Filed by:
Kri Pelletier, Property Specialist - SBA Communications
134 Flanders Rd., Suite 125, Westborough, MA 01581
508.251.0720 x 3804 - kpelletier@sbasite.com

February 25, 2016

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

Notice of Exempt Modification
1021 Blue Hills Avenue, Bloomfield, CT 06002
41.8201031 N
-72.6965269 W
AT&T #: 10035110 _LTE

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 98-foot level of the existing 125-foot Self-Support Tower at 1021 Blue Hills Avenue. The tower is owned by SBA Towers, LLC. The property is owned by Blue Hills Fire District. AT&T now intends to install three (3) new LTE antennas. These antennas would be installed at the 98-foot level of the tower. AT&T also intends to:

Remove:

- None

Remove and Replace:

- Remove (2) existing Andrew SBNHH panel antennas and replace with (2) new CCI HPA-65R-BUU-H8 panel antennas
- Remove (1) existing KMW AM-X-CD panel antenna and replace with (1) new CCI HPA-65R-BUU-H6 panel antennas
- Remove (1) DUL21 radio and replace with (1) DUL41 radio within existing equipment rack within existing equipment shelter

Install:

- (3) Ericsson RRUS A-2 Module (in conjunction with RRUS-11 noted in the existing entitlements)

Existing Equipment to Remain (Entitlements):

- All Existing Equipment located within existing Equipment shelter
- (3) Sector T-Frame stand offs
- (6) Powerwave 7770 Panel Antennas
- (3) Ericsson RRUS-11 Remote Radio Unit (Installed to remain)
- (3) Ericsson RRUS-11 Remote Radio Unit (Reserved entitlement to be installed)

- (6) Powerwave LPG21401 - TMA/TTA
- (6) Powerwave LPG21903 Diplexer
- (1) Raycap DC6 Surge Suppressor
- (12) 7/8" Coax Lines
- (1) 3" conduit with fiber/DC power cables listed below:
  - (1) 3/8" Fiber Cable
  - (2) 3/4" DC Power Cable
- (1) Nokia CS72188.01 LMU Antenna (Reserved Entitlement)
- (1) 1/2" Coax line (Reserved Entitlement)

This facility was approved with Special Permit by the Board of Appeals of the Town of Bloomfield on December 1, 1997. The tower was to be located 12 feet from the property line at 1021 Blue Hills Ave with an 8' chain link fence placed around the tower. This modification complies with the aforementioned conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16.50j-72(b)(2). In accordance with R.C.S.A. § 16.50j-73, a copy of this letter is being sent to The Honorable Joan Gamble, Mayor of Bloomfield, as well as the property owner, Blue Hills Fire District. (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, AT&T 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
134 Flanders Rd., Suite 125
Westborough, MA 01581

508.251.0720 x3804 + T
508.366.2610 + F
203.446.7700 + C
kpelletier@sbasite.com

Attachments

cc: The Honorable Joan Gamble, Mayor of Bloomfield—as elected official
Bloomfield Town Hall, 800 Bloomfield Ave., Bloomfield, CT 06002
Blue Hills Fire District–as property owner
1021 Blue Hills Avenue Bloomfield CT 06002-3715

POWER DENSITY

AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	98 feet	Height (AGL):	98 feet	Height (AGL):	98 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	4,281.78	ERP (W):	4,281.78	ERP (W):	4,281.78
Antenna A1 MPE%	**2.36**	Antenna B1 MPE%	**2.36**	Antenna C1 MPE%	**2.36**
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	CCI HPA-65R-BUU-H8	Make / Model:	CCI HPA-65R-BUU-H8	Make / Model:	CCI HPA-65R-BUU-H6
Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd	Gain:	11.95 / 14.75 dBd
Height (AGL):	98 feet	Height (AGL):	98 feet	Height (AGL):	98 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	6,229.75	ERP (W):	6,229.75	ERP (W):	5,462.56
Antenna A2 MPE%	**3.85**	Antenna B2 MPE%	**3.85**	Antenna C2 MPE%	**3.23**
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	98 feet	Height (AGL):	98 feet	Height (AGL):	98 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A3 MPE%	**1.18**	Antenna B3 MPE%	**1.18**	Antenna C3 MPE%	**1.18**

Site Composite MPE%	
Carrier	MPE%
AT&T – Max per sector	**7.38 %**
Verizon Wireless	7.16 %
T-Mobile	0.08 %
MetroPCS	2.55 %
Clearwire	0.15 %
Sprint	2.32 %
Nextel	0.44 %
XM Satellite Radio	0.16 %
PageNet	0.08 %
Blue Hills FD	1.75 %
Site Total MPE %:	**22.07 %**

AT&T Sector 1 Total:	7.38 %
AT&T Sector 2 Total:	7.38 %
AT&T Sector 3 Total:	6.77 %
Site Total:	22.07 %

AT&T _ 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
AT&T 850 MHz UMTS	4	414.12	98	7.04	850	567	1.24 %
T&T 1900 MHz (PCS) UMTS	4	656.33	98	11.15	1900	1000	1.12 %
AT&T 700 MHz LTE	2	1239.23	98	10.53	700	467	2.25 %
T&T 1900 MHz (PCS) LTE	2	1875.65	98	15.93	1900	1000	1.59 %
AT&T 850 MHz GSM	2	414.12	98	3.52	850	567	0.62 %
T&T 1900 MHz (PCS) GSM	2	656.33	98	5.58	1900	1000	0.56 %
						Total:	7.38 %

ALLPRO
CONSULTING GROUP, INC.
9221 Lyndon B. Johnson Freeway, #204, Dallas, TX 75243 ★ PHONE 972-231-8893 ★ FAX 1-866-364-8375
www.allprocgi.com ★ e-mail: info@allprocgi.com

Tower Structural Analysis Report for
SBA Communications Corporation

Existing 125' Self Supported Tower

SBA Site Name: Bloomfield
SBA Site Number: CT01725-A-02
Carrier Name: AT&T
Carrier Site ID: FA# 10035110 USID# 14526

Site Location:
1021 Blue Hills Avenue,
Bloomfield, CT 06002-3715
Hartford County

Latitude: 41.820119°
Longitude: -72.696514 °

ACGI Job # 16-0654
(Refer previous: ACGI# 16-0291 dated 02/17/2016)

ANALYSIS RESULTS		
Tower Components	95.7 %	**Sufficient**
Tower Foundation Capacity	75.9 %	**Sufficient**

Prepared By:
Sudarshan Kasera, EIT

02/24/2016
Approved By:
Joji George, P.E.
CT PE# 24444

TABLE OF CONTENTS

1. ANALYSIS SUMMARY

The existing 125' Self Supported Tower located in Bloomfield, CT was analyzed by Allpro Consulting Group, Inc (ACGI) for the existing loads and the proposed AT&T antennas and coaxes as authorized by SBA Communication Corp. Based on the results of the analysis, the existing tower with below 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 Connecticut State Building Code (IBC 2003). The current analysis was performed under the assumption that the previously proposed modification for Verizon have been properly installed as per the modification design report prepared by Allpro Consulting Group, Inc., ACGI# 16-0291 dated 02/17/2016. No new loading should be added to the tower before the installation of the proposed modifications.*

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:	Fred A. Nudd Corporation	Original Structural Design Report by Fred A. Nudd Corporation, Project# 5566A dated March 11, 1998.
	B&T Group	Previous failing structural analysis by B&T Group, Project Number: 101023.003.001 dated January 21, 2016.
	Allpro Consulting Group, Inc.	Previous modification report by Allpro Consulting Group, Inc., ACGI# 16-0291 dated 02/17/2016.
Foundation Data:	Fred A. Nudd Corporation	Foundation Design Drawings by Fred A. Nudd Corporation, Drawing# 97-5566-2 dated 12/18/97
Geotechnical Report:	FDH Engineering, Inc.	Geotechnical Evaluation of Subsurface Conditions, Project Number 1206690EG1 dated 08/10/2012.
Loading Data:	Allpro Consulting Group, Inc.	Previous modification report by Allpro Consulting Group, Inc., ACGI# 16-0291 dated 02/17/2016.
	SBA Communication Corp.	SBA site summary dated 09/10/2015
		Proposed final loading for AT&T as per SBA Portal, Application# 29563, v1.
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:	Bloomfield
SBA Site Number:	CT01725-A-02
Carrier Site Name:	AT&T- FA# 10035110 USID# 14526
City, State:	Bloomfield, CT
County:	Hartford
Code Wind Load Requirement:	ANSI/TIA-222-F & *Connecticut State Building Code (IBC 2003)* (80 mph basic wind speed)
Wind Load Used:	ANSI/TIA-222-F Code: • 80 mph/69.3 mph + 1/2" ice

TOWER DATA	
Tower Type:	Self - Supported Tower
Height:	125.0'
Cross Section:	Triangular
Steel Strength:	Legs – 55 ksi Braces – 36 ksi
Type of Foundation:	Mat foundation

TOWER HISTORY	
Tower Manufacturer / Model:	Fred A. Nudd Corporation, Model: S9BPA
Date of Original Design:	March 11, 1998
Previous Modifications:	Previous modification report by Allpro Consulting Group, Inc., ACGI# 16-0291 dated 02/17/2016.
Original Design Code Requirements:	ANSI/TIA/EIA 222-E, Design wind & Ice: 80 mph/60 mph + 1/2" ice

4. CONCLUSIONS

RESULT SUMMARY		
MEMBER	***% Capacity***	***Pass/Acceptable***
Legs	**95.7 %**	**Pass**
Diagonals	**88.8 %**	**Pass**
Horizontals	**46.7 %**	**Pass**
Secondary Horizontals	**20.5 %**	**Pass**
Top Girt	**25.7 %**	**Pass**
Bottom girts	**23.7 %**	**Pass**
Bolt checks	**88.8 %**	**Pass**
Anchor Bolt checks	**58.8 %**	**Pass**
Foundation (Overturning)	**45.1 %**	**Pass**
Foundation (Net soil bearing)	**15.4 %**	
Foundation (Horizontal Shear)	**31.7 %**	
Foundation (Uplift)	**39.8 %**	
Foundation (Reinforcement)	**75.9 %**	
OVERALL TOWER RATING = 95.7 % (Pass)		

MAXIMUM DISH ROTATION AT SERVICE WIND SPEED Twist and Sway (deg), 10 dB degradation limit					
Elev. (ft)	*MW Dish*	*Twist (deg)*	*Sway (deg)*	*Allowable (deg)*	*Result*
123±	**(E) (1) Andrew VHLP2.5 Dish**	**0.055**	**0.527**	**Carrier to provide**	**-**
117±	**(E) (1) Andrew VHLP2.5 Dish**	**0.034**	**0.515**	**Carrier to provide**	**-**

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 *Connecticut State Building Code (IBC 2003)*.

5. RECOMMENDATIONS

The existing tower is recommended for the final loading listed under Section 7 "Appurtenances Listing", after the previously proposed modification for Verizon have been properly installed as per the modification design report prepared by Allpro Consulting Group, Inc., ACGI# 16-0291 dated 02/17/2016. No new loading should be added to the tower before the installation of the proposed modifications.

6. 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.

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.

7. APPURTENANCE LISTING

EXISTING LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
135±	3	Celwave PD455	(1) Platform w/ rails @ 125.0'	(1) 1-1/4" (2) 1/2" (2) 7/8"	Blue Hills Fire & PD
	2	20' Omni			
125±	3	Commscope LNX-6515DS-A1M	(1) Platform w/ rails @ 125.0'	(13) 1-5/8"	T-Mobile
	3	Ericsson S11B12			
	3	Ericsson AIR21 B2A/B4P			
	3	Ericsson AIR21 B4A/B2P			
	3	Ericsson KRY 112 144/1			
123±	1	Andrew VHLP2.5 dish			
120±	3	Samsung U-RAS	(3) Sector Frames @ 120'	(3) 1-1/4" (7) 5/16" (2) 1/2"	Clearwire
	2	Dragonwave HORIZON DUO			
	3	Kathrein 840 10054			
119±	1	Andrew VHLP2.5 dish			
110±	3	Amphenol BXA-70063-4CF-EDIN-6 panel antenna	(3) Sector Frames @ 107'	(18) 1-5/8" + (2) 1-5/8" Hybrids + (2) 1/2" GPS line	Verizon
	9	Andrew SBNHH-1D65B panel antenna			
	3	Alcatel Lucent RRH2x60-AWS radio			
	3	Alcatel Lucent RRH2x60-700 radio			
	3	Alcatel Lucent RRH 4x45-PCS radio			
	2	Andrew GPS			
	1	Rfs Celwave DB-T1-6Z-8AB-0Z distribution box			
98±	2	Andrew SBNH-1D6565C	(3) Sector Frames @ 98'	(12) 7/8" (2) 3/4" (1) 3/8" (1) 3"	AT&T
	6	Ericsson RRUS-11			
	1	KMW AM-X-CD-16-65-00T-RET			
	6	Powerwave Tech.7770.00			
	6	Powerwave Tech.LGP21401			
	6	Powerwave Tech.LGP21903			
96±	1	Raycap DC6-48-60-18-8F	Direct mount @ 96.0'		
87±	3	Alcatel Lucent 1900MHz RRH	(3) Sector Frames @ 87'	(3) 1-1/4" (1) 0.7"	Sprint
	3	Alcatel Lucent 800MHZ RRH			
	3	Alcatel Lucent TD-RRH8x20-25			
	4	RFS Celwave ACU-A20-N			
	3	RFS Celwave APXVSPP18-C-A20			
	3	RFS Celwave APXVTM14-C-120			
	3	Samsung 800 MHz Filter			
75±	1	RFS Celwave APXV18-206517S-C	Direct mount @ 75.0'	(6) 1-5/8"	Metro
51±	3	2' Omni	(1) Stand off @ 50.0'	-	Unknown

PROPOSED LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
98±	6	Powerwave 7770 panel antenna	(3) Sector Frames @ 98'	(12) 7/8" (2) 3/4" DC + (1) 1/2" Fiber within 3" Flex conduits (1) 1/2"	AT&T
	2	CCI HPA-65R-BUU-H8 panel antenna			
	1	CCI HPA-65R-BUU-H6 panel antenna			
	6	Powerwave LGP21401 TMA			
	6	Ericsson RRUs 11			
	3	Ericsson RRUs A2			
	6	Powerwave LGP21903 diplexer			
	1	Raycap DC6-48-60-18-8F			
65±	1	Nokia CS72188.01 LMU Antenna			

Notes: ACGI should be notified for a redesign in case of any discrepancies found in the data listed in this report and any potential physical & other interference with existing antennas.

