12' PCS T-Frame	C	From Leg	0.00	0.0000	150.00	No Ice	9.80	5.00	0.26
(1) 104569			0.00			1/2" Ice	14.80	8.00	0.36
(Verizon)			0.00						
(E) Lighting Rod	B	From Leg	0.00	0.0000	182.00	No Ice	0.25	0.25	0.03
			0.00			1/2" Ice	0.66	0.66	0.03
			0.00						
**********									
(P) SF-HPM3-96	A	From Leg	0.00	0.0000	175.00	No Ice	8.20	3.80	0.28
(T-Mobile)			0.00			1/2" Ice	10.68	4.90	0.33
			0.00						
(P) SF-HPM3-96	B	From Leg	0.00	0.0000	175.00	No Ice	8.20	3.80	0.28
(T-Mobile)			0.00			1/2" Ice	10.68	4.90	0.33
			0.00						
(P) SF-HPM3-96	C	From Leg	0.00	0.0000	175.00	No Ice	8.20	3.80	0.28
(T-Mobile)			0.00			1/2" Ice	10.68	4.90	0.33
			0.00						

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice

Comb. No.	Description
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	182 - 161.9	11.878	35	0.6938	0.0195
T2	161.9 - 141.8	8.951	35	0.6709	0.0182
T3	141.8 - 121.6	6.333	35	0.5221	0.0137
T4	121.6 - 101.4	4.352	35	0.3937	0.0073
T5	101.4 - 81.1	2.834	35	0.3035	0.0038
T6	81.1 - 60.9	1.701	35	0.2162	0.0025
T7	60.9 - 40.7	0.911	35	0.1413	0.0015
T8	40.7 - 20.3	0.393	35	0.0838	0.0007
T9	20.3 - 0	0.106	35	0.0353	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
182.00	(E) Lighting Rod	35	11.878	0.6938	0.0195	73413

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
177.00	(P) APXV18-206516S-C-A20	35	11.140	0.6962	0.0194	73413
175.00	(P) LNX-6515DS-A1M	35	10.845	0.6964	0.0193	52438
169.52	(3) (E) P65-17-XLH	35	10.044	0.6928	0.0190	29412
150.00	(2) (E) SBNHH-1D65B	35	7.334	0.5899	0.0160	8241

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	182 - 161.9	23.844	10	1.3929	0.0392
T2	161.9 - 141.8	17.967	10	1.3467	0.0365
T3	141.8 - 121.6	12.711	10	1.0481	0.0276
T4	121.6 - 101.4	8.751	23	0.7902	0.0146
T5	101.4 - 81.1	5.726	23	0.6092	0.0077
T6	81.1 - 60.9	3.455	23	0.4343	0.0049
T7	60.9 - 40.7	1.861	23	0.2851	0.0030
T8	40.7 - 20.3	0.808	23	0.1698	0.0015
T9	20.3 - 0	0.220	23	0.0718	0.0006

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
182.00	(E) Lighting Rod	10	23.844	1.3929	0.0392	36667
177.00	(P) APXV18-206516S-C-A20	10	22.362	1.3976	0.0388	36667
175.00	(P) LNX-6515DS-A1M	10	21.771	1.3980	0.0387	26190
169.52	(3) (E) P65-17-XLH	10	20.162	1.3906	0.0380	14690
150.00	(2) (E) SBNHH-1D65B	10	14.722	1.1841	0.0321	4115

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	182	Leg	A325N	0.7500	4	3.67	19.44	0.189 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	3.89	5.10	0.764 ✔	1.333	Member Bearing
		Top Girt	A325N	0.6250	1	0.18	5.10	0.036 ✔	1.333	Member Bearing
T2	161.9	Leg	A325N	0.8750	4	16.77	26.46	0.634 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	6.89	6.44	1.069 ✔	1.333	Bolt Shear
T3	141.8	Leg	A325N	1.0000	4	26.61	34.56	0.770 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	3.77	5.41	0.697 ✔	1.333	Member Bearing

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Top Girt	A325N	0.6250	1	0.56	5.10	0.109 ✔	1.333	Member Bearing
T4	121.6	Leg	A325N	1.0000	4	33.21	34.56	0.961 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	3.74	5.41	0.692 ✔	1.333	Member Bearing
T5	101.4	Leg	A325N	1.0000	6	25.68	34.56	0.743 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	4.06	6.44	0.631 ✔	1.333	Bolt Shear
T6	81.1	Leg	A325N	1.0000	6	29.16	34.56	0.844 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	4.61	6.44	0.715 ✔	1.333	Bolt Shear
T7	60.9	Leg	A325N	1.0000	8	24.38	34.56	0.705 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	5.10	6.44	0.792 ✔	1.333	Bolt Shear
T8	40.7	Leg	A325N	1.0000	8	26.44	34.56	0.765 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	6.36	8.16	0.780 ✔	1.333	Member Bearing
T9	20.3	Diagonal	A325N	0.7500	1	8.25	8.16	1.012 ✔	1.333	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	182 - 161.9	ROHN 2.5 STD	20.10	4.02	50.9 K=1.00	24.207	1.7040	-18.02	41.25	0.437 ✔
T2	161.9 - 141.8	ROHN 3 STD	20.10	4.02	41.5 K=1.00	25.626	2.2285	-73.09	57.11	1.280 ✔
T3	141.8 - 121.6	ROHN 4 EH	20.24	4.05	32.9 K=1.00	26.788	4.4074	-114.81	118.07	0.972 ✔
T4	121.6 - 101.4	ROHN 5 EH	20.23	5.06	33.0 K=1.00	26.773	6.1120	-143.61	163.64	0.878 ✔
T5	101.4 - 81.1	ROHN 5 EH	20.34	6.78	44.2 K=1.00	25.224	6.1120	-169.04	154.17	1.096 ✔
T6	81.1 - 60.9	ROHN 6 EHS	20.23	6.74	36.4 K=1.00	26.331	6.7133	-195.25	176.77	1.105 ✔
T7	60.9 - 40.7	ROHN 6 EH	20.23	6.74	36.9 K=1.00	26.263	8.4049	-221.33	220.74	1.003 ✔
T8	40.7 - 20.3	ROHN 8 EHS	20.44	10.22	42.0 K=1.00	25.549	9.7193	-244.03	248.32	0.983 ✔
T9	20.3 - 0	ROHN 8 EH	20.33	10.17	42.4 K=1.00	25.492	12.7627	-269.08	325.35	0.827 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	182 - 161.9	L1 3/4x1 3/4x3/16	6.17	2.81	103.7 K=1.06	12.509	0.6211	-3.89	7.77	0.501 ✔
T2	161.9 - 141.8	L2x2x1/4	6.23	2.81	94.6 K=1.10	13.650	0.9380	-6.89	12.80	0.538 ✔
T3	141.8 - 121.6	L2x2x3/16	7.76	3.66	113.8 K=1.02	11.149	0.7564	-3.41	8.43	0.404 ✔
T4	121.6 - 101.4	L2x2x3/16	9.96	4.74	144.5 K=1.00	7.148	0.7564	-3.67	5.41	0.679 ✔
T5	101.4 - 81.1	L2 1/2x2 1/2x3/16	12.55	6.09	148.6 K=1.00	6.760	1.1875	-4.06	8.03	0.506 ✔
T6	81.1 - 60.9	L2 1/2x2 1/2x3/16	14.27	6.89	168.3 K=1.00	5.272	1.1875	-4.61	6.26	0.736 ✔
T7	60.9 - 40.7	L2 1/2x2 1/2x1/4	16.05	7.78	190.2 K=1.00	4.127	1.1900	-4.78	4.91	0.974 ✔
T8	40.7 - 20.3	L3x3x1/4	19.37	9.44	191.3 K=1.00	4.082	1.4400	-5.46	5.88	0.929 ✔
T9	20.3 - 0	L3 1/2x3 1/2x1/4	20.22	9.86	170.4 K=1.00	5.142	1.6900	-7.31	8.69	0.841 ✔