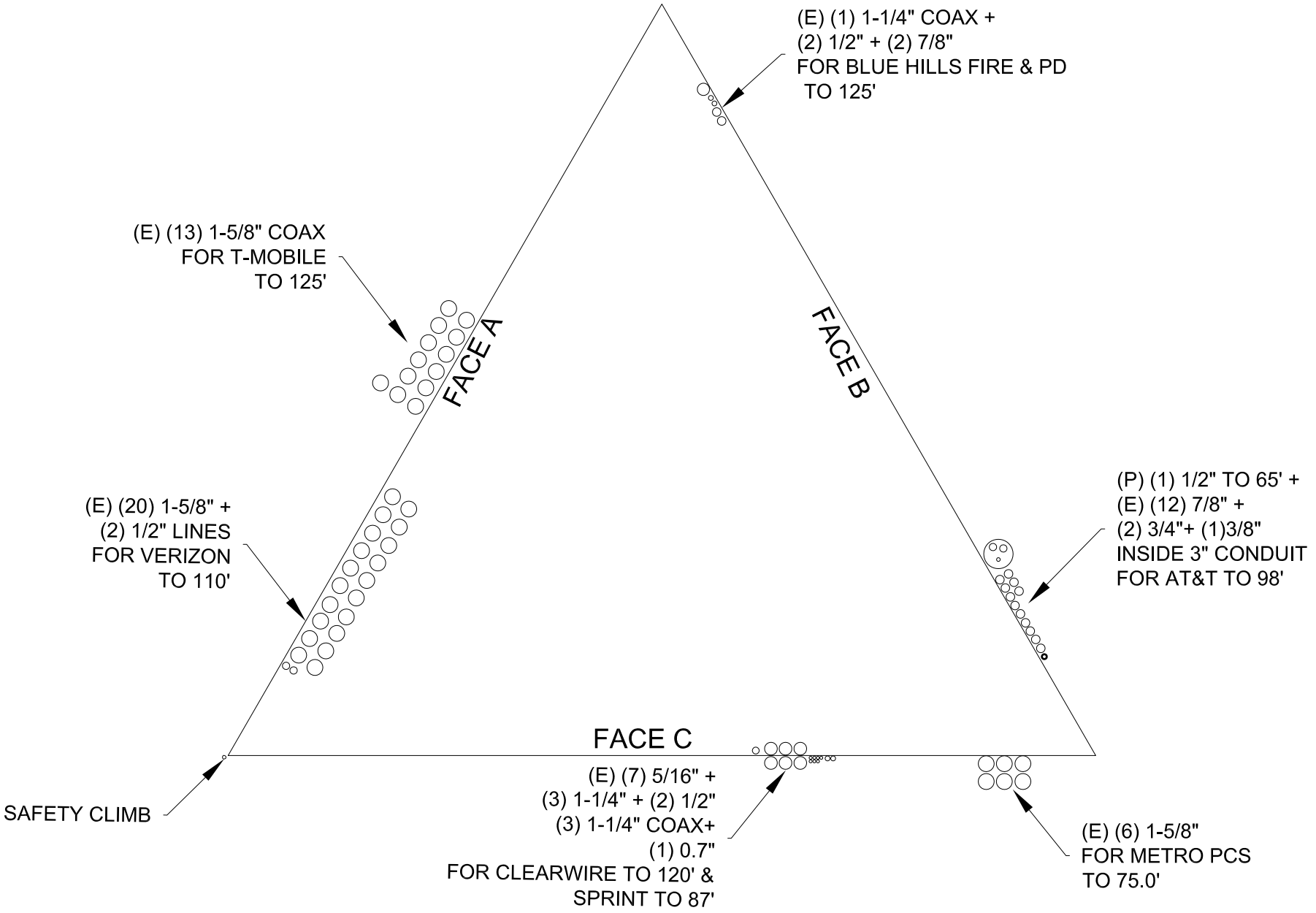
8. SUMMARY OF WORKING PERCENTAGE OF STRUCTURAL COMPONENTS

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
T1	125 - 120	Leg	P2.5x.203	1	-10.897	66.831	16.3	Pass
T2	120 - 100	Leg	P2.5x.203	25	-43.389	53.921	80.5	Pass
T3	100 - 80	Leg	P3.5x.226	52	-92.825	97.412	95.3	Pass
T4	80 - 60	Leg	P5x.258	79	-138.963	158.579	87.6	Pass
T5	60 - 40	Leg	P6x.28	100	-181.384	214.348	84.6	Pass
T6	40 - 20	Leg	P6x.28	121	-213.680	223.180	95.7	Pass
T7	20 - 0	Leg	P8x.322	142	-249.202	313.084	79.6	Pass
T1	125 - 120	Diagonal	5/8	15	3.795	8.834	43.0	Pass
T2	120 - 100	Diagonal	L1 1/2x1 1/2x3/16	32	-4.560	5.323	85.7	Pass
T3	100 - 80	Diagonal	L2x2x3/16	59	-6.263	9.811	63.8 80.4 (b)	Pass
T4	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	86	-6.455	12.275	52.6 86.0 (b)	Pass
T5	60 - 40	Diagonal	L2 1/2x2 1/2x3/16	107	-6.154	10.043	61.3 75.3 (b)	Pass
T6	40 - 20	Diagonal	L3x3x3/16	137	-8.321	11.201	74.3 88.8 (b)	Pass
T7	20 - 0	Diagonal	L3 1/2x3 1/2x1/4	149	-7.505	19.295	38.9 71.5 (b)	Pass
T1	125 - 120	Horizontal	L1 1/2x1 1/2x3/16	18	-2.983	6.385	46.7	Pass
T6	40 - 20	Secondary Horizontal	L3x3x1/4	130	-3.704	18.047	20.5	Pass
T1	125 - 120	Top Girt	L1 1/2x1 1/2x3/16	6	-1.638	6.385	25.7	Pass
T1	125 - 120	Bottom Girt	L1 1/2x1 1/2x3/16	9	-1.513	6.385	23.7	Pass
							Summary	
						Leg (T6)	95.7	Pass
						Diagonal (T6)	88.8	Pass
						Horizontal (T1)	46.7	Pass
						Secondary Horizontal (T6)	20.5	Pass
						Top Girt (T1)	25.7	Pass
						Bottom Girt (T1)	23.7	Pass
						Bolt Checks	88.8	Pass
						RATING =	**95.7**	**Pass**

APPENDIX

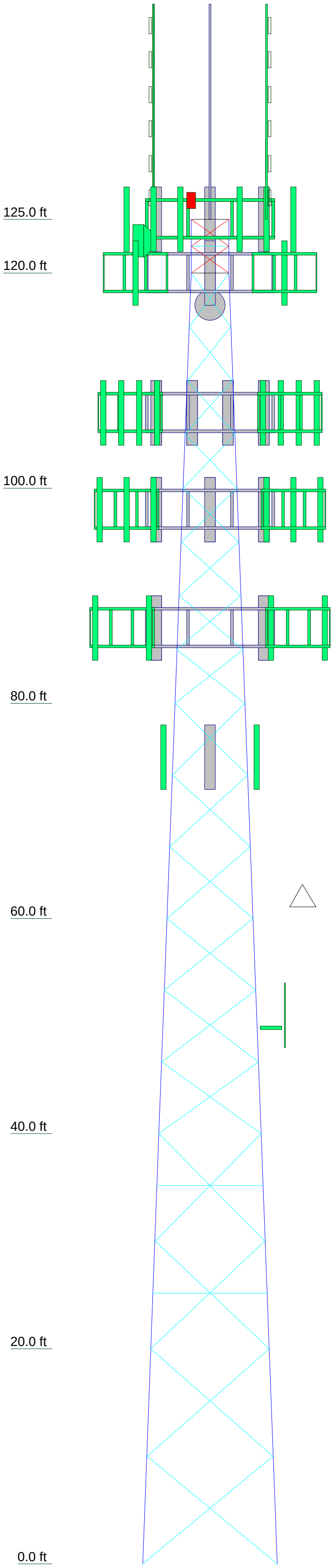
COAX LAYOUT



COAX LAYOUT

N.T.S

TOWER ELEVATION DRAWING



Section	T1	T2	T3	T4	T5	T6	T7	
Legs	P2.5x.203		P3.5x.226	P5x.258	P6x.28		P8x.322	
Leg Grade	A572-55							
Diagonals	SR 5/8	L1 1/2x1 1/2x3/16	L2x2x3/16	L2 1/2x2 1/2x3/16		L3x3x3/16	L3 1/2x3 1/2x1/4	
Diagonal Grade	A36							
Top Girts	A	N.A.						
Bottom Girts	A	N.A.						
Horizontals	A	N.A.						
Sec. Horizontals	N.A.					L3x3x1/4	N.A.	
Face Width (ft)	3.5	5		6.5	8	9.5	11	12.5
# Panels @ (ft)	2 @ 2.5	8 @ 5		6 @ 6.66667		4 @ 10		
Weight (K)	0.2	0.7	1.0	1.5	1.8	2.2	2.9	10.3

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION
Lightning Rod 5/8" x 5' (E)	125
Flash Beacon Lighting (E)	125
PD455 (E-Blue Hills Fire _PD)	125
PD455 (E-Blue Hills Fire _PD)	125
PD455 (E-Blue Hills Fire _PD)	125
20' x 3" Omni (E-Blue Hills Fire _PD)	125
20' x 3" Omni (E-Blue Hills Fire _PD)	125
AIR21 B2A/B4P w/ Mount Pipe (E-T-Mobile)	125
AIR21 B2A/B4P w/ Mount Pipe (E-T-Mobile)	125
AIR21 B2A/B4P w/ Mount Pipe (E-T-Mobile)	125
AIR21 B4A/B2P w/ Mount Pipe (E-T-Mobile)	125
AIR21 B4A/B2P w/ Mount Pipe (E-T-Mobile)	125
AIR21 B4A/B2P w/ Mount Pipe (E-T-Mobile)	125
KRY 112 144/1 (E-T-Mobile)	125
KRY 112 144/1 (E-T-Mobile)	125
KRY 112 144/1 (E-T-Mobile)	125
LNX-6515DS-A1M w/ Mount Pipe (R-T-Mobile)	125
LNX-6515DS-A1M w/ Mount Pipe (R-T-Mobile)	125
LNX-6515DS-A1M w/ Mount Pipe (R-T-Mobile)	125
S11B12 (R-T-Mobile)	125
S11B12 (R-T-Mobile)	125
S11B12 (R-T-Mobile)	125
Platform Mount [LP 602-1] (E)	125
840 10054 w/ Mount Pipe (E-Clearwire)	120
840 10054 w/ Mount Pipe (E-Clearwire)	120
840 10054 w/ Mount Pipe (E-Clearwire)	120
U-RAS (E-Clearwire)	120
U-RAS (E-Clearwire)	120
U-RAS (E-Clearwire)	120
HORIZON DUO (E-Clearwire)	120
HORIZON DUO (E-Clearwire)	120
4' x 2" Pipe Mount (E-Per Photo)	120
4' x 2" Pipe Mount (E-Per Photo)	120
4' x 2" Pipe Mount (E-Per Photo)	120
Sector Mount [SM 402-3] (E-2PIPIES/SEC)	120
VHLP2.5 (E-CL Per Photo)	120
VHLP2.5 (E-CL Per Photo)	120
BXA-70063-4CF-EDIN-6 w/ Mount Pipe (E-Verizon)	107
BXA-70063-4CF-EDIN-6 w/ Mount Pipe (E-Verizon)	107
BXA-70063-4CF-EDIN-6 w/ Mount Pipe (E-Verizon)	107
DB-T1-6Z-8AB-0Z (E-Verizon)	107
(3) SBNHH-1D65B w/ Mount Pipe (P-Verizon)	107
(3) SBNHH-1D65B w/ Mount Pipe (P-Verizon)	107
(3) SBNHH-1D65B w/ Mount Pipe (P-Verizon)	107
RRH2x60-AWS (P-Verizon)	107
RRH2x60-AWS (P-Verizon)	107
RRH2x60-AWS (P-Verizon)	107
RRH2x60-700 (P-Verizon)	107
RRH2x60-700 (P-Verizon)	107
RRH2x60-700 (P-Verizon)	107
RRH 4x45-PCS (P-Verizon)	107
RRH 4x45-PCS (P-Verizon)	107
RRH 4x45-PCS (P-Verizon)	107
Sector Mount [SM 802-3] (E)	107
GPS_A (E-Verizon)	107
GPS_A (E-Verizon)	107
(2) 7770.00 w/ Mount Pipe (ATT)	98
HPA-65R-BUU-H8-K (ATT)	98
HPA-65R-BUU-H8-K (ATT)	98
HPA-65R-BUU-H6 (ATT)	98
(2) LGP21401 (ATT)	98
(2) LGP21401 (ATT)	98
(2) LGP21401 (ATT)	98
(2) RRUS-11 (ATT)	98
(2) RRUS-11 (ATT)	98
(2) RRUS-11 (ATT)	98
RRUS A2 (ATT)	98
RRUS A2 (ATT)	98
RRUS A2 (ATT)	98
(2) LGP21903 (ATT)	98
(2) LGP21903 (ATT)	98
(2) LGP21903 (ATT)	98
Sector Mount [SM 802-3] (ATT)	98
(2) 7770.00 w/ Mount Pipe (ATT)	98
(2) 7770.00 w/ Mount Pipe (ATT)	98
DC6-48-60-18-8F (ATT (Leg mount))	96
APXVSPP18-C-A20 w/ Mount Pipe (E-Sprint)	87
APXVSPP18-C-A20 w/ Mount Pipe (E-Sprint)	87
APXVTM14-C-120 w/ Mount Pipe (E-Sprint)	87
APXVTM14-C-120 w/ Mount Pipe (E-Sprint)	87
APXVTM14-C-120 w/ Mount Pipe (E-Sprint)	87
TD-RRH8x20-25 (E-Sprint-Hz Offset Per Photo)	87
TD-RRH8x20-25 (E-Sprint-Hz Offset Per Photo)	87
TD-RRH8x20-25 (E-Sprint-Hz Offset Per Photo)	87
1900MHz RRH (E-Sprint-Hz Offset Per Photo)	87
1900MHz RRH (E-Sprint-Hz Offset Per Photo)	87
1900MHz RRH (E-Sprint-Hz Offset Per Photo)	87
800MHZ RRH (E-Sprint-Hz Offset Per Photo)	87
800MHZ RRH (E-Sprint-Hz Offset Per Photo)	87
800MHZ RRH (E-Sprint-Hz Offset Per Photo)	87
800 MHz Filter (E-Sprint-Hz Offset Per Photo)	87
800 MHz Filter (E-Sprint-Hz Offset Per Photo)	87
800 MHz Filter (E-Sprint-Hz Offset Per Photo)	87
(2) ACU-A20-N (E-Sprint-Hz Offset Per Photo)	87
ACU-A20-N (E-Sprint-Hz Offset Per Photo)	87
ACU-A20-N (E-Sprint-Hz Offset Per Photo)	87
(2) 4' x 2" Pipe Mount (E)	87
(2) 4' x 2" Pipe Mount (E)	87
(2) 4' x 2" Pipe Mount (E)	87
Sector Mount [SM 502-3] (E)	87
APXVSPP18-C-A20 w/ Mount Pipe (E-Sprint)	87
APXV18-206517S-C w/ Mount Pipe (E-MetroPCS-Leg Mounted)	75
APXV18-206517S-C w/ Mount Pipe (E-MetroPCS-Leg Mounted)	75
APXV18-206517S-C w/ Mount Pipe (E-MetroPCS-Leg Mounted)	75
CS72188.01 LMU antenna (ATT)	65
Side Arm Mount [SO 701-1] (E)	50
2' Omni Whip (E)	50

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 1/2x1 1/2x3/16		

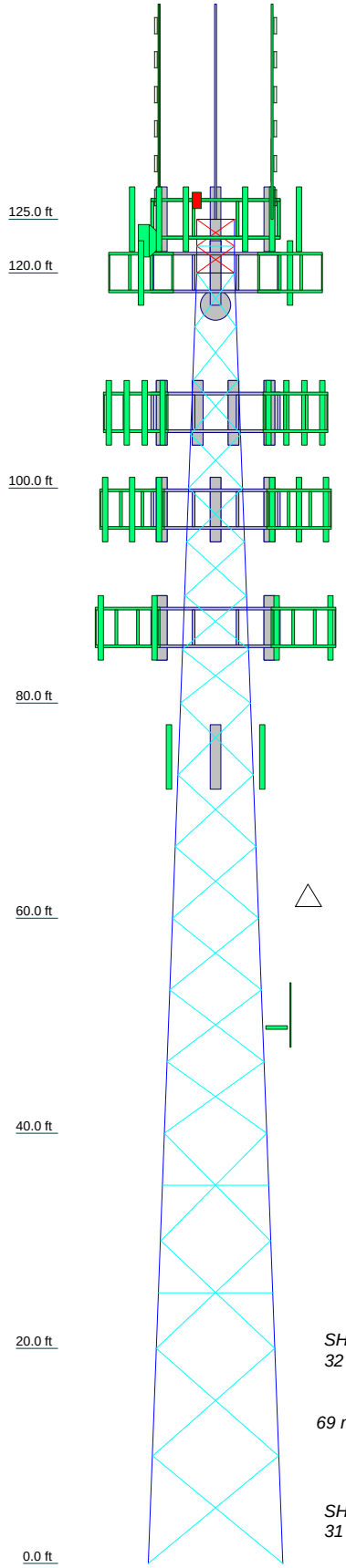
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu

Allpro Consulting Group Inc.
9221 Lyndon B. Johnson Freeway, # 204
Dallas, TX 75243
Phone: 972-231-8893
FAX: (555) 555-1235
Consulting Engineers

Job: ***CT01725-A-02/Bloomfield, CT***		
Project: ***ACGI# 16-0654***		
Client: SBA Network Services	Drawn by: SKasera	App'd:
Code: TIA/EIA-222-F	Date: 02/24/16	Scale: NTS
Path: P:\2016\Structural\16-0654 CT01725-A-02-Bloomfield_AT&T_125' SST SA_(SBA)\Tnx Tower\CT01725-A-02_Bloomfield_AT&T_02.24.2016.tnx.16_ERI		Dwg No. E-1

Section	T1	T2	T3	T4	T5	T6	T7		
Legs		P2.5x.203	P3.5x.226	P5x.258		P6x.28	P8x.322		
Leg Grade				A572-55					
Diagonals	SR 5/8	L1 1/2x1 1/2x3/16	L2x2x3/16	L2 1/2x2 1/2x3/16		L3x3x3/16	L3 1/2x3 1/2x1/4		
Diagonal Grade				A36					
Top Girts	A			N.A.					
Bottom Girts	A			N.A.					
Horizontals	A			N.A.					
Sec. Horizontals	N.A.					L3x3x1/4	N.A.		
Face Width (ft)	3.5		5	6.5	8	9.5	11		12.5
# Panels @ (ft)	2 @ 2.5		8 @ 5		6 @ 6.66667		4 @ 10		
Weight (K)	0.2	0.7	1.0	1.5	1.8	2.2	2.9		10.3



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 1/2x1 1/2x3/16		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-55	55 ksi	70 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 95.7%

MAX. CORNER REACTIONS AT BASE:
DOWN: 258 K
SHEAR: 19 K

UPLIFT: -220 K
SHEAR: 18 K

AXIAL
56 K
SHEAR
32 K
MOMENT
2588 kip-ft

TORQUE 3 kip-ft
69 mph WIND - 0.500 in ICE

AXIAL
32 K
SHEAR
31 K
MOMENT
2533 kip-ft

TORQUE 4 kip-ft
REACTIONS - 80 mph WIND

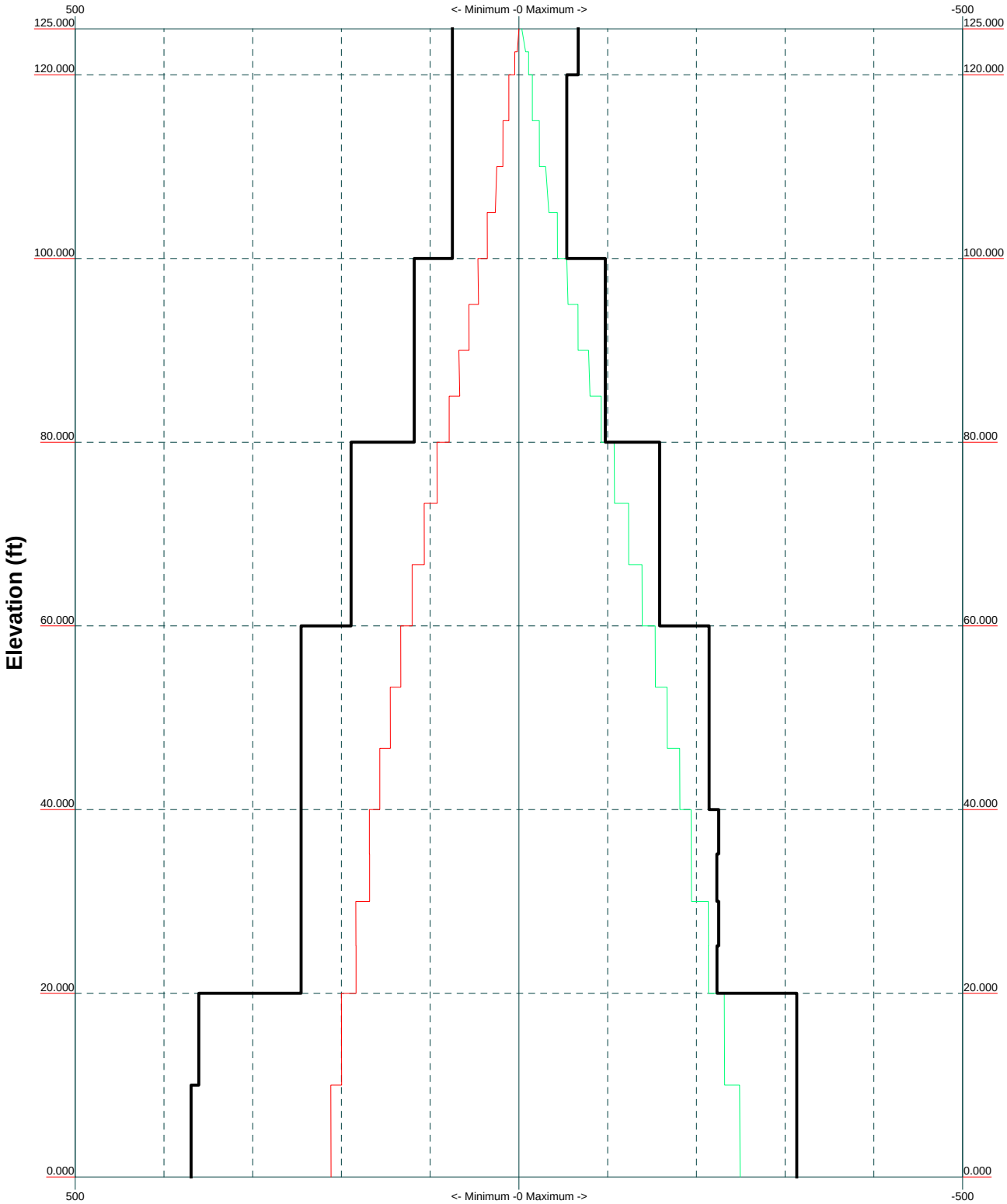
Allpro Consulting Group Inc.
9221 Lyndon B. Johnson Freeway, # 204
Dallas, TX 75243
Consulting Engineers
Phone: 972-231-8893
FAX: (555) 555-1235

Job: ***CT01725-A-02/Bloomfield, CT***			
Project: ***ACGI# 16-0654***			
Client: SBA Network Services	Drawn by: SKasera	App'd:	
Code: TIA/EIA-222-F	Date: 02/24/16	Scale: NTS	
Path:		Dwg No. E-1	

MISCELLANEOUS PLOTS

TIA/EIA-222-F - 80 mph/69 mph 0.500 in Ice

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



Allpro Consulting Group Inc.
9221 Lyndon B. Johnson Freeway, # 204
Dallas, TX 75243
Consulting Engineers
Phone: 972-231-8893
FAX: (555) 555-1235

Job: ***CT01725-A-02/Bloomfield, CT***			
Project: ***ACGI# 16-0654***			
Client: SBA Network Services	Drawn by: SKasera	App'd:	
Code: TIA/EIA-222-F	Date: 02/24/16	Scale: NTS	
Path:		Dwg No. E-3	

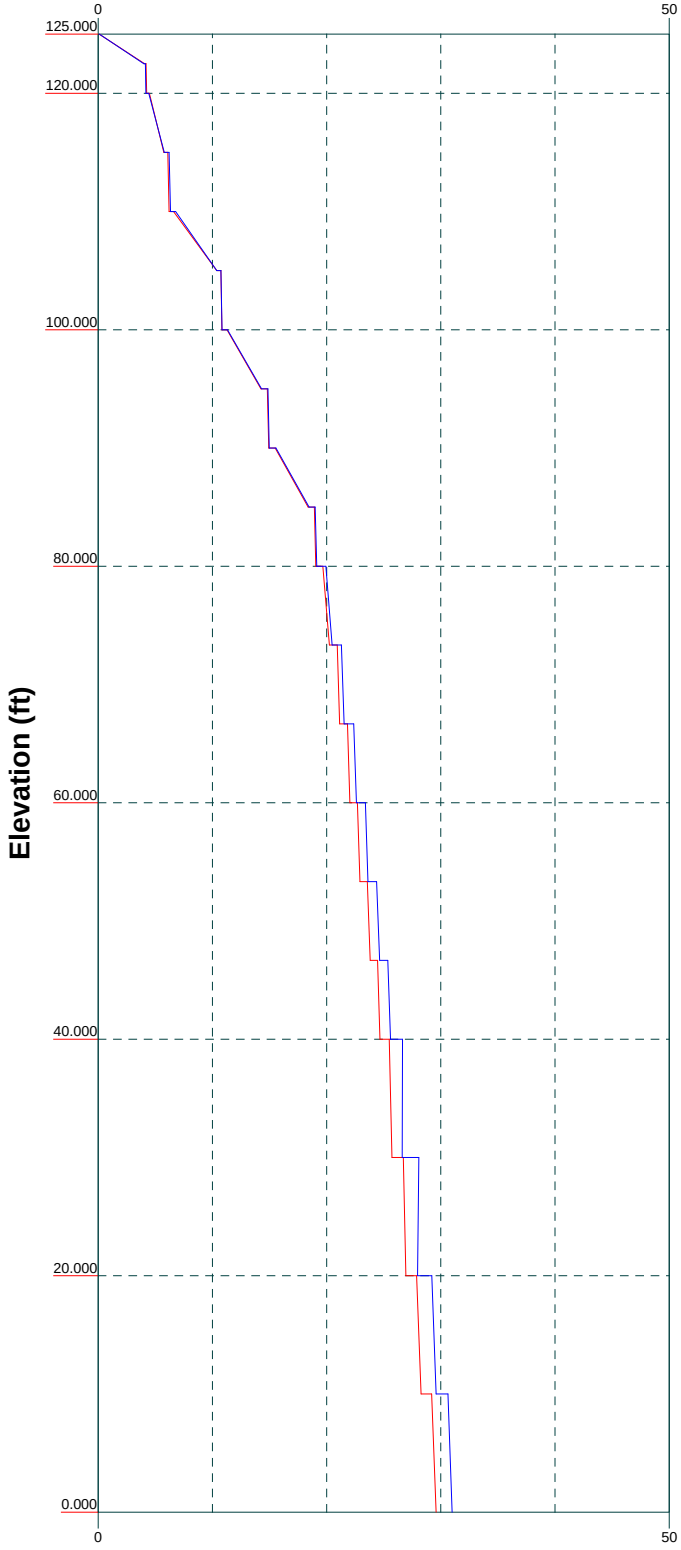
TIA/EIA-222-F - 80 mph/69 mph 0.500 in Ice