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	182 - 161.9	L1 3/4x1 3/4x3/16	4.65	4.17	145.6 K=1.00	7.046	0.6211	-0.20	4.38	0.045 ✔
T3	141.8 - 121.6	L1 3/4x1 3/4x3/16	4.76	4.23	147.8 K=1.00	6.839	0.6211	-0.55	4.25	0.128 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	182 - 161.9	ROHN 2.5 STD	20.10	4.02	50.9	30.000	1.7040	14.67	51.12	0.287 ✔
T2	161.9 - 141.8	ROHN 3 STD	20.10	4.02	41.5	30.000	2.2285	67.08	66.85	1.003 ✔
T3	141.8 - 121.6	ROHN 4 EH	20.24	4.05	32.9	30.000	4.4074	106.44	132.22	0.805 ✔
T4	121.6 - 101.4	ROHN 5 EH	20.23	5.06	33.0	30.000	6.1120	132.86	183.36	0.725 ✔
T5	101.4 - 81.1	ROHN 5 EH	20.34	6.78	44.2	30.000	6.1120	154.08	183.36	0.840

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T6	81.1 - 60.9	ROHN 6 EHS	20.23	6.74	36.4	30.000	6.7133	174.95	201.40	0.869 ✔
T7	60.9 - 40.7	ROHN 6 EH	20.23	6.74	36.9	30.000	8.4049	195.01	252.15	0.773 ✔
T8	40.7 - 20.3	ROHN 8 EHS	20.44	10.22	42.0	30.000	9.7193	211.51	291.58	0.725 ✔
T9	20.3 - 0	ROHN 8 EH	20.33	10.17	42.4	30.000	12.7627	229.07	382.88	0.598 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	182 - 161.9	L1 3/4x1 3/4x3/16	6.17	2.81	65.5	29.000	0.3604	3.89	10.45	0.372 ✔
T2	161.9 - 141.8	L2x2x1/4	6.23	2.81	57.7	29.000	0.5629	6.75	16.32	0.414 ✔
T3	141.8 - 121.6	L2x2x3/16	6.73	3.16	63.8	29.000	0.4554	3.77	13.21	0.286 ✔
T4	121.6 - 101.4	L2x2x3/16	9.53	4.52	90.5	29.000	0.4554	3.74	13.21	0.283 ✔
T5	101.4 - 81.1	L2 1/2x2 1/2x3/16	11.97	5.80	92.3	29.000	0.7500	4.01	21.75	0.184 ✔
T6	81.1 - 60.9	L2 1/2x2 1/2x3/16	14.27	6.89	109.4	29.000	0.7500	4.53	21.75	0.208 ✔
T7	60.9 - 40.7	L2 1/2x2 1/2x1/4	16.05	7.78	123.3	29.000	0.7519	5.10	21.80	0.234 ✔
T8	40.7 - 20.3	L3x3x1/4	19.37	9.44	123.5	29.000	0.9159	6.36	26.56	0.239 ✔
T9	20.3 - 0	L3 1/2x3 1/2x1/4	21.09	10.29	114.7	29.000	1.1034	8.25	32.00	0.258 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	182 - 161.9	L1 3/4x1 3/4x3/16	4.65	4.17	98.5	29.000	0.3604	0.18	10.45	0.018 ✔
T3	141.8 - 121.6	L1 3/4x1 3/4x3/16	4.76	4.23	99.9	29.000	0.3604	0.56	10.45	0.053 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	182 - 161.9	Leg	ROHN 2.5 STD	3	-18.02	54.99	32.8	Pass
		Diagonal	L1 3/4x1 3/4x3/16	9	-3.89	10.36	37.6	Pass
							57.3 (b)	
		Top Girt	L1 3/4x1 3/4x3/16	4	-0.20	5.83	3.4	Pass
T2	161.9 - 141.8	Leg	ROHN 3 STD	37	-73.09	76.12	96.0	Pass
		Diagonal	L2x2x1/4	44	-6.89	17.07	40.4	Pass
							80.2 (b)	
T3	141.8 - 121.6	Leg	ROHN 4 EH	70	-114.81	157.39	72.9	Pass
		Diagonal	L2x2x3/16	81	-3.41	11.24	30.3	Pass
							52.3 (b)	
		Top Girt	L1 3/4x1 3/4x3/16	73	-0.55	5.66	9.6	Pass
T4	121.6 - 101.4	Leg	ROHN 5 EH	106	-143.61	218.13	65.8	Pass
							72.1 (b)	
		Diagonal	L2x2x3/16	114	-3.67	7.21	50.9	Pass
							51.9 (b)	
T5	101.4 - 81.1	Leg	ROHN 5 EH	133	-169.04	205.51	82.3	Pass
		Diagonal	L2 1/2x2 1/2x3/16	141	-4.06	10.70	38.0	Pass
							47.3 (b)	
T6	81.1 - 60.9	Leg	ROHN 6 EHS	154	-195.25	235.63	82.9	Pass
		Diagonal	L2 1/2x2 1/2x3/16	162	-4.61	8.35	55.2	Pass
T7	60.9 - 40.7	Leg	ROHN 6 EH	175	-221.33	294.25	75.2	Pass
		Diagonal	L2 1/2x2 1/2x1/4	182	-4.78	6.55	73.0	Pass
T8	40.7 - 20.3	Leg	ROHN 8 EHS	196	-244.03	331.01	73.7	Pass
		Diagonal	L3x3x1/4	204	-5.46	7.84	69.7	Pass
T9	20.3 - 0	Leg	ROHN 8 EH	211	-269.08	433.70	62.0	Pass
		Diagonal	L3 1/2x3 1/2x1/4	224	-7.31	11.58	63.1	Pass
							75.9 (b)	
							Summary	
						Leg (T2)	96.0	Pass
						Diagonal (T2)	80.2	Pass
						Top Girt (T3)	9.6	Pass
						Bolt Checks	80.2	Pass
						RATING =	**96.0**	**Pass**

MATHCAD CALCULATION PRINTOUT

Existing 182 ft. Self Supported Tower Foundation Check

Customer Name: SBA Communications Corp
Customer Site Name: Troiano Realty
Customer Site ID: CT13617-A-02

Carrier Name: T-Mobile
Carrier Site ID: CT11530B

Site Location:
157 Chestnut Hill Road
Stafford Springs, CT 06076

Latitude: 41.977417
Longitude:-72.383306

ACGI Job # 15-4990

November 11, 2015

Foundation check

-Foundation Reactions-

As per TNX output results:

Total Shear	$S := 38 \cdot kips$	Compression on Pedestal:	$P_c := 274 \cdot kips$
Moment	$M := 4115 \cdot ft\_K$	Uplift on Pedestal:	$P_{up} := 234 \cdot kips$
Down load, Tower weight	$Pv := 35 \cdot kips$	Shear on Pedestal:	$Sh := 22 \cdot kips$

-Soil Properties- **Soil data is as per Geotechnical Report by Jaworski Geotech, Inc., Project # 01659G, dated 10/19/2001.**

Allowable Bearing Capacity	$Brg_{allw} := 8000 \cdot psf$	$SF_b := 2$
Ultimate Bearing Capacity	$Brg_{ult} := Brg_{allw} \cdot SF_b = 16 \cdot ksf$	
Internal angle of friction for soil,	$\phi := 30 \cdot deg$	
Unit wt. of soil,	$\gamma_s := 0.12 \cdot kcf$	
Alowable Passive Pressure	see next page	
Cohesion of soil,	$c_u := 0 \cdot ksf$	
Friction Factor	$FF := 0.4$	
Depth to be neglected	$L_{neg} := 1 \cdot ft$	