Vx Vz

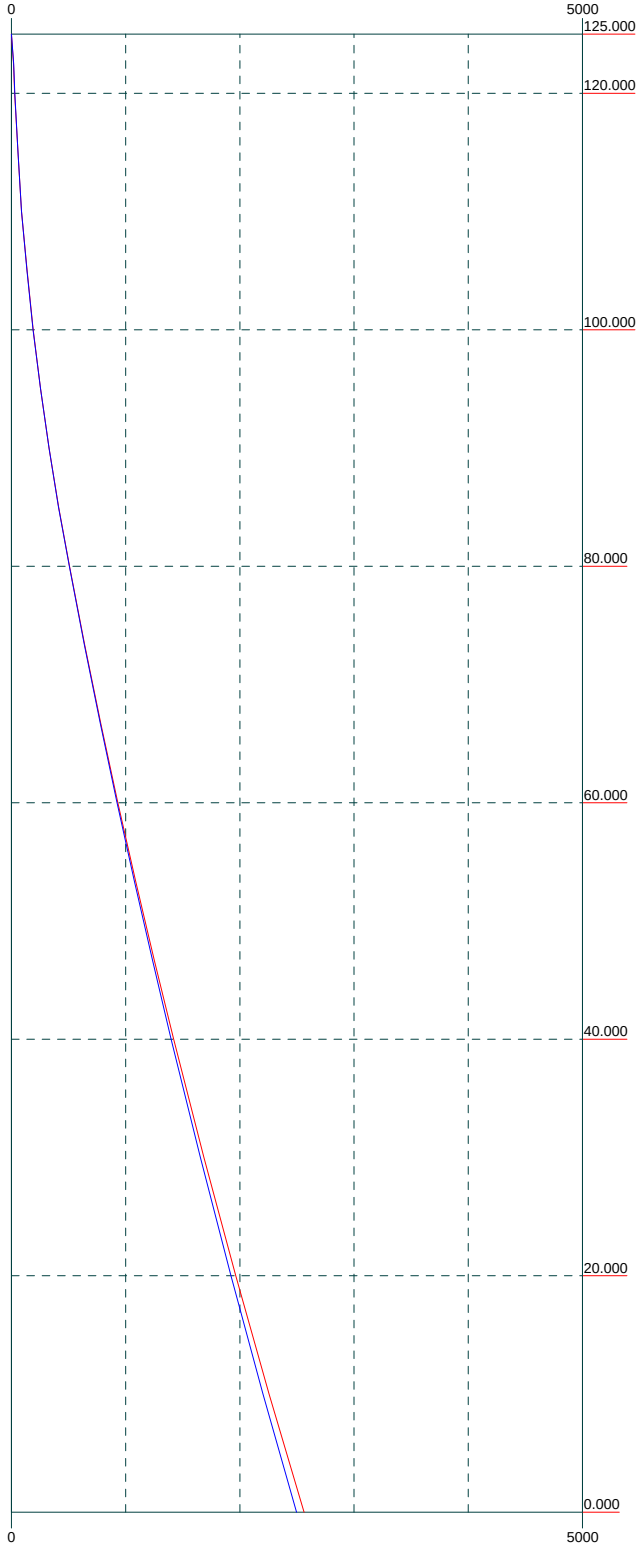
Maximum Values

Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)

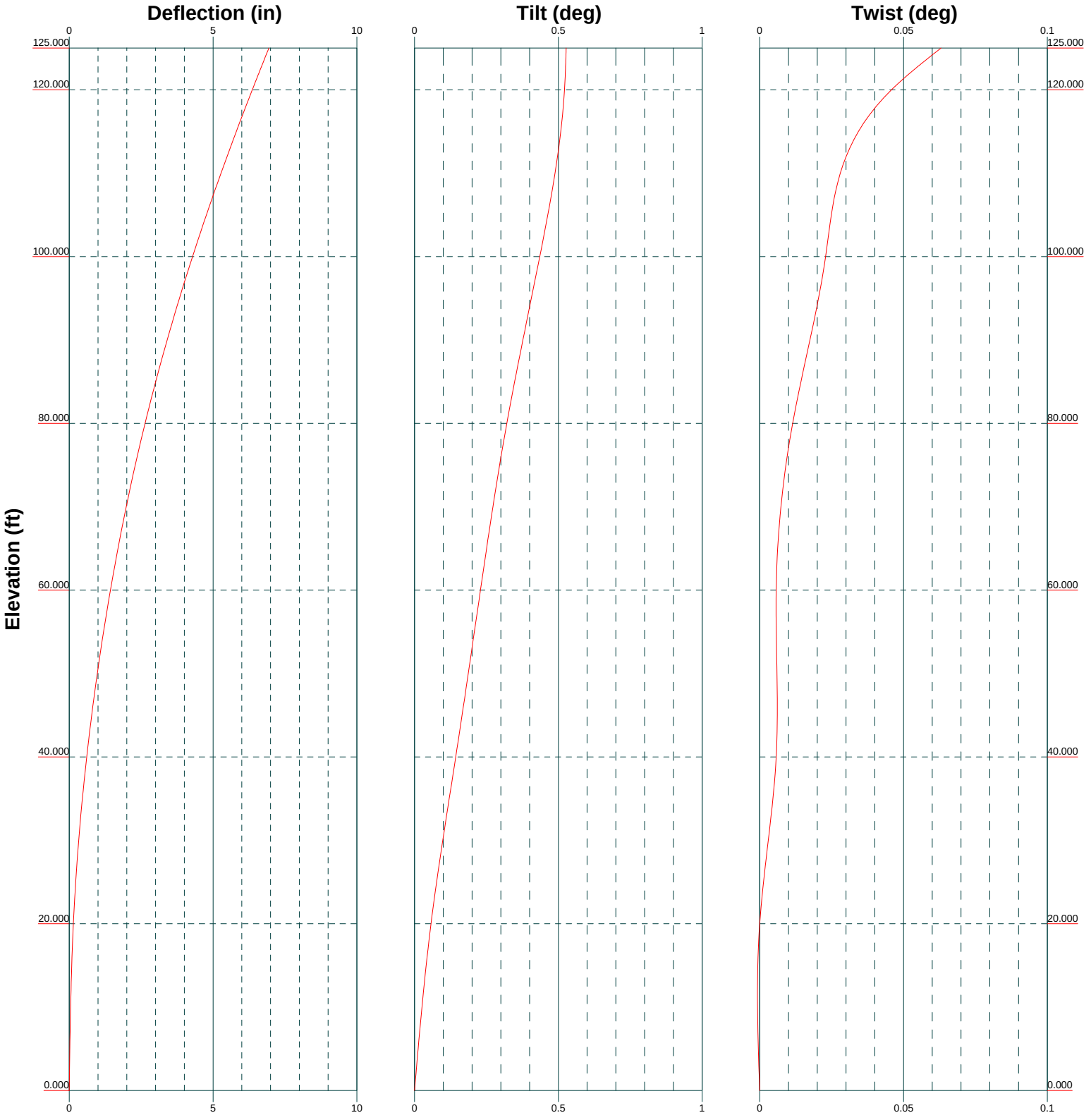


Allpro Consulting Group Inc.
9221 Lyndon B. Johnson Freeway, # 204
Dallas, TX 75243
Consulting Engineers
Phone: 972-231-8893
FAX: (555) 555-1235

Job: ***CT01725-A-02/Bloomfield, CT***			
Project: ***ACGI# 16-0654***			
Client: SBA Network Services	Drawn by: SKasera	App'd:	
Code: TIA/EIA-222-F	Date: 02/24/16	Scale: NTS	
Path:		Dwg No. E-4	

TIA/EIA-222-F - Service - 50 mph

Maximum Values

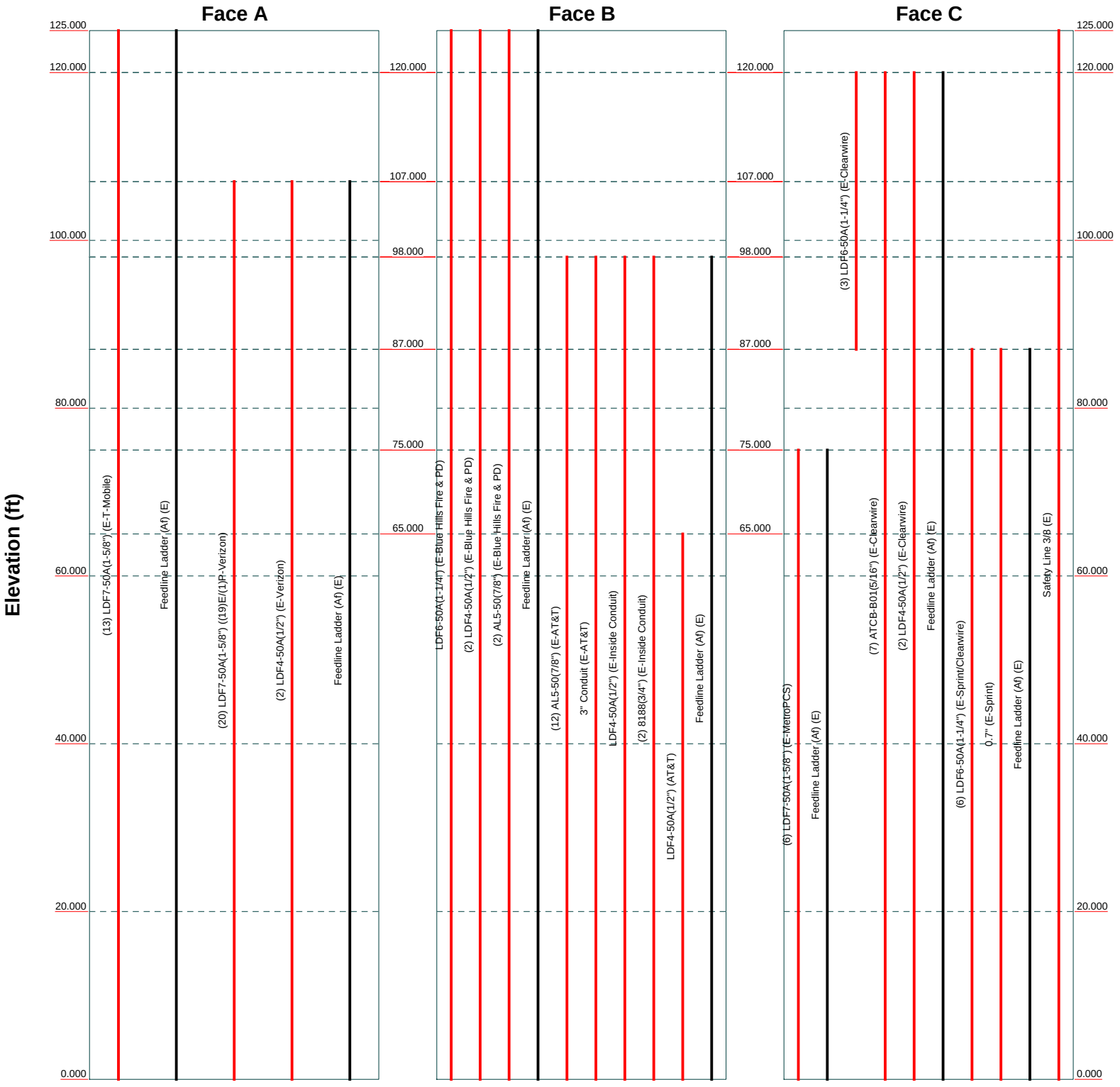


Allpro Consulting Group Inc.
9221 Lyndon B. Johnson Freeway, # 204
Dallas, TX 75243
Consulting Engineers
Phone: 972-231-8893
FAX: (555) 555-1235

Job: ***CT01725-A-02/Bloomfield, CT***			
Project: ***ACGI# 16-0654***			
Client: SBA Network Services	Drawn by: SKasera		App'd:
Code: TIA/EIA-222-F	Date: 02/24/16		Scale: NTS
Path:			Dwg No. E-5

Feed Line Distribution Chart
0' - 125'

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



Allpro Consulting Group Inc.
9221 Lyndon B. Johnson Freeway, # 204
Dallas, TX 75243
Consulting Engineers
Phone: 972-231-8893
FAX: (555) 555-1235

Job: ***CT01725-A-02/Bloomfield, CT***			
Project: ***ACGI# 16-0654***			
Client: SBA Network Services	Drawn by: SKasera	App'd:	
Code: TIA/EIA-222-F	Date: 02/24/16	Scale: NTS	
Path:		Dwg No. E-7	

TNX TOWER CALCULATION PRINTOUT

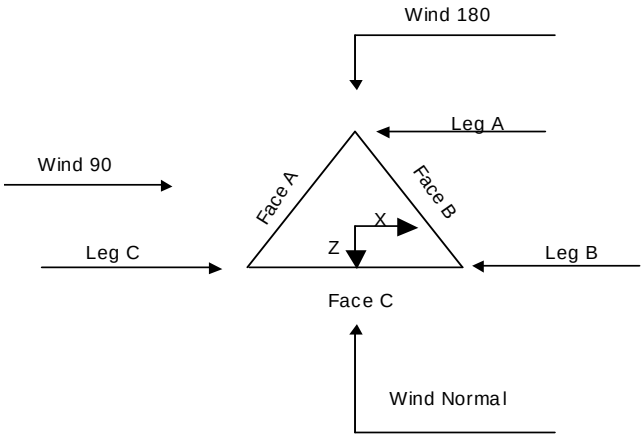
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 125.000 ft above the ground line.
The base of the tower is set at an elevation of 0.000 ft above the ground line.
The face width of the tower is 3.500 ft at the top and 12.500 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.500 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 69 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
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.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
√	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	125.000-120.000			3.500	1	5.000
T2	120.000-100.000			3.500	1	20.000
T3	100.000-80.000			5.000	1	20.000
T4	80.000-60.000			6.500	1	20.000
T5	60.000-40.000			8.000	1	20.000
T6	40.000-20.000			9.500	1	20.000
T7	20.000-0.000			11.000	1	20.000

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	125.000-120.000	2.500	TX Brace	No	Yes	0.000	0.000
T2	120.000-100.000	5.000	X Brace	No	No	0.000	0.000
T3	100.000-80.000	5.000	X Brace	No	No	0.000	0.000
T4	80.000-60.000	6.667	X Brace	No	No	0.000	0.000
T5	60.000-40.000	6.667	X Brace	No	No	0.000	0.000
T6	40.000-20.000	10.000	X Brace	No	Yes	0.000	0.000
T7	20.000-0.000	10.000	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 125.000-120.000	Pipe	P2.5x.203	A572-55 (55 ksi)	Solid Round	5/8	A36 (36 ksi)
T2 120.000-100.000	Pipe	P2.5x.203	A572-55 (55 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T3 100.000-80.000	Pipe	P3.5x.226	A572-55 (55 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 80.000-60.000	Pipe	P5x.258	A572-55 (55 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 60.000-40.000	Pipe	P6x.28	A572-55 (55 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 40.000-20.000	Pipe	P6x.28	A572-55 (55 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T7 20.000-0.000	Pipe	P8x.322	A572-55 (55 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 125.000-120.000	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 125.000-120.000	None	Single Angle		A36 (36 ksi)	Equal Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T6 40.000-20.000	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A572-50 (50 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	Double Angle Stitch Bolt Spacing Redundants in
T1 125.000-120.000	0.000	0.000	A36 (36 ksi)	1	1.05	1.05	0.000	0.000	36.000
T2 120.000-100.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T3 100.000-80.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T4 80.000-60.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T5 60.000-40.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T6 40.000-20.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T7 20.000-0.000	0.000	0.000	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000

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 125.000-120.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 120.000-100.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 100.000-80.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 80.000-60.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 60.000-40.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 40.000-20.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 20.000-0.000	Yes	No	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		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 125.000-120.000	0.000	1	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 120.000-100.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 100.000-80.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 80.000-60.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 60.000-40.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 40.000-20.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 20.000-0.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 125.000-120.000	Flange	0.750 A325N	4	0.500 A325X	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T2 120.000-100.000	Flange	0.750 A325N	6	0.500 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T3 100.000-80.000	Flange	1.000 A325N	6	0.500 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T4 80.000-60.000	Flange	1.000 A325N	8	0.500 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T5 60.000-40.000	Flange	1.000 A325N	8	0.625 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T6 40.000-20.000	Flange	1.250 A325N	8	0.625 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T7 20.000-0.000	Flange	1.500 A36	8	0.625 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
LDF7-50A(1-5/8")	A	Yes	Ar (CfAe)	125.000 - 0.000	0.000	0	13	6	0.500	1.980		0.001
(E-T-Mobile) Feedline Ladder (Af) (E) **#**	A	Yes	Af (CfAe)	125.000 - 0.000	0.000	0	1	1	3.000	1.500	6.000	0.008
LDF6-50A(1-1/4") (E-Blue Hills Fire & PD)	B	Yes	Ar (CfAe)	125.000 - 0.000	-0.500	-0.4	1	1	0.850 0.750	1.550		0.001
LDF4-50A(1/2") (E-Blue Hills Fire & PD)	B	Yes	Ar (CfAe)	125.000 - 0.000	-0.500	-0.37	2	2	0.630	0.630		0.000
AL5-50(7/8") (E-Blue Hills Fire & PD)	B	Yes	Ar (CfAe)	125.000 - 0.000	-0.500	-0.35	2	2	0.850 0.750	1.100		0.000
Feedline Ladder (Af) (E) **#**	B	Yes	Af (CfAe)	125.000 - 0.000	-0.500	-0.33	1	1	3.000	3.000	12.000	0.008
LDF7-50A(1-5/8") ((19)E/(1)P-Verizon)	A	Yes	Ar (CfAe)	107.000 - 0.000	-3.000	-0.23	20	10	0.500	1.980		0.001
LDF4-50A(1/2") (E-Verizon)	A	Yes	Ar (CfAe)	107.000 - 0.000	-1.500	-0.33	2	1	0.500	0.630		0.000
Feedline Ladder (Af) (E) **#**	A	Yes	Af (CfAe)	107.000 - 0.000	-0.500	-0.3	1	1	3.000	1.500	6.000	0.008
LDF7-50A(1-5/8") (E-MetroPCS)	C	Yes	Ar (CfAe)	75.000 - 0.000	0.000	-0.42	6	3	0.500	1.980		0.001
Feedline Ladder (Af) (E) **#**	C	Yes	Af (CfAe)	75.000 - 0.000	0.000	-0.42	1	1	3.000	3.000	12.000	0.008
LDF6-50A(1-1/4") (E-Clearwire)	C	Yes	Ar (CfAe)	120.000 - 87.000	0.000	-0.05	3	3	0.850 0.750	1.550		0.001
ATCB-B01(5/16") (E-Clearwire)	C	Yes	Ar (CfAe)	120.000 - 0.000	0.000	-0.085	7	4	0.315	0.315		0.000
LDF4-50A(1/2") (E-Clearwire)	C	Yes	Ar (CfAe)	120.000 - 0.000	0.000	-0.1	2	2	0.500	0.630		0.000
Feedline Ladder (Af) (E) **#**	C	Yes	Af (CfAe)	120.000 - 0.000	0.000	-0.05	1	1	3.000	3.000	12.000	0.008
AL5-50(7/8") (E-AT&T)	B	Yes	Ar (CfAe)	98.000 - 0.000	0.000	0.3	12	9	0.850 0.750	1.100		0.000
3" Conduit (E-AT&T)	B	Yes	Ar (CfAe)	98.000 - 0.000	0.000	0.23	1	1	3.000	3.000		0.003
LDF4-50A(1/2") (E-Inside Conduit)	B	Yes	Ar (CfAe)	98.000 - 0.000	0.000	0.23	1	1	0.500	0.630		0.000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
8188(3/4") (E-Inside Conduit)	B	No	Ar (CfAe)	98.000 - 0.000	0.000	0.23	2	2	0.750	0.000		0.000
LDF4-50A(1/2") (AT&T)	B	Yes	Ar (CfAe)	65.000 - 0.000	0.000	0.23	1	1	0.500	0.630		0.000
Feedline Ladder (Af) (E) **#**	B	Yes	Af (CfAe)	98.000 - 0.000	0.000	0.25	1	1	3.000	3.000	12.000	0.008
LDF6-50A(1-1/4") (E-Sprint/Clearwire)	C	Yes	Ar (CfAe)	87.000 - 0.000	-0.500	-0.05	6	3	0.850 0.750	1.550		0.001
0.7" (E-Sprint)	C	Yes	Ar (CfAe)	87.000 - 0.000	-0.500	0.025	1	1	0.630	0.700		0.000
Feedline Ladder (Af) (E) **#**	C	Yes	Af (CfAe)	87.000 - 0.000	-0.500	0	1	1	3.000	3.000	12.000	0.008
Safety Line 3/8 (E)	C	No	Ar (Leg)	125.000 - 0.000	0.000	0	1	1	0.375	0.375		0.000

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	125.000-120.000	A	5.106	0.625	0.000	0.000	0.095
		B	2.087	1.250	0.000	0.000	0.049
		C	0.156	0.000	0.000	0.000	0.001
T2	120.000-100.000	A	32.343	3.375	0.000	0.000	0.557
		B	8.350	5.000	0.000	0.000	0.198
		C	12.575	5.000	0.000	0.000	0.229
T3	100.000-80.000	A	54.475	5.000	0.000	0.000	0.883
		B	28.645	9.500	0.000	0.000	0.471
		C	12.983	6.750	0.000	0.000	0.302
T4	80.000-60.000	A	54.475	5.000	0.000	0.000	0.883
		B	31.162	10.000	0.000	0.000	0.502
		C	21.167	13.750	0.000	0.000	0.640
T5	60.000-40.000	A	54.475	5.000	0.000	0.000	0.883
		B	31.950	10.000	0.000	0.000	0.504
		C	23.642	15.000	0.000	0.000	0.706
T6	40.000-20.000	A	54.475	5.000	0.000	0.000	0.883
		B	31.950	10.000	0.000	0.000	0.504
		C	23.642	15.000	0.000	0.000	0.706
T7	20.000-0.000	A	54.475	5.000	0.000	0.000	0.883
		B	31.950	10.000	0.000	0.000	0.504
		C	23.642	15.000	0.000	0.000	0.706

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	125.000-120.000	A	0.585	1.957	6.117	0.000	0.000	0.207
		B		2.830	2.913	0.000	0.000	0.094
		C		0.644	0.000	0.000	0.000	0.005
T2	120.000-100.000	A	0.578	10.647	38.795	0.000	0.000	1.241
		B		11.244	11.634	0.000	0.000	0.374
		C		12.486	19.317	0.000	0.000	0.481
T3	100.000-80.000	A	0.564	15.795	65.373	0.000	0.000	2.000
		B		24.969	41.756	0.000	0.000	1.036
		C		13.369	21.475	0.000	0.000	0.608
T4	80.000-60.000	A	0.547	15.571	65.299	0.000	0.000	1.982
		B		26.837	45.032	0.000	0.000	1.098
		C		18.913	36.327	0.000	0.000	1.230
T5	60.000-40.000	A	0.526	15.283	65.203	0.000	0.000	1.960
		B		28.415	44.936	0.000	0.000	1.091
		C		19.761	39.804	0.000	0.000	1.338
T6	40.000-20.000	A	0.500	14.942	65.089	0.000	0.000	1.934
		B		27.733	44.822	0.000	0.000	1.065
		C		19.250	39.633	0.000	0.000	1.314
T7	20.000-0.000	A	0.500	14.942	65.089	0.000	0.000	1.934
		B		27.733	44.822	0.000	0.000	1.065
		C		19.250	39.633	0.000	0.000	1.314

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	125.000-120.000	A	0.285	1.561	0.418	0.569
		B	0.171	1.214	0.250	0.443
		C	0.000	0.000	0.000	0.000
T2	120.000-100.000	A	0.000	2.859	2.728	3.712
		B	0.000	1.408	1.038	1.828
		C	0.000	1.790	1.317	2.324
T3	100.000-80.000	A	0.000	3.993	5.214	7.081
		B	0.000	3.253	3.380	5.768
		C	0.000	1.658	1.693	2.940
T4	80.000-60.000	A	0.000	2.965	5.006	6.774
		B	0.000	2.607	3.501	5.955
		C	0.000	2.028	2.917	4.633
T5	60.000-40.000	A	0.000	2.622	4.629	6.235
		B	0.000	2.365	3.299	5.625
		C	0.000	1.949	2.990	4.636
T6	40.000-20.000	A	0.000	2.494	5.585	7.483
		B	0.000	2.238	3.981	6.714
		C	0.000	1.843	3.608	5.529
T7	20.000-0.000	A	0.000	1.727	4.510	6.043
		B	0.000	1.549	3.215	5.422
		C	0.000	1.276	2.913	4.465

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	125.000-120.000	-2.848	-4.040	-1.745	-1.866
T2	120.000-100.000	-4.339	-1.358	-3.328	-0.787
T3	100.000-80.000	-2.538	0.466	-1.221	0.793
T4	80.000-60.000	-0.508	2.220	0.196	2.139
T5	60.000-40.000	0.110	2.905	0.796	2.725
T6	40.000-20.000	0.092	3.127	0.830	2.975
T7	20.000-0.000	0.084	3.395	0.940	3.349

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft / ft / ft	°	ft		ft^2	ft^2	K
Lightning Rod 5/8" x 5' (E)	B	From Leg	4.000 0.000 5.500	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.313 0.826 1.322 1.957 3.338	0.313 0.826 1.322 1.957 3.338	0.031 0.035 0.041 0.065 0.159
Flash Beacon Lighting (E)	C	From Leg	0.000 0.000 1.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.700 3.100 3.500 4.300 5.900	2.700 3.100 3.500 4.300 5.900	0.050 0.070 0.090 0.130 0.210
#									
PD455 (E-Blue Hills Fire & PD)	A	From Leg	4.000 0.000 10.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.560 7.130 10.700 17.840 32.120	3.560 7.130 10.700 17.840 32.120	0.023 0.046 0.069 0.115 0.207
PD455 (E-Blue Hills Fire & PD)	B	From Leg	4.000 0.000 10.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.560 7.130 10.700 17.840 32.120	3.560 7.130 10.700 17.840 32.120	0.023 0.046 0.069 0.115 0.207
PD455 (E-Blue Hills Fire & PD)	C	From Leg	4.000 0.000 10.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.560 7.130 10.700 17.840 32.120	3.560 7.130 10.700 17.840 32.120	0.023 0.046 0.069 0.115 0.207
20' x 3" Omni (E-Blue Hills Fire & PD)	A	From Leg	4.000 0.000 10.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.000 8.033 10.083 14.233 21.700	6.000 8.033 10.083 14.233 21.700	0.050 0.093 0.149 0.299 0.759
20' x 3" Omni (E-Blue Hills Fire & PD)	C	From Leg	4.000 0.000 10.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.000 8.033 10.083 14.233 21.700	6.000 8.033 10.083 14.233 21.700	0.050 0.093 0.149 0.299 0.759
#									
AIR21 B2A/B4P w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	125.000	No Ice 1/2" Ice	6.533 6.978	4.356 4.775	0.070 0.112