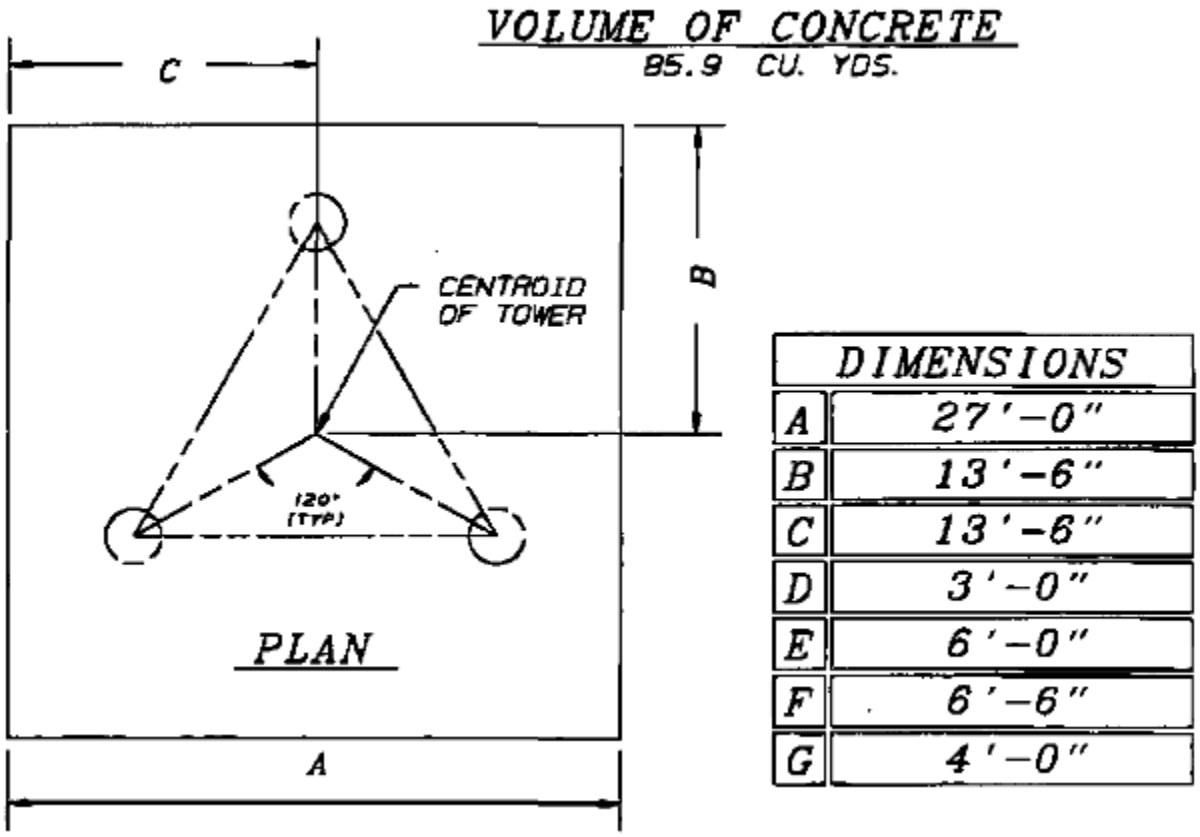
-Material Parameters-

Conforming to the design requirements as in ACI 318

Unit wt. of concrete,	$\gamma_c := 0.150 \cdot kcf$
Concrete compressive strength,	$f_c := 4000 \cdot psi$

-Factor of Safety-

FS concrete weight	$FS_c := 1.25$
FS soil weight	$FS_s := 1.50$
FS passive pressure	$FS_{pp} := 2.00$
FS bearing pressure	$FS_{bp} := 2.00$



DIMENSIONS	
A	27'-0"
B	13'-6"
C	13'-6"
D	3'-0"
E	6'-0"
F	6'-6"
G	4'-0"

DIMENSIONS

Tower face width TWFW := 18.9896·ft Tower ht. Tw_{ht} := 182·ft

The tower location is eccentric by L_{pe} := 0·ft with respect to the mat foundation center towards the base

Type of column, col.t=0 for circular,=1 for rectangular/square col_t := 0

(Existing MAT foundation data is as per original foundation design by Rohn Industries, Inc., Rohn File # 49944AE, Drawing # A012939, dated 12/18/2001).

Depth of mat, D_f := 6.5·ft

Thickness of mat, T_f := 3·ft

Pedestal size, Ped_s := 4·ft No. of pedestals Nped := 3

Extension above the grade, E_g := 0.5·ft

Mat Dimensions, LxB L := 27·ft x B := 27·ft

Brg_{allw} = 8·ksf

MAT CALCULATIONS

$K_p := \tan\left(45\cdot deg + \frac{\Phi}{2}\right)^2$ $K_p = 3$

$P_{pave} := \frac{\left(D_f - T_f - L_{neg}\right)\cdot K_p\cdot\gamma_s + \left(D_f - L_{neg}\right)\cdot K_p\cdot\gamma_s}{2}$ $P_{pave} = 1.44\cdot ksf$

Safety against overturning and location of resultant on the base

Resisting Moments about mid axis parallel to base $Area_{ped} := if\left(col_t = 1\ , Ped_s^2\ , \frac{\pi}{4}\cdot Ped_s^2\right)$ $Area_{ped} = 12.566\,ft^2$

component	value, kips	lever arm, ft	resisting moment, ft-kips
1) Concrete wt.	$C_w := L\cdot B\cdot T_f\cdot\left(\gamma_c\right) + Area_{ped}\cdot\gamma_c\cdot\left(D_f + E_g - T_f\right)\cdot Nped$	$L_c := \frac{L}{2}$	$R_c := C_w\cdot L_c$
	$C_w = 350.669\cdot kips$	$L_c = 13.5\,ft$	$R_c = 4734.038\cdot ft\_K$
2) Soil wt.	$S_w := \left[L\cdot B\cdot\left(D_f - T_f\right) - Area_{ped}\cdot\left(D_f - T_f\right)\cdot Nped\right]\cdot\gamma_s$	$L_s := \frac{L}{2}$	$R_s := S_w\cdot L_s$
	$S_w = 290.346\cdot kips$	$L_s = 13.5\,ft$	$R_s = 3919.676\cdot ft\_K$
3) Wt. of soil wedge	$W_w := \left(D_f\right)\cdot\frac{1}{2}\cdot\left(D_f\cdot\tan(\phi)\right)\cdot B\cdot\left(\gamma_s\right)$	$L_w := \left(L + D_f\cdot\frac{\tan(\phi)}{3}\right)$	$R_w := W_w\cdot L_w$
	$W_w = 39.517\cdot kips$	$L_w = 28.251\,ft$	$R_w = 1116.384\cdot ft\_K$
4) Passive pressure	$Pe_p := T_f\cdot B\cdot P_{pave}$	$L_p := \frac{T_f}{3}$	$R_p := Pe_p\cdot L_p$
	$Pe_p = 116.64\cdot kips$	$L_p = 1\,ft$	$R_p = 116.64\cdot ft\_K$
5) Vertical	$Pv = 35\cdot kips$	$L_v := \frac{L}{2}$	$R_v := Pv\cdot L_v$
$S_{w1} := L\cdot B\cdot D_f\cdot\gamma_s$	$S_{w1} = 568.62\cdot kips$ <--- for net calcs		
Total weight $T_w := C_w + S_w + W_w + Pv$	$T_w = 715.533\cdot kips$	$L_v = 13.5\,ft$	$R_v = 472.5\cdot ft\_K$

Total resisting Moment= $M_r := R_c + R_s + R_w + R_p + R_v$ $M_r = 10359.238\cdot ft\_K$

Overturning Moments component	value, kips	lever arm, ft	Overturning Moment ft-kips
1) Moment on foundation due to eccentric location of tower	$Pv = 35\cdot kips$	$L_{pe} = 0$	$M_{pe} := L_{pe}\cdot Pv$ $M_{pe} = 0\cdot ft\_K$
2) Moment on foundation	-	-	$M = 4115\cdot ft\_K$
3) Moment due to horizontal shear	$S_t := S$	$L_{hs} := D_f + E_g$ $L_{hs} = 7\,ft$	$O_{hs} := L_{hs}\cdot S_t$ $O_{hs} = 266\cdot ft\_K$

Total Overturning Moment= $M_o := M + O_{hs} + M_{pe}$ $M_o = 4381\cdot ft\_K$

Check Safety Factor against Overturning about mid axis parallel to base

$SF := \frac{M_r}{M_o}$ $SF = 2.365$ > 1.5 **O.K!**

Calculate eccentricity, e

$e := \frac{M_o}{T_w}$ $e = 6.123\,ft$

Check location of eccentricity and determine pressure distribution under the mat

$L_{loc} := \frac{L}{6}$ $L_{loc} = 4.5\,ft$ For net bearing calcs $T_{w1} := S_{w1} + W_w$ $T_{w1} = 608.137 \cdot kips$

$P_{max1} := if\left[e \le L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[1 + \left(6 \cdot \frac{e}{L}\right)\right], 4 \cdot \frac{T_w}{3 \cdot B \cdot (L - 2 \cdot e)}\right]$ $P_{max1} = 2.395 \cdot ksf$

$P_{max2} := \left(\frac{T_{w1}}{L \cdot B}\right)$ $P_{max2} = 0.834 \cdot ksf$ $P_{net} := P_{max1} - P_{max2}$ $P_{max} := P_{net}$

Net soil pressure, $P_{net} = 1.561 \cdot ksf$ < $Brg_{allw} = 8 \cdot ksf$ **O.K.!**

$P_{min} := if\left[e \le L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[1 - \left(6 \cdot \frac{e}{L}\right)\right], 0 \cdot ksf\right]$ $P_{min} = 0 \cdot ksf$ $FS_{shear} := 2$

Check for horizontal shear $P_{hor} := \frac{(Pe_p + Pv \cdot FF)}{FS_{shear}}$

$P_{hor} = 65.32 \cdot kips$ > $S = 38 \cdot kips$ Since P.hor > S it is safe!