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-T-Mobile)			0.000			1" Ice	7.432	5.202	0.159
						2" Ice	8.365	6.084	0.269
						4" Ice	10.336	7.951	0.559
AIR21 B2A/B4P w/ Mount Pipe	B	From Leg	4.000	0.000	125.000	No Ice	6.533	4.356	0.070
			0.000			1/2" Ice	6.978	4.775	0.112
(E-T-Mobile)			0.000			1" Ice	7.432	5.202	0.159
						2" Ice	8.365	6.084	0.269
						4" Ice	10.336	7.951	0.559
AIR21 B2A/B4P w/ Mount Pipe	C	From Leg	4.000	0.000	125.000	No Ice	6.533	4.356	0.070
			0.000			1/2" Ice	6.978	4.775	0.112
(E-T-Mobile)			0.000			1" Ice	7.432	5.202	0.159
						2" Ice	8.365	6.084	0.269
						4" Ice	10.336	7.951	0.559
AIR21 B4A/B2P w/ Mount Pipe	A	From Leg	4.000	0.000	125.000	No Ice	6.840	5.681	0.044
			0.000			1/2" Ice	7.397	6.581	0.101
(E-T-Mobile)			0.000			1" Ice	7.932	7.376	0.165
						2" Ice	9.035	9.019	0.317
						4" Ice	11.370	12.521	0.745
AIR21 B4A/B2P w/ Mount Pipe	B	From Leg	4.000	0.000	125.000	No Ice	6.840	5.681	0.044
			0.000			1/2" Ice	7.397	6.581	0.101
(E-T-Mobile)			0.000			1" Ice	7.932	7.376	0.165
						2" Ice	9.035	9.019	0.317
						4" Ice	11.370	12.521	0.745
AIR21 B4A/B2P w/ Mount Pipe	C	From Leg	4.000	0.000	125.000	No Ice	6.840	5.681	0.044
			0.000			1/2" Ice	7.397	6.581	0.101
(E-T-Mobile)			0.000			1" Ice	7.932	7.376	0.165
						2" Ice	9.035	9.019	0.317
						4" Ice	11.370	12.521	0.745
KRY 112 144/1	A	From Leg	4.000	0.000	125.000	No Ice	0.408	0.204	0.011
(E-T-Mobile)			0.000			1/2" Ice	0.497	0.273	0.014
			0.000			1" Ice	0.594	0.351	0.019
						2" Ice	0.815	0.533	0.032
						4" Ice	1.359	0.999	0.082
KRY 112 144/1	B	From Leg	4.000	0.000	125.000	No Ice	0.408	0.204	0.011
(E-T-Mobile)			0.000			1/2" Ice	0.497	0.273	0.014
			0.000			1" Ice	0.594	0.351	0.019
						2" Ice	0.815	0.533	0.032
						4" Ice	1.359	0.999	0.082
KRY 112 144/1	C	From Leg	4.000	0.000	125.000	No Ice	0.408	0.204	0.011
(E-T-Mobile)			0.000			1/2" Ice	0.497	0.273	0.014
			0.000			1" Ice	0.594	0.351	0.019
						2" Ice	0.815	0.533	0.032
						4" Ice	1.359	0.999	0.082
LNX-6515DS-A1M w/ Mount Pipe	A	From Leg	4.000	0.000	125.000	No Ice	11.683	9.842	0.083
			0.000			1/2" Ice	12.404	11.366	0.173
(R-T-Mobile)			0.000			1" Ice	13.135	12.914	0.273
						2" Ice	14.601	15.267	0.506
						4" Ice	17.875	20.139	1.151
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	4.000	0.000	125.000	No Ice	11.683	9.842	0.083
			0.000			1/2" Ice	12.404	11.366	0.173
(R-T-Mobile)			0.000			1" Ice	13.135	12.914	0.273
						2" Ice	14.601	15.267	0.506
						4" Ice	17.875	20.139	1.151
LNX-6515DS-A1M w/ Mount Pipe	C	From Leg	4.000	0.000	125.000	No Ice	11.683	9.842	0.083
			0.000			1/2" Ice	12.404	11.366	0.173
(R-T-Mobile)			0.000			1" Ice	13.135	12.914	0.273
						2" Ice	14.601	15.267	0.506

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
						4" Ice	17.875	20.139	1.151
S11B12	A	From Leg	4.000	0.000	125.000	No Ice	3.306	1.361	0.051
(R-T-Mobile)			0.000			1/2" Ice	3.550	1.540	0.072
			0.000			1" Ice	3.802	1.728	0.096
						2" Ice	4.334	2.130	0.154
						4" Ice	5.501	3.038	0.314
S11B12	B	From Leg	4.000	0.000	125.000	No Ice	3.306	1.361	0.051
(R-T-Mobile)			0.000			1/2" Ice	3.550	1.540	0.072
			0.000			1" Ice	3.802	1.728	0.096
						2" Ice	4.334	2.130	0.154
						4" Ice	5.501	3.038	0.314
S11B12	C	From Leg	4.000	0.000	125.000	No Ice	3.306	1.361	0.051
(R-T-Mobile)			0.000			1/2" Ice	3.550	1.540	0.072
			0.000			1" Ice	3.802	1.728	0.096
						2" Ice	4.334	2.130	0.154
						4" Ice	5.501	3.038	0.314
Platform Mount [LP 602-1]	C	None		0.000	125.000	No Ice	32.030	32.030	1.343
(E)						1/2" Ice	38.710	38.710	1.800
						1" Ice	45.390	45.390	2.257
						2" Ice	58.750	58.750	3.170
						4" Ice	85.470	85.470	4.998
#									
840 10054 w/ Mount Pipe	A	From Leg	4.000	0.000	120.000	No Ice	5.413	2.385	0.051
(E-Clearwire)			0.000			1/2" Ice	5.833	2.917	0.088
			0.000			1" Ice	6.263	3.466	0.129
						2" Ice	7.156	4.614	0.230
						4" Ice	9.093	7.316	0.533
840 10054 w/ Mount Pipe	B	From Leg	4.000	0.000	120.000	No Ice	5.413	2.385	0.051
(E-Clearwire)			0.000			1/2" Ice	5.833	2.917	0.088
			0.000			1" Ice	6.263	3.466	0.129
						2" Ice	7.156	4.614	0.230
						4" Ice	9.093	7.316	0.533
840 10054 w/ Mount Pipe	C	From Leg	4.000	0.000	120.000	No Ice	5.413	2.385	0.051
(E-Clearwire)			0.000			1/2" Ice	5.833	2.917	0.088
			0.000			1" Ice	6.263	3.466	0.129
						2" Ice	7.156	4.614	0.230
						4" Ice	9.093	7.316	0.533
U-RAS	A	From Leg	4.000	0.000	120.000	No Ice	1.804	0.778	0.030
(E-Clearwire)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
U-RAS	B	From Leg	4.000	0.000	120.000	No Ice	1.804	0.778	0.030
(E-Clearwire)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
U-RAS	C	From Leg	4.000	0.000	120.000	No Ice	1.804	0.778	0.030
(E-Clearwire)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
HORIZON DUO	A	From Leg	4.000	0.000	120.000	No Ice	0.547	0.343	0.007
(E-Clearwire)			0.000			1/2" Ice	0.648	0.426	0.012
			0.000			1" Ice	0.759	0.518	0.018
						2" Ice	1.005	0.728	0.036
						4" Ice	1.601	1.252	0.097

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
HORIZON DUO (E-Clearwire)	C	From Leg	4.000 0.000 0.000	0.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.547 0.648 0.759 1.005 1.601	0.343 0.426 0.518 0.728 1.252	0.007 0.012 0.018 0.036 0.097
4' x 2" Pipe Mount (E-Per Photo)	A	From Leg	4.000 0.000 0.000	0.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.785 1.028 1.281 1.814 3.111	0.785 1.028 1.281 1.814 3.111	0.029 0.035 0.044 0.072 0.167
4' x 2" Pipe Mount (E-Per Photo)	B	From Leg	4.000 0.000 0.000	0.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.785 1.028 1.281 1.814 3.111	0.785 1.028 1.281 1.814 3.111	0.029 0.035 0.044 0.072 0.167
4' x 2" Pipe Mount (E-Per Photo)	C	From Leg	4.000 0.000 0.000	0.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.785 1.028 1.281 1.814 3.111	0.785 1.028 1.281 1.814 3.111	0.029 0.035 0.044 0.072 0.167
Sector Mount [SM 402-3] (E-2PIPIES/SEC)	C	None		0.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	18.910 26.780 34.650 50.390 81.870	18.910 26.780 34.650 50.390 81.870	0.851 1.233 1.616 2.381 3.910
# GPS_A (E-Verizon)	A	From Leg	4.000 0.000 3.000	0.000	107.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.297 0.374 0.459 0.655 1.151	0.297 0.374 0.459 0.655 1.151	0.001 0.005 0.010 0.025 0.079
GPS_A (E-Verizon)	B	From Leg	4.000 0.000 3.000	0.000	107.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.297 0.374 0.459 0.655 1.151	0.297 0.374 0.459 0.655 1.151	0.001 0.005 0.010 0.025 0.079
BXA-70063-4CF-EDIN-6 w/ Mount Pipe (E-Verizon)	A	From Leg	4.000 0.000 3.000	0.000	107.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.399 5.844 6.299 7.240 9.261	3.693 4.295 4.913 6.258 9.285	0.028 0.070 0.118 0.235 0.576
BXA-70063-4CF-EDIN-6 w/ Mount Pipe (E-Verizon)	B	From Leg	4.000 0.000 3.000	0.000	107.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.399 5.844 6.299 7.240 9.261	3.693 4.295 4.913 6.258 9.285	0.028 0.070 0.118 0.235 0.576
BXA-70063-4CF-EDIN-6 w/ Mount Pipe (E-Verizon)	C	From Leg	4.000 0.000 3.000	0.000	107.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.399 5.844 6.299 7.240 9.261	3.693 4.295 4.913 6.258 9.285	0.028 0.070 0.118 0.235 0.576
DB-T1-6Z-8AB-0Z (E-Verizon)	C	From Leg	4.000 0.000 3.000	0.000	107.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.044 0.080 0.120 0.213 0.455
(3) SBNHH-1D65B w/	A	From Leg	4.000	0.000	107.000	No Ice	8.637	7.071	0.066

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.000			1/2" Ice	9.293	8.260	0.135
(P-Verizon)			3.000			1" Ice	9.917	9.170	0.212
						2" Ice	11.190	11.006	0.394
						4" Ice	13.855	15.043	0.903
(3) SBNHH-1D65B w/	B	From Leg	4.000	0.000	107.000	No Ice	8.637	7.071	0.066
Mount Pipe			0.000			1/2" Ice	9.293	8.260	0.135
(P-Verizon)			3.000			1" Ice	9.917	9.170	0.212
						2" Ice	11.190	11.006	0.394
						4" Ice	13.855	15.043	0.903
(3) SBNHH-1D65B w/	C	From Leg	4.000	0.000	107.000	No Ice	8.637	7.071	0.066
Mount Pipe			0.000			1/2" Ice	9.293	8.260	0.135
(P-Verizon)			3.000			1" Ice	9.917	9.170	0.212
						2" Ice	11.190	11.006	0.394
						4" Ice	13.855	15.043	0.903
RRH2x60-AWS	A	From Leg	4.000	0.000	107.000	No Ice	3.957	1.816	0.060
(P-Verizon)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2x60-AWS	B	From Leg	4.000	0.000	107.000	No Ice	3.957	1.816	0.060
(P-Verizon)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2x60-AWS	C	From Leg	4.000	0.000	107.000	No Ice	3.957	1.816	0.060
(P-Verizon)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2x60-700	A	From Leg	4.000	0.000	107.000	No Ice	3.957	1.816	0.060
(P-Verizon)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2x60-700	B	From Leg	4.000	0.000	107.000	No Ice	3.957	1.816	0.060
(P-Verizon)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2x60-700	C	From Leg	4.000	0.000	107.000	No Ice	3.957	1.816	0.060
(P-Verizon)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH 4x45-PCS	A	From Leg	4.000	0.000	107.000	No Ice	2.698	2.771	0.060
(P-Verizon)			0.000			1/2" Ice	2.936	3.011	0.084
			3.000			1" Ice	3.183	3.260	0.111
						2" Ice	3.703	3.784	0.176
						4" Ice	4.846	4.935	0.354
RRH 4x45-PCS	B	From Leg	4.000	0.000	107.000	No Ice	2.698	2.771	0.060
(P-Verizon)			0.000			1/2" Ice	2.936	3.011	0.084
			3.000			1" Ice	3.183	3.260	0.111
						2" Ice	3.703	3.784	0.176
						4" Ice	4.846	4.935	0.354
RRH 4x45-PCS	C	From Leg	4.000	0.000	107.000	No Ice	2.698	2.771	0.060
(P-Verizon)			0.000			1/2" Ice	2.936	3.011	0.084
			3.000			1" Ice	3.183	3.260	0.111

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
						2" Ice	3.703	3.784	0.176
						4" Ice	4.846	4.935	0.354
Sector Mount [SM 802-3] (E)	C	None		0.000	107.000	No Ice	24.410	24.410	0.930
						1/2" Ice	31.390	31.390	1.362
						1" Ice	38.370	38.370	1.794
						2" Ice	52.330	52.330	2.658
						4" Ice	80.250	80.250	4.386
#									
(2) 7770.00 w/ Mount Pipe (AT&T)	A	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) 7770.00 w/ Mount Pipe (AT&T)	B	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) 7770.00 w/ Mount Pipe (AT&T)	C	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
HPA-65R-BUU-H8-K (AT&T)	A	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice	13.295	7.516	0.068
						1/2" Ice	13.994	8.087	0.142
						1" Ice	14.702	8.666	0.223
						2" Ice	16.144	9.846	0.410
						4" Ice	19.130	12.294	0.882
HPA-65R-BUU-H8-K (AT&T)	B	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice	13.295	7.516	0.068
						1/2" Ice	13.994	8.087	0.142
						1" Ice	14.702	8.666	0.223
						2" Ice	16.144	9.846	0.410
						4" Ice	19.130	12.294	0.882
HPA-65R-BUU-H6 (AT&T)	C	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice	10.122	5.486	0.043
						1/2" Ice	10.688	5.942	0.100
						1" Ice	11.263	6.405	0.164
						2" Ice	12.439	7.354	0.311
						4" Ice	14.894	9.535	0.689
(2) LGP21401 (AT&T)	A	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(2) LGP21401 (AT&T)	B	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(2) LGP21401 (AT&T)	C	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice	1.288	0.233	0.014
						1/2" Ice	1.445	0.313	0.021
						1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(2) RRUS-11 (AT&T)	A	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice	3.249	1.373	0.048
						1/2" Ice	3.491	1.551	0.068
						1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150

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
						4" Ice	5.426	3.042	0.310
(2) RRUS-11	B	From Leg	4.000	0.000	98.000	No Ice	3.249	1.373	0.048
(AT&T)			0.000			1/2" Ice	3.491	1.551	0.068
			0.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
(2) RRUS-11	C	From Leg	4.000	0.000	98.000	No Ice	3.249	1.373	0.048
(AT&T)			0.000			1/2" Ice	3.491	1.551	0.068
			0.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
RRUS A2	A	From Leg	4.000	0.000	98.000	No Ice	2.411	0.533	0.022
(AT&T)			0.000			1/2" Ice	2.619	0.665	0.035
			0.000			1" Ice	2.837	0.806	0.050
						2" Ice	3.297	1.114	0.088
						4" Ice	4.322	1.833	0.203
RRUS A2	B	From Leg	4.000	0.000	98.000	No Ice	2.411	0.533	0.022
(AT&T)			0.000			1/2" Ice	2.619	0.665	0.035
			0.000			1" Ice	2.837	0.806	0.050
						2" Ice	3.297	1.114	0.088
						4" Ice	4.322	1.833	0.203
RRUS A2	C	From Leg	4.000	0.000	98.000	No Ice	2.411	0.533	0.022
(AT&T)			0.000			1/2" Ice	2.619	0.665	0.035
			0.000			1" Ice	2.837	0.806	0.050
						2" Ice	3.297	1.114	0.088
						4" Ice	4.322	1.833	0.203
(2) LGP21903	A	From Leg	4.000	0.000	98.000	No Ice	0.270	0.184	0.011
(AT&T)			0.000			1/2" Ice	0.343	0.248	0.013
			0.000			1" Ice	0.425	0.322	0.017
						2" Ice	0.616	0.494	0.028
						4" Ice	1.101	0.943	0.072
(2) LGP21903	B	From Leg	4.000	0.000	98.000	No Ice	0.270	0.184	0.011
(AT&T)			0.000			1/2" Ice	0.343	0.248	0.013
			0.000			1" Ice	0.425	0.322	0.017
						2" Ice	0.616	0.494	0.028
						4" Ice	1.101	0.943	0.072
(2) LGP21903	C	From Leg	4.000	0.000	98.000	No Ice	0.270	0.184	0.011
(AT&T)			0.000			1/2" Ice	0.343	0.248	0.013
			0.000			1" Ice	0.425	0.322	0.017
						2" Ice	0.616	0.494	0.028
						4" Ice	1.101	0.943	0.072
DC6-48-60-18-8F	C	From Leg	1.000	0.000	96.000	No Ice	1.467	1.467	0.019
(AT&T (Leg mount))			0.000			1/2" Ice	1.667	1.667	0.037
			0.000			1" Ice	1.878	1.878	0.057
						2" Ice	2.333	2.333	0.105
						4" Ice	3.378	3.378	0.239
CS72188.01 LMU antenna	C	From Leg	4.000	0.000	65.000	No Ice	0.200	0.200	0.000
(AT&T)			0.000			1/2" Ice	0.300	0.300	0.000
			0.000			1" Ice	0.400	0.400	0.001
						2" Ice	0.600	0.600	0.001
						4" Ice	1.000	1.000	0.001
Sector Mount [SM 802-3]	C	None		0.000	98.000	No Ice	24.410	24.410	0.930
(AT&T)						1/2" Ice	31.390	31.390	1.362
						1" Ice	38.370	38.370	1.794
						2" Ice	52.330	52.330	2.658
						4" Ice	80.250	80.250	4.386

#

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
#									
APXVSPP18-C-A20 w/ Mount Pipe (E-Sprint)	A	From Leg	4.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
APXVSPP18-C-A20 w/ Mount Pipe (E-Sprint)	B	From Leg	4.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
APXVSPP18-C-A20 w/ Mount Pipe (E-Sprint)	C	From Leg	4.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
APXVTM14-C-120 w/ Mount Pipe (E-Sprint)	A	From Leg	4.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.131 0.193 0.338 0.752
APXVTM14-C-120 w/ Mount Pipe (E-Sprint)	B	From Leg	4.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.131 0.193 0.338 0.752
APXVTM14-C-120 w/ Mount Pipe (E-Sprint)	C	From Leg	4.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.131 0.193 0.338 0.752
TD-RRH8x20-25 (E-Sprint-Hz Offset Per Photo)	A	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
TD-RRH8x20-25 (E-Sprint-Hz Offset Per Photo)	B	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
TD-RRH8x20-25 (E-Sprint-Hz Offset Per Photo)	C	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
1900MHz RRH (E-Sprint-Hz Offset Per Photo)	A	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.907 3.145 3.391 3.909 5.050	3.801 4.065 4.337 4.908 6.152	0.044 0.075 0.110 0.192 0.407
1900MHz RRH (E-Sprint-Hz Offset Per Photo)	B	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.907 3.145 3.391 3.909 5.050	3.801 4.065 4.337 4.908 6.152	0.044 0.075 0.110 0.192 0.407
1900MHz RRH	C	From Leg	2.000	0.000	87.000	No Ice	2.907	3.801	0.044

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E-Sprint-Hz Offset Per Photo)			0.000 0.000			1/2" Ice 1" Ice 2" Ice 4" Ice	3.145 3.391 3.909 5.050	4.065 4.337 4.908 6.152	0.075 0.110 0.192 0.407
800MHZ RRH (E-Sprint-Hz Offset Per Photo)	A	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.490 2.706 2.931 3.407 4.462	2.068 2.271 2.481 2.928 3.927	0.053 0.074 0.098 0.157 0.318
800MHZ RRH (E-Sprint-Hz Offset Per Photo)	B	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.490 2.706 2.931 3.407 4.462	2.068 2.271 2.481 2.928 3.927	0.053 0.074 0.098 0.157 0.318
800MHZ RRH (E-Sprint-Hz Offset Per Photo)	C	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.490 2.706 2.931 3.407 4.462	2.068 2.271 2.481 2.928 3.927	0.053 0.074 0.098 0.157 0.318
800 MHz Filter (E-Sprint-Hz Offset Per Photo)	A	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.820 2.008 2.205 2.625 3.568	0.604 0.747 0.899 1.228 1.991	0.009 0.019 0.032 0.064 0.165
800 MHz Filter (E-Sprint-Hz Offset Per Photo)	B	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.820 2.008 2.205 2.625 3.568	0.604 0.747 0.899 1.228 1.991	0.009 0.019 0.032 0.064 0.165
800 MHz Filter (E-Sprint-Hz Offset Per Photo)	C	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.820 2.008 2.205 2.625 3.568	0.604 0.747 0.899 1.228 1.991	0.009 0.019 0.032 0.064 0.165
(2) ACU-A20-N (E-Sprint-Hz Offset Per Photo)	A	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.078 0.121 0.173 0.302 0.665	0.136 0.189 0.251 0.400 0.802	0.001 0.002 0.004 0.012 0.045
ACU-A20-N (E-Sprint-Hz Offset Per Photo)	B	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.078 0.121 0.173 0.302 0.665	0.136 0.189 0.251 0.400 0.802	0.001 0.002 0.004 0.012 0.045
ACU-A20-N (E-Sprint-Hz Offset Per Photo)	C	From Leg	2.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.078 0.121 0.173 0.302 0.665	0.136 0.189 0.251 0.400 0.802	0.001 0.002 0.004 0.012 0.045
(2) 4' x 2" Pipe Mount (E)	A	From Leg	4.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.785 1.028 1.281 1.814 3.111	0.785 1.028 1.281 1.814 3.111	0.029 0.035 0.044 0.072 0.167
(2) 4' x 2" Pipe Mount (E)	B	From Leg	4.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	0.785 1.028 1.281	0.785 1.028 1.281	0.029 0.035 0.044

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
						2" Ice	1.814	1.814	0.072
						4" Ice	3.111	3.111	0.167
(2) 4' x 2" Pipe Mount (E)	C	From Leg	4.000 0.000 0.000	0.000	87.000	No Ice	0.785	0.785	0.029
						1/2" Ice	1.028	1.028	0.035
						1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
						4" Ice	3.111	3.111	0.167
Sector Mount [SM 502-3] (E)	C	None		0.000	87.000	No Ice	33.020	33.020	1.673
						1/2" Ice	47.360	47.360	2.224
						1" Ice	61.700	61.700	2.775
						2" Ice	90.380	90.380	3.876
						4" Ice	147.740	147.740	6.080
#									
APXV18-206517S-C w/ Mount Pipe (E-MetroPCS-Leg Mounted)	A	From Leg	1.000 0.000 0.000	0.000	75.000	No Ice	5.404	4.700	0.052
						1/2" Ice	5.960	5.860	0.097
						1" Ice	6.481	6.734	0.150
						2" Ice	7.547	8.515	0.280
						4" Ice	9.919	12.277	0.679
APXV18-206517S-C w/ Mount Pipe (E-MetroPCS-Leg Mounted)	B	From Leg	1.000 0.000 0.000	0.000	75.000	No Ice	5.404	4.700	0.052
						1/2" Ice	5.960	5.860	0.097
						1" Ice	6.481	6.734	0.150
						2" Ice	7.547	8.515	0.280
						4" Ice	9.919	12.277	0.679
APXV18-206517S-C w/ Mount Pipe (E-MetroPCS-Leg Mounted)	C	From Leg	1.000 0.000 0.000	0.000	75.000	No Ice	5.404	4.700	0.052
						1/2" Ice	5.960	5.860	0.097
						1" Ice	6.481	6.734	0.150
						2" Ice	7.547	8.515	0.280
						4" Ice	9.919	12.277	0.679
#									
2' Omni Whip (E)	B	From Leg	3.000 0.000 1.000	0.000	50.000	No Ice	0.411	0.411	0.010
						1/2" Ice	0.556	0.556	0.015
						1" Ice	0.722	0.722	0.021
						2" Ice	1.089	1.089	0.039
						4" Ice	1.956	1.956	0.103
Side Arm Mount [SO 701-1] (E)	B	From Leg	1.500 0.000 0.000	0.000	50.000	No Ice	0.850	1.670	0.065
						1/2" Ice	1.140	2.340	0.079
						1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
						4" Ice	3.170	7.030	0.177
#									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2.5 (E-CL Per Photo)	A	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 -3.000	0.000		120.000	2.917	No Ice	6.681	0.048
									1/2" Ice	7.069	0.077
									1" Ice	7.456	0.106

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2.5 (E-CL Per Photo) **#**	C	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 3.000	0.000		120.000	2.917	2" Ice 4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.230 9.779 6.681 7.069 7.456 8.230 9.779	0.164 0.280 0.048 0.077 0.106 0.164 0.280

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
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	125 - 120	6.940	35	0.529	0.064
T2	120 - 100	6.365	35	0.522	0.043
T3	100 - 80	4.287	35	0.436	0.022
T4	80 - 60	2.635	35	0.323	0.012
T5	60 - 40	1.432	35	0.228	0.007
T6	40 - 20	0.607	35	0.145	0.004
T7	20 - 0	0.143	35	0.059	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.000	Lightning Rod 5/8" x 5'	35	6.940	0.529	0.064	15472
123.000	VHLP2.5	35	6.709	0.527	0.055	15472
120.000	840 10054 w/ Mount Pipe	35	6.365	0.522	0.043	15472
117.000	VHLP2.5	35	6.028	0.515	0.034	12834
107.000	GPS_A	35	4.969	0.474	0.024	11842
98.000	(2) 7770.00 w/ Mount Pipe	35	4.102	0.424	0.021	11152
96.000	DC6-48-60-18-8F	35	3.921	0.413	0.021	11014
87.000	APXVSPP18-C-A20 w/ Mount Pipe	35	3.161	0.361	0.016	10412
75.000	APXV18-206517S-C w/ Mount Pipe	35	2.294	0.297	0.010	10680
65.000	CS72188.01 LMU antenna	35	1.695	0.250	0.008	12399
50.000	2' Omni Whip	35	0.975	0.187	0.005	13506

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	125 - 120	17.887	23	1.363	0.163
T2	120 - 100	16.409	23	1.344	0.111
T3	100 - 80	11.074	23	1.119	0.056
T4	80 - 60	6.826	23	0.833	0.031
T5	60 - 40	3.723	23	0.589	0.018
T6	40 - 20	1.582	23	0.376	0.009
T7	20 - 0	0.373	23	0.153	0.003

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.000	Lightning Rod 5/8" x 5'	23	17.887	1.363	0.163	6029
123.000	VHLP2.5	23	17.292	1.356	0.141	6029
120.000	840 10054 w/ Mount Pipe	23	16.409	1.344	0.111	6029
117.000	VHLP2.5	23	15.544	1.324	0.089	5000
107.000	GPS_A	23	12.824	1.217	0.061	4611