Summary

-Foundation Reactions-

Shear $S = 38 \cdot kips$

Down load $Pv = 35 \cdot kips$

Uplift load $P_{up} = 234 \cdot kips$

Moment; $M = 4115 \cdot ft \cdot kip$

Size of Mat

$L = 27\,ft$ $B = 27\,ft$

Depth of base of mat $D_f = 6.5\,ft$ Thickness of Mat $T_f = 3\,ft$

Pedestal size $Ped_s = 4\,ft$

The tower location is eccentric by $L_{pe} = 0$ with respect to the mat foundation center towards the base

Stability Calculations

Safety Factor against Overturning	$SF = 2.365$	>	1.5	$\frac{1.5}{SF} = 0.634$	**O.K.!**
Net soil pressure,	$P_{net} = 1.561 \cdot ksf$	<	$Brg_{allw} = 8 \cdot ksf$	$\frac{P_{net}}{(Brg_{allw})} = 0.195$	**O.K.!**
Check for horizontal shear	$P_{hor} = 65.32 \cdot kips$	>	$S = 38 \cdot kips$	$\frac{S}{P_{hor}} = 0.582$	**O.K.!**

SITE NAME: TOWER VENTURES - STAFFORD

157 CHESTNUT HILL ROAD
STAFFORD SPRINGS, CT 06076
TOLLAND COUNTY

SITE NUMBER: CT11530B

PROJECT: T-MOBILE L700

CONFIGURATION: 704G

T-MOBILE TECHNICIAN SITE SAFETY NOTES

LOCATION	SPECIAL RESTRICTIONS
ANTENNA/TMA	
SECTOR A:	ACCESS NOT PERMITTED
SECTOR B:	ACCESS NOT PERMITTED
SECTOR C:	ACCESS NOT PERMITTED
GPS/LMU:	UNRESTRICTED*
(*CAUTION: OSHA-APPROVED PORTABLE 8' STEP-LADDER REQUIRED)	
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 NORTHEAST, LLC. 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 CONSTRUCTION NOTES

1. TOWER OWNER SHALL PROVIDE GLOBAL STRUCTURAL STABILITY ANALYSIS OF EXISTING ANTENNA SUPPORT STRUCTURE. GENERAL CONTRACTOR SCOPE OF WORK SHALL INCLUDE ALL REQUIRED STRUCTURAL MODIFICATIONS, RE-BUNDLING OF COAXIAL CABLES OR OTHER SPECIAL MODIFICATIONS AS OUTLINED THEREIN.
2. 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.
3. PROTERRA DESIGN GROUP 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

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:	157 CHESTNUT HILL ROAD STAFFORD SPRINGS, CT 06076
LATITUDE:	41.97739 (FROM T-MOBLE RFDS)
LONGITUDE:	-72.38304 (FROM T-MOBLE RFDS)
JURISDICTION:	TOWN OF STAFFORD
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
TOWER OWNER:	SBA TOWERS V, LLC
SBA SITE ID:	CT13617-A
SBA SITE NAME:	TROIANO REALTY
SBA REGIONAL SITE MANAGER:	STEPHEN ROTH (860) 539-4920

APPROVALS

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

DIG SAFE SYSTEM
(MA, ME, NH, RI, VT):
1-888-344-7233

CALL BEFORE YOU DIG
(CT): 1-800-922-4455

UNDERGROUND SERVICE ALERT

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
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A-3	DETAILS	2
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Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
11-25-15

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

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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) LIGHTNING 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 SURCUITS 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 ELECTRICL 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 – SBA COMMUNICATIONS CORP.
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – T-MOBILE

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND 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, CUR\BS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE 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 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 = 35 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: 2005 CONNECTICUT STATE BUILDING CODE WITH AMENDMENTS

    ELECTRICAL CODE: 2011 NATIONAL ELECTRICAL CODE AND AMENDMENTS

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	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	G.C.	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BTCW	BARE TINNED SOLID COPPER WIRE	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
		MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	PROPOSED	NEW OR (P)	TYP	TYPICAL
EXISTING	EXISTING OR (E)	N.T.S.	NOT TO SCALE	VIF	VERIFY IN FIELD
EGB	EQUIPMENT GROUND BAR	RAD	RADIATION CENTERLINE (ANTENNA)		
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
11-25-15

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

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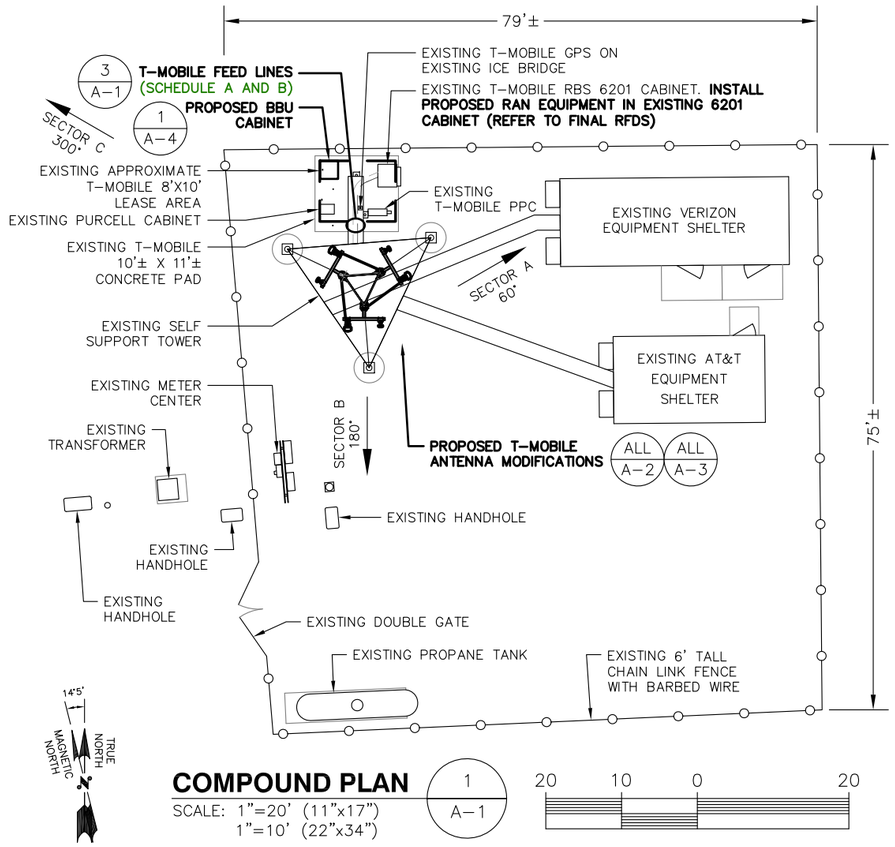
SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-1



COMPOUND PLAN

SCALE: 1"=20' (11"x17")
1"=10' (22"x34")

1 / A–1

20 10 0 20

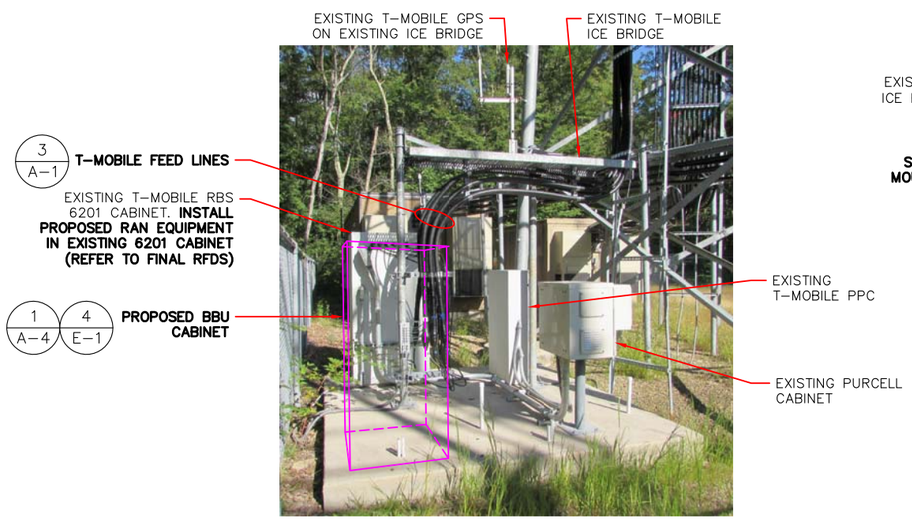


IMAGE SOURCE: PROTERRA 08/28/15

EQUIPMENT PHOTO DETAIL

SCALE: N.T.S.

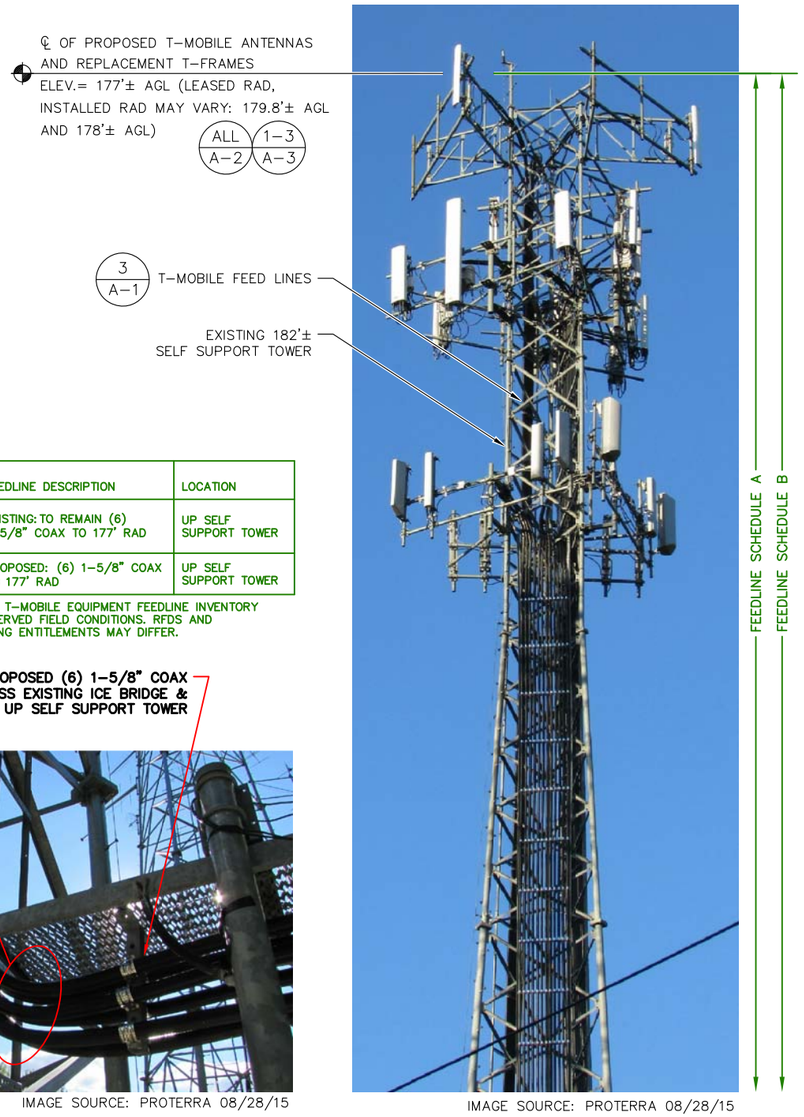
2 / A–1

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

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

STRUCTURAL NOTES:

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



FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING: TO REMAIN (6) 1–5/8" COAX TO 177' RAD	UP SELF SUPPORT TOWER
B	PROPOSED: (6) 1–5/8" COAX TO 177' RAD	UP SELF SUPPORT TOWER

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

EXISTING (6) 1–5/8" COAX ACROSS EXISTING ICE BRIDGE & UP SELF SUPPORT TOWER, **ALL TO REMAIN (REFER TO SBA–PROVIDED STRUCTURAL ANALYSIS FOR SPECIAL FEEDLINE INSTALLATION REQUIREMENTS, STACKING (6 ON 6), BUNDLING, SHIELDING, MOUNTING AND RELOCATION OF EXISTING OR PROPOSED FEEDLINES)**

PROPOSED (6) 1–5/8" COAX ACROSS EXISTING ICE BRIDGE & UP SELF SUPPORT TOWER

IMAGE SOURCE: PROTERRA 08/28/15

FEEDLINE PHOTO DETAIL AT TOWER BASE

SCALE: N.T.S.

3 / A–1

IMAGE SOURCE: PROTERRA 08/28/15

PARTIAL ELEVATION PHOTO DETAIL

SCALE: N.T.S.

4 / A–1

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COMPOUND & ELEVATION PLAN

SHEET NUMBER
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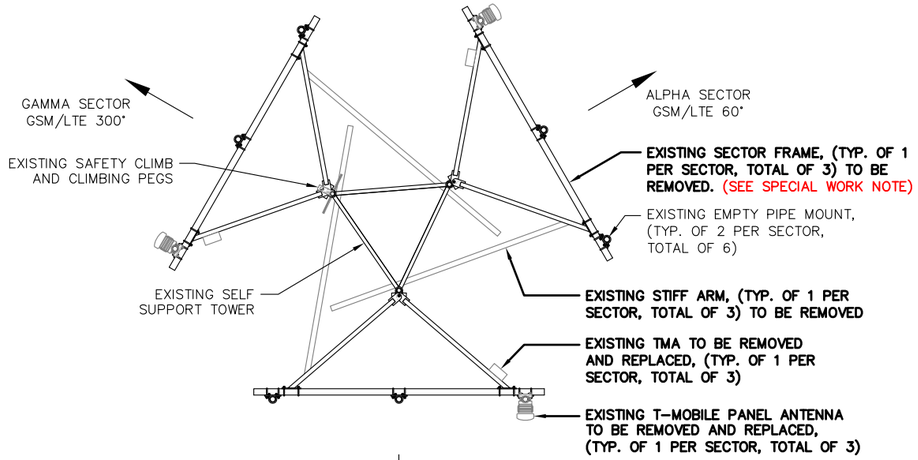
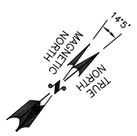
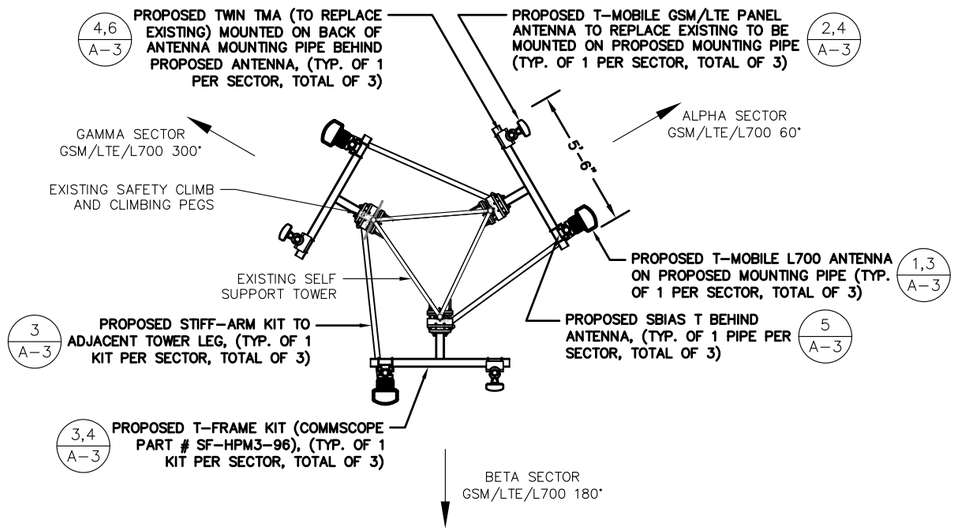




EXISTING ANTENNA PLAN

SCALE: N.T.S.

1 / A-2



PROPOSED ANTENNA PLAN

SCALE: N.T.S.

2 / A-2

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

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

STRUCTURAL NOTES:

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

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

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

SPECIAL WORK NOTE:
GENERAL CONTRACTOR SHALL REMOVE EXISTING SECTOR-FRAMES FOR STRUCTURAL PURPOSES AND RETURN THEM TO T-MOBILE WAREHOUSE. EXISTING V-FRAMES SHALL NOT BE STORED ON SITE FOR MORE THAN (7) DAYS.

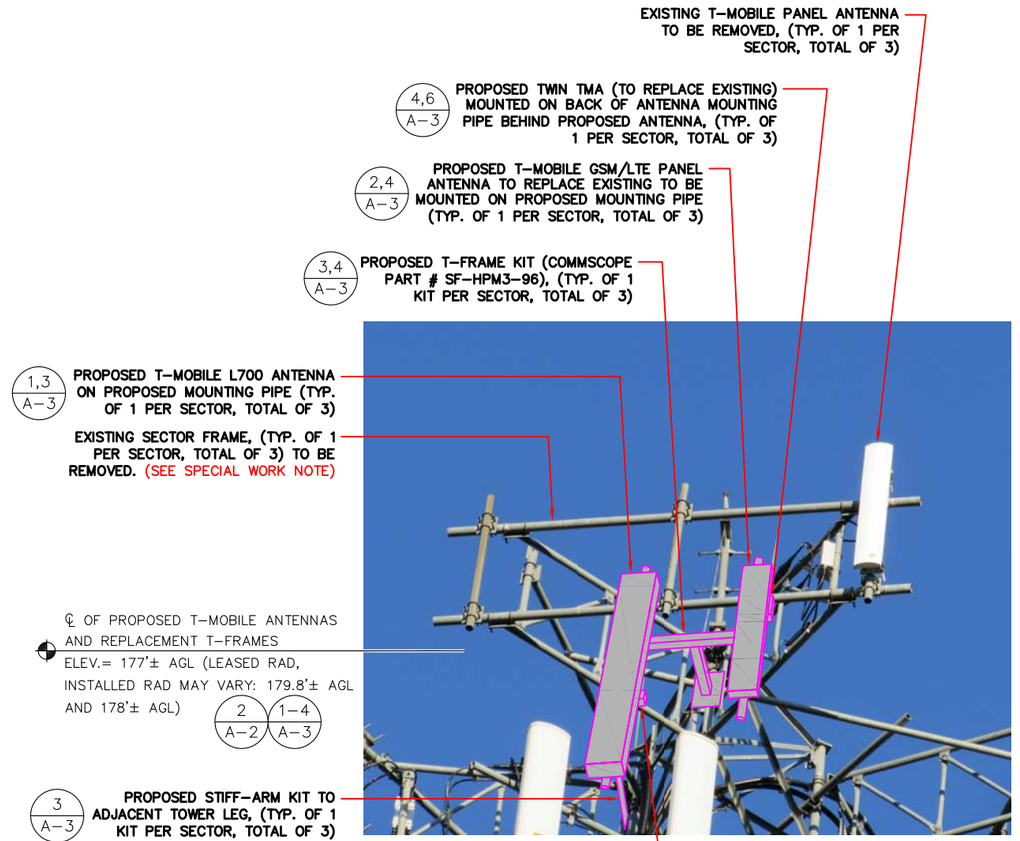


IMAGE SOURCE: PROTERRA 08/28/15
NOTE: ONE SECTOR SHOWN FOR CLARITY

ANTENNA PHOTO DETAIL

SCALE: N.T.S.

3 / A-2

T-MOBILE NORTHEAST LLC
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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
11-25-15

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

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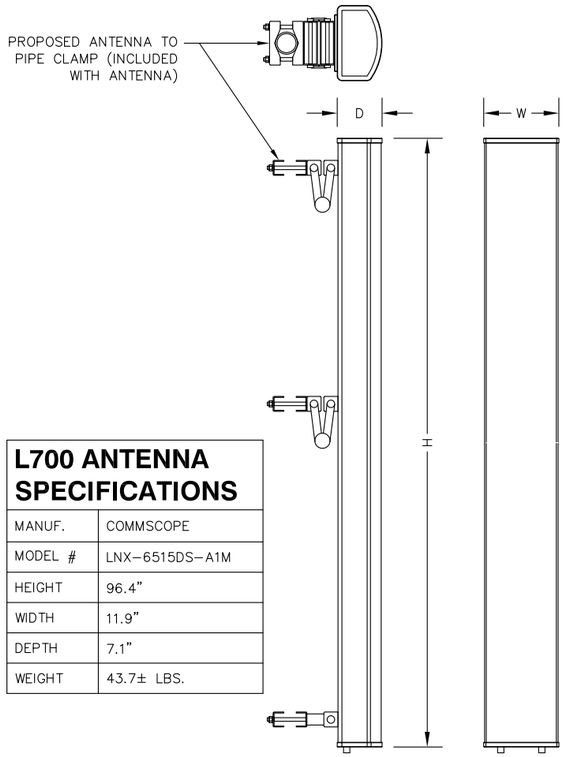
SITE NUMBER:
CT11530B
SITE NAME:
TOWER VENTURES - STAFFORD
SITE ADDRESS:
157 CHESTNUT HILL ROAD
STAFFORD SPRINGS, CT 06076
TOLLAND COUNTY

SHEET TITLE
EXISTING & PROPOSED ANTENNA PLAN

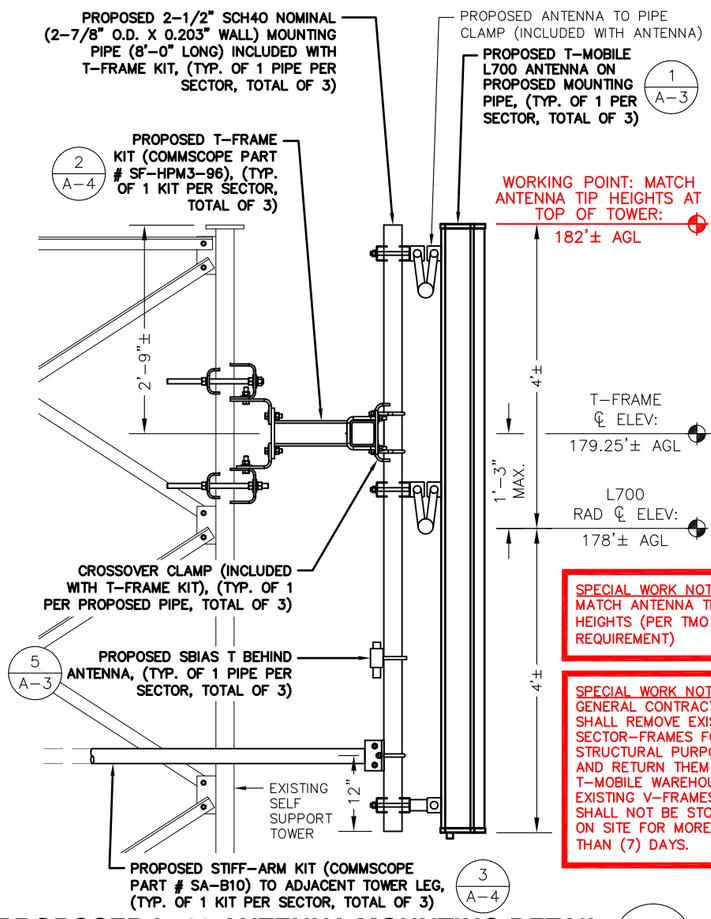
SHEET NUMBER
A-2



L700 ANTENNA SPECIFICATIONS

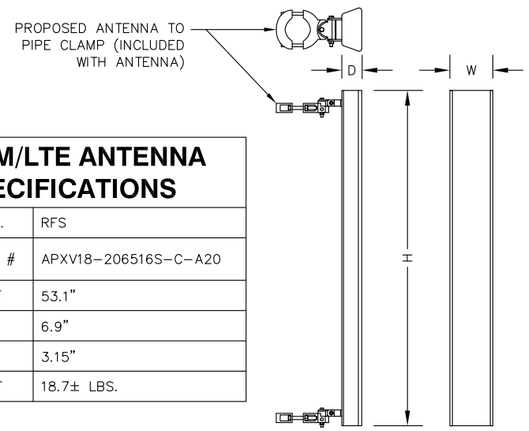
MANUF.	COMMSCOPE
MODEL #	LNX-6515DS-A1M
HEIGHT	96.4"
WIDTH	11.9"
DEPTH	7.1"
WEIGHT	43.7± LBS.

L700 ANTENNA DETAIL
SCALE: N.T.S.
1 / A-3



PROPOSED L700 ANTENNA MOUNTING DETAIL
SCALE: N.T.S.
3 / A-3

PROPOSED GSM/LTE ANTENNA MOUNTING DETAIL
SCALE: N.T.S.
4 / A-3



GSM/LTE ANTENNA SPECIFICATIONS

MANUF.	RFS
MODEL #	APXV18-206516S-C-A20
HEIGHT	53.1"
WIDTH	6.9"
DEPTH	3.15"
WEIGHT	18.7± LBS.

GSM/LTE ANTENNA DETAIL
SCALE: N.T.S.
2 / A-3

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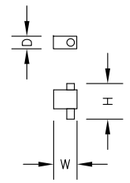
SBT SPECIFICATIONS

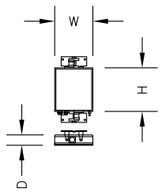
MANUF.	COMMSCOPE
MODEL #	ATSBT-TOP-FM-4G
HEIGHT	5.63"
WIDTH	3.7"
DEPTH	2.0"
WEIGHT	1.8 LBS.



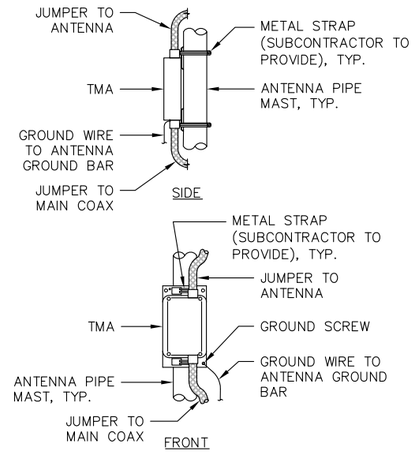
SMART BIAS TEE (SBT)
SCALE: N.T.S.
5 / A-3

TWIN TMA SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	KRY 112 144/1
HEIGHT	6.9"
WIDTH	6.1"
DEPTH	2.8"
WEIGHT	11 LBS.



TWIN TMA
SCALE: N.T.S.
6 / A-3



TMA MOUNTING DETAIL
SCALE: N.T.S.
7 / A-3

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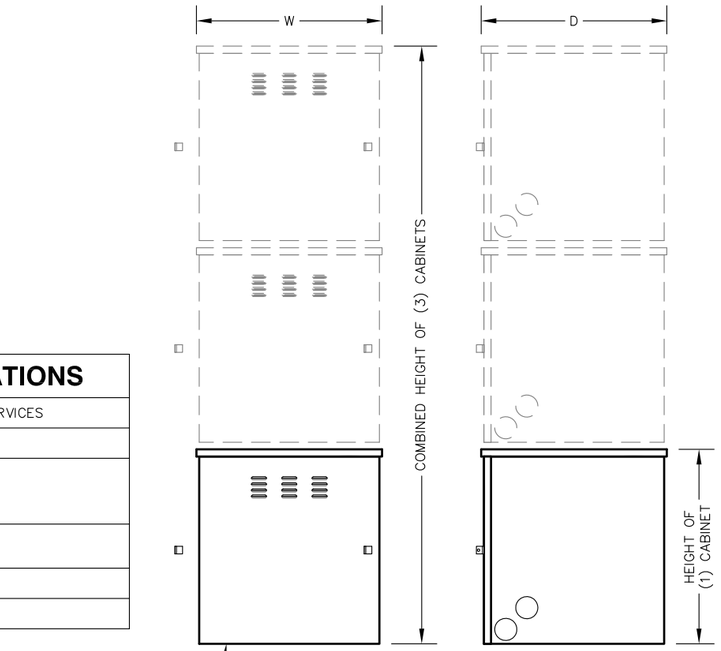
SHEET TITLE
DETAILS

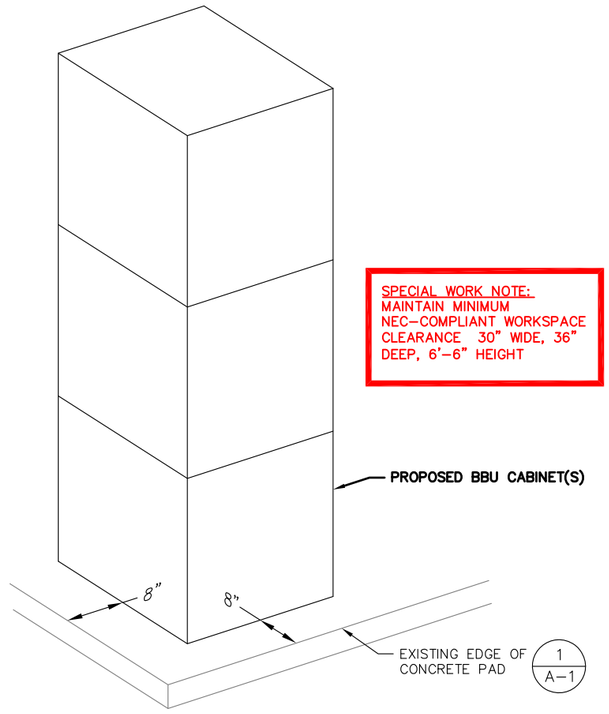
SHEET NUMBER
A-3

BBU SPECIFICATIONS

MANUF.	MFS DATA SERVICES
MODEL #	DUBBM-2ALM
HEIGHT (1) CABINET	29.67"
HEIGHT (3) CABINETS	89.01"
WIDTH	28.54"
DEPTH	28.54"



NOTE:
MFS DATA SERVICES BBU CABINET, MODEL DUBBM-2ALM (STACKABLE - 3 TOTAL PROPOSED)



ISOMETRIC

SPECIAL WORK NOTE:
MAINTAIN MINIMUM NEC-COMPLIANT WORKSPACE CLEARANCE 30" WIDE, 36" DEEP, 6'-6" HEIGHT

PROPOSED BBU CABINET DETAIL

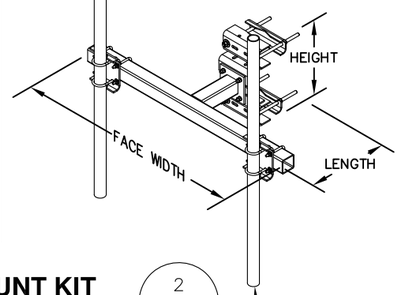
SCALE: N.T.S.

1 / A-4

PROPOSED 2-1/2" SCH40 NOMINAL (2-7/8" O.D. X 0.203" WALL) MOUNTING PIPE (8'-0" LONG) INCLUDED WITH T-FRAME KIT, (TYP. OF 1 PIPE PER SECTOR, TOTAL OF 3)

T-FRAME SPECIFICATIONS

MANUF.	COMMSCOPE
MODEL #	SF-HPM3-96
HEIGHT	1'-10"±
FACE WIDTH	5'-6"±
LENGTH	2'-0"±
WEIGHT	276± LBS.

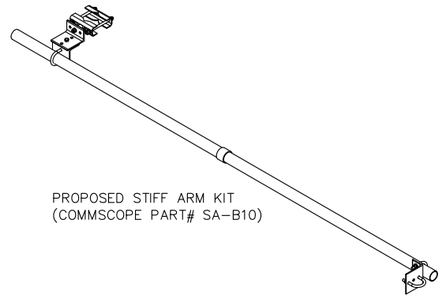


PROPOSED 2-1/2" SCH40 NOMINAL (2-7/8" O.D. X 0.203" WALL) MOUNTING PIPE (8' LONG INCLUDED WITH T-FRAME KIT, CUT TO LENGTH 6'-0" LONG), (TYP. OF 1 PIPE PER SECTOR, TOTAL OF 3)

T-FRAME MOUNT KIT

SCALE: N.T.S.

2 / A-4



PROPOSED STIFF ARM DETAIL

SCALE: N.T.S.

3 / A-4

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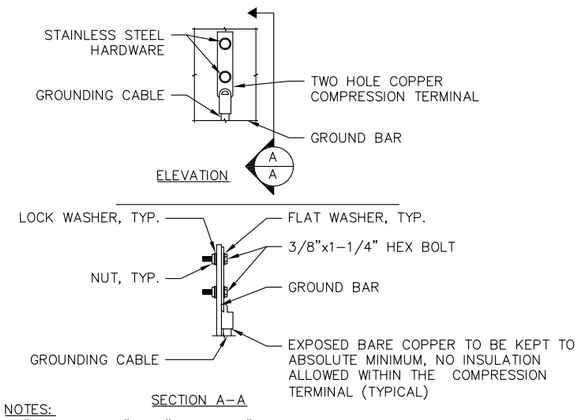
SHEET TITLE
DETAILS

SHEET NUMBER
A-4

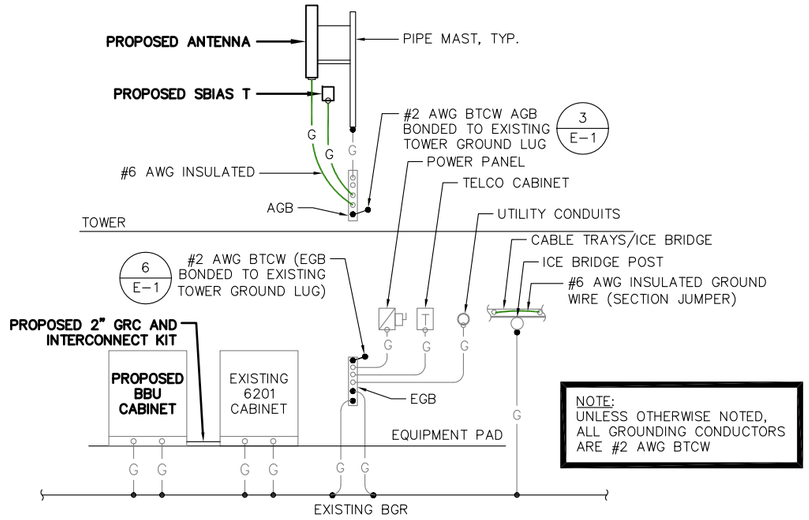


NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

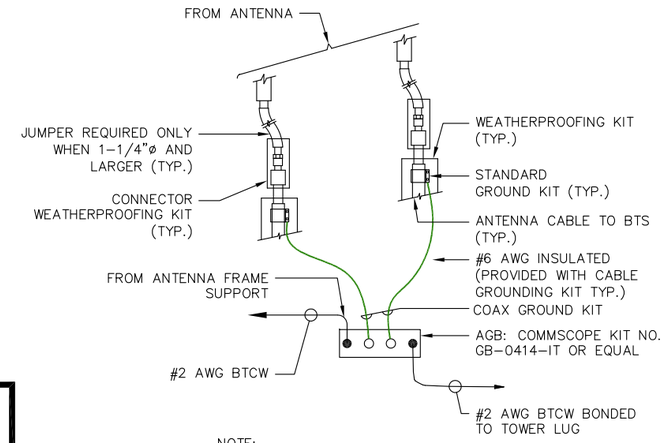
TYPICAL GROUND BAR CONNECTION DETAIL

1 / E-1

SCALE: N.T.S.



NOTE:
UNLESS OTHERWISE NOTED, ALL GROUNDING CONDUCTORS ARE #2 AWG BTCW



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

TYPICAL GROUNDING RISER DIAGRAM

2 / E-1

SCALE: N.T.S.

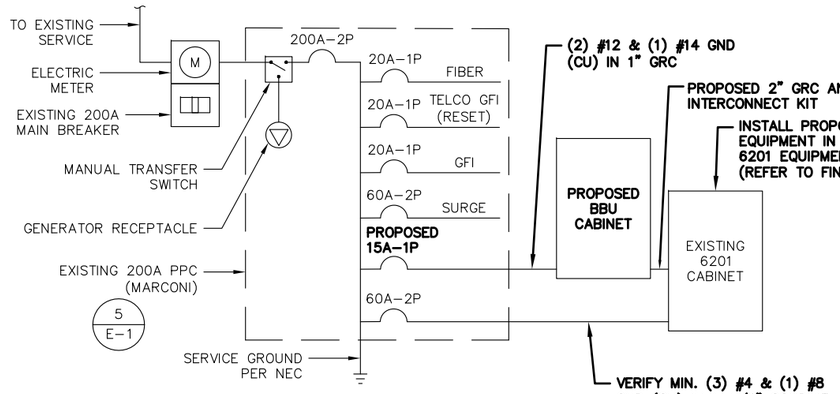


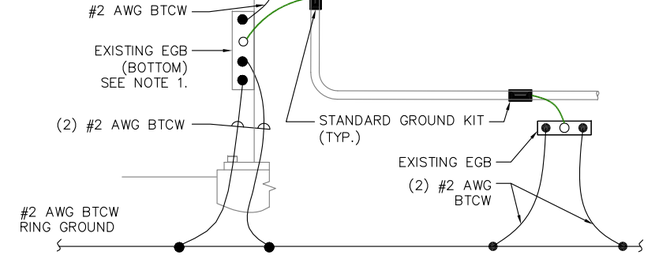
IMAGE SOURCE: PROTERRA 08/28/15

IMAGE SOURCE: PROTERRA 08/28/15

TOWER TOP CABLE GROUNDING DETAIL

3 / E-1

SCALE: N.T.S.



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

ONE LINE POWER SCHEMATIC

4 / E-1

SCALE: N.T.S.

ELECTRICAL LEGEND

A	AMPERE
V	VOLT
KWH	KILOWATT - HOUR
C	CONDUIT
GRC	GALVANIZED RIGID CONDUIT
BTCW	BARE TINNED (SOLID) COPPER WIRE (#2 AWG, UNLESS NOTES OTHERWISE)
G	GROUND
MGB	GROUND
	MASTER GROUND BAR — ○ MECHANICAL CONNECTION ● CADWELD CONNECTION
AGB/EGB	EQUIPMENT GROUND BAR/ANTENNA GROUND BAR
G	GROUND COPPER WIRE, SIZE AS NOTED
	EXPOSED WIRING
	INSULATED GROUNDING CONDUCTOR (#6 AWG STRANDED, UNLESS NOTED OTHERWISE)
	5/8"x10' COPPER CLAD STAINLESS STEEL GROUND ROD
	● EXOTHERMIC (CAD WELD) OR ○ MECHANICAL (COMPRESSION TYPE) CONNECTION
PPC	POWER PROTECTION CABINET
	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL

CONTRACTOR NOTE:
G.C. TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

PHOTO DETAIL: PPC PANEL

5 / E-1

SCALE: N.T.S.

TOWER BOTTOM CABLE GROUNDING DETAIL

6 / E-1

SCALE: N.T.S.

ELECTRICAL & GROUNDING NOTES:

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) 2014 AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THHN INSULATION AS REQUIRED BY NEC.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE POWER PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON DRAWING A-1. PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
14. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PRODUCERS (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN BTS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LYGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
19. BOMD ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20. BOND ANTENNA EGB'S AND MGB TO WATER MAIN/GROUND RING.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

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SHEET TITLE
ONE-LINE DIAGRAM & GROUNDING DETAILS

SHEET NUMBER
E-1