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
98.000	(2) 7770.00 w/ Mount Pipe	23	10.598	1.090	0.055	4352
96.000	DC6-48-60-18-8F	23	10.133	1.061	0.053	4303
87.000	APXVSPP18-C-A20 w/ Mount Pipe	23	8.181	0.930	0.041	4097
75.000	APXV18-206517S-C w/ Mount Pipe	23	5.949	0.767	0.026	4200
65.000	CS72188.01 LMU antenna	23	4.401	0.645	0.020	4863
50.000	2' Omni Whip	23	2.538	0.483	0.013	5255

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	125	Leg	A325N	0.750	4	1.193	19.439	0.061 ✔	1.333	Bolt Tension
T2	120	Leg	A325N	0.750	6	5.946	19.439	0.306 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.500	1	4.557	4.350	1.048 ✔	1.333	Member Block Shear
T3	100	Leg	A325N	1.000	6	13.106	34.557	0.379 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.500	1	6.116	5.709	1.071 ✔	1.333	Member Block Shear
T4	80	Leg	A325N	1.000	8	15.053	34.557	0.436 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.500	1	6.755	5.890	1.147 ✔	1.333	Bolt Shear
T5	60	Leg	A325N	1.000	8	19.606	34.557	0.567 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.625	1	6.140	6.117	1.004 ✔	1.333	Member Bearing
T6	40	Leg	A325N	1.250	8	22.951	53.996	0.425 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.625	1	7.237	6.117	1.183 ✔	1.333	Member Bearing
T7	20	Leg	A36	1.500	8	26.496	33.823	0.783 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.625	1	7.776	8.156	0.953 ✔	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 $\frac{P}{P_a}$
T1	125 - 120	P2.5x.203	5.000	2.500	31.7 K=1.00	29.422	1.704	-10.897	50.136	0.217 ✔
T2	120 - 100	P2.5x.203	20.019	5.005	63.4 K=1.00	23.738	1.704	-43.389	40.451	1.073 ✔
T3	100 - 80	P3.5x.226	20.019	5.005	44.9 K=1.00	27.272	2.680	-92.825	73.077	1.270 ✔

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 $\frac{P}{P_a}$
T4	80 - 60	P5x.258	20.019	6.673	42.6 K=1.00	27.667	4.300	-138.963	118.964	1.168 ✔
T5	60 - 40	P6x.28	20.019	6.673	35.7 K=1.00	28.810	5.581	-181.384	160.801	1.128 ✔
T6	40 - 20	P6x.28	20.019	5.181	27.7 K=1.00	29.998	5.581	-213.680	167.427	1.276 ✔
T7	20 - 0	P8x.322	20.019	10.009	40.9 K=1.00	27.963	8.399	-249.202	234.872	1.061 ✔

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 $\frac{P}{P_a}$
T2	120 - 100	L1 1/2x1 1/2x3/16	6.941	3.433	140.4 K=1.00	7.573	0.527	-4.560	3.994	1.142 ✔
T3	100 - 80	L2x2x3/16	8.054	3.934	119.9 K=1.00	10.296	0.715	-6.263	7.360	0.851 ✔
T4	80 - 60	L2 1/2x2 1/2x3/16	10.224	4.971	120.5 K=1.00	10.205	0.902	-6.455	9.208	0.701 ✔
T5	60 - 40	L2 1/2x2 1/2x3/16	11.403	5.515	133.7 K=1.00	8.349	0.902	-6.154	7.534	0.817 ✔
T6	40 - 20	L3x3x3/16	14.056	6.916	139.2 K=1.00	7.710	1.090	-8.321	8.403	0.990 ✔
T7	20 - 0	L3 1/2x3 1/2x1/4	15.718	7.636	132.0 K=1.00	8.565	1.690	-7.505	14.475	0.518 ✔

Horizontal 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	125 - 120	L1 1/2x1 1/2x3/16	3.500	3.260	128.2 K=0.96	9.083	0.527	-2.983	4.790	0.623 ✔

Secondary Horizontal 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 $\frac{P}{P_a}$
T6	40 - 20	L3x3x1/4	10.612	10.060	126.0 K=0.97	9.402	1.440	-3.704	13.539	0.274 ✔

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	125 - 120	L1 1/2x1 1/2x3/16	3.500	3.260	128.2 K=0.96	9.083	0.527	-1.638	4.790	0.342 ✔

Bottom 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	125 - 120	L1 1/2x1 1/2x3/16	3.500	3.260	128.2 K=0.96	9.083	0.527	-1.513	4.790	0.316 ✔

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	125 - 120	P2.5x.203	5.000	2.500	31.7	33.000	1.704	4.774	56.234	0.085 ✔
T2	120 - 100	P2.5x.203	20.019	5.005	63.4	33.000	1.704	35.673	56.234	0.634 ✔
T3	100 - 80	P3.5x.226	20.019	5.005	44.9	33.000	2.680	78.638	88.425	0.889 ✔
T4	80 - 60	P5x.258	20.019	6.673	42.6	33.000	4.300	120.426	141.896	0.849 ✔
T5	60 - 40	P6x.28	20.019	6.673	35.7	33.000	5.581	156.849	184.185	0.852 ✔
T6	40 - 20	P6x.28	20.019	4.828	25.8	33.000	5.581	183.808	184.185	0.998 ✔
T7	20 - 0	P8x.322	20.019	10.009	40.9	33.000	8.399	211.970	277.175	0.765 ✔

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	125 - 120	5/8	4.301	4.007	307.7	21.600	0.307	3.795	6.627	0.573

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 $\frac{P}{P_a}$
T2	120 - 100	L1 1/2x1 1/2x3/16	6.941	3.433	90.2	29.000	0.308	4.557	8.921	0.511 ✔
T3	100 - 80	L2x2x3/16	8.054	3.934	76.5	29.000	0.448	6.116	12.999	0.470 ✔
T4	80 - 60	L2 1/2x2 1/2x3/16	9.488	4.614	71.1	29.000	0.589	6.550	17.077	0.384 ✔
T5	60 - 40	L2 1/2x2 1/2x3/16	11.403	5.515	85.0	29.000	0.571	6.140	16.567	0.371 ✔
T6	40 - 20	L3x3x3/16	14.056	6.916	88.3	29.000	0.712	7.237	20.645	0.351 ✔
T7	20 - 0	L3 1/2x3 1/2x1/4	15.718	7.636	84.1	29.000	1.127	7.776	32.679	0.238 ✔

Horizontal 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	125 - 120	L1 1/2x1 1/2x3/16	3.500	3.260	85.7	21.600	0.527	0.189	11.391	0.017 ✔

Secondary Horizontal 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 $\frac{P}{P_a}$
T6	40 - 20	L3x3x1/4	10.612	10.060	129.8	21.600	1.440	3.704	31.104	0.119 ✔

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	125 - 120	L1 1/2x1 1/2x3/16	3.500	3.260	85.7	21.600	0.527	0.635	11.391	0.056 ✔

Bottom 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	125 - 120	L1 1/2x1 1/2x3/16	3.500	3.260	85.7	21.600	0.527	0.218	11.391	0.019 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	125 - 120	Leg	P2.5x.203	1	-10.897	66.831	16.3	Pass
T2	120 - 100	Leg	P2.5x.203	25	-43.389	53.921	80.5	Pass
T3	100 - 80	Leg	P3.5x.226	52	-92.825	97.412	95.3	Pass
T4	80 - 60	Leg	P5x.258	79	-138.963	158.579	87.6	Pass
T5	60 - 40	Leg	P6x.28	100	-181.384	214.348	84.6	Pass
T6	40 - 20	Leg	P6x.28	121	-213.680	223.180	95.7	Pass
T7	20 - 0	Leg	P8x.322	142	-249.202	313.084	79.6	Pass
T1	125 - 120	Diagonal	5/8	15	3.795	8.834	43.0	Pass
T2	120 - 100	Diagonal	L1 1/2x1 1/2x3/16	32	-4.560	5.323	85.7	Pass
T3	100 - 80	Diagonal	L2x2x3/16	59	-6.263	9.811	63.8 80.4 (b)	Pass
T4	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	86	-6.455	12.275	52.6 86.0 (b)	Pass
T5	60 - 40	Diagonal	L2 1/2x2 1/2x3/16	107	-6.154	10.043	61.3 75.3 (b)	Pass
T6	40 - 20	Diagonal	L3x3x3/16	137	-8.321	11.201	74.3 88.8 (b)	Pass
T7	20 - 0	Diagonal	L3 1/2x3 1/2x1/4	149	-7.505	19.295	38.9 71.5 (b)	Pass
T1	125 - 120	Horizontal	L1 1/2x1 1/2x3/16	18	-2.983	6.385	46.7	Pass
T6	40 - 20	Secondary Horizontal	L3x3x1/4	130	-3.704	18.047	20.5	Pass
T1	125 - 120	Top Girt	L1 1/2x1 1/2x3/16	6	-1.638	6.385	25.7	Pass
T1	125 - 120	Bottom Girt	L1 1/2x1 1/2x3/16	9	-1.513	6.385	23.7	Pass
							Summary	
						Leg (T6)	95.7	Pass
						Diagonal (T6)	88.8	Pass
						Horizontal (T1)	46.7	Pass
						Secondary Horizontal (T6)	20.5	Pass
						Top Girt (T1)	25.7	Pass
						Bottom Girt (T1)	23.7	Pass
						Bolt Checks	88.8	Pass
						RATING =	**95.7**	**Pass**

MATHCAD CALCULATION PRINTOUT

Existing 125 ft Self Supporting Tower Foundation Check

Customer Name: SBA Communications Corp
Customer Site Number: CT01725-A-10
Customer Site Name: Bloomfield

ACGI Job # 16-0654

Foundation check

-Foundation Reactions-

(As per TNX output, Factored, F Code)

Total Shear	$S := 31 \cdot kips$	Compression on Pedestal:	$P_c := 258 \cdot kips$
Moment	$M := 2533 \cdot ft\_K$	Uplift on Pedestal:	$P_{up} := 220 \cdot kips$
Down load, Tower weight	$Pv := 32kips$	Shear on Pedestal:	$Sh := 19 \cdot kips$

-*Soil Properties*- Soil data as per Report of Geotechnical Evaluation of Subsurface Conditions by FDH Engineering, Project# 1206690EG1 dated 08/10/2012.

Allowable Bearing Capacity	$Brg_{allw} := 5.0 \cdot ksf$	Safety Factor $SF := 2.0$	(Estimated)
Internal friction angle,	$\phi := 30deg$	$Brg_{uc} := SF \cdot Brg_{allw} = 10 \cdot ksf$	
Unit wt. of soil,	$\gamma_s := 0.110 \cdot kcf$		
Alowable Passive Pressure	see next page		
Cohesion of soil,	$c_u := 0 \cdot ksf$		
Friction Factor	$FF := 0.3$		(Estimated)
Depth to be neglected	$L_{neg} := 0 \cdot ft$		

-Material Parameters-

Conforming to the design requirements as in ACI 318-05

Unit wt. of concrete,	$\gamma_c := 0.150 \cdot kcf$
Concrete compressive strength,	$f_c := 3000 \cdot psi$
Rebar yield strength,	$f_y := 60000 \cdot psi$

DIMENSIONS

Tower face width $TWFW := 12.5 \cdot ft$ Tower ht. $Tw_{ht} := 125 \cdot ft$

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

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

Depth of mat,	$D_f := 4.25 \cdot ft$		
Thickness of mat,	$T_f := 4.25 \cdot ft$		
Pedestal size,	$Ped_s := 0 \cdot ft$	No. of pedestals	$Nped := 0$
Extension above the grade,	$E_g := 0 \cdot ft$		

Mat Dimensions, LxB $L := 29 \cdot ft$ x $B := L$ $B = 29\,ft$ $Brg_{allw} = 5 \cdot ksf$

- Foundation Dimensions as per Original Foundation Design by Fred A. Nudd Corporation, Dwg# 97-5566-2 dated 12/16/1997.

-Reinforcement Data-

Typical concrete cover	$cc := 3in$
Vertical rebar size	$d_{bar} := 8$

MAT SIZING CALCULATIONS

Check of mat size

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

$P_{pave} := \frac{(D_f - T_f - L_{neg})\cdot K_p\cdot\gamma_s + (D_f - L_{neg})\cdot K_p\cdot\gamma_s}{2} = 0.701\cdot ksf$

Calculate safety against overturning and location of resultant on the base

Resisting Moments about mid axis parallel to base

$Area_{ped} := if\left(col_t = 1, Ped_s^2, \frac{\pi}{4}\cdot Ped_s^2\right) \qquad Area_{ped} = 0$

component	value, kips	lever arm, ft	resisting moment, ft-kips
1) Concrete wt.	$C_w := L\cdot B\cdot T_f\cdot(\gamma_c) + Area_{ped}\cdot\gamma_c\cdot(D_f + E_g - T_f)\cdot Nped$	$L_c := \frac{L}{2}$	$R_c := C_w\cdot L_c$
	$C_w = 536.137\cdot kips$	$L_c = 14.5\,ft$	$R_c = 7773.994\cdot ft\_K$
2) Soil wt.	$S_w := \left[L\cdot B\cdot(D_f - T_f) - Area_{ped}\cdot(D_f - T_f)\cdot Nped\right]\cdot\gamma_s$	$L_s := \frac{L}{2}$	$R_s := S_w\cdot L_s$
	$S_w = 0\cdot kips$	$L_s = 14.5\,ft$	$R_s = 0\cdot ft\_K$
3) Wt. of soil wedge	$W_w := (D_f)\cdot\frac{1}{2}\cdot(D_f\cdot\tan(\phi))\cdot B\cdot(\gamma_s)$	$L_w := \left(L + D_f\cdot\frac{\tan(\phi)}{3}\right)$	$R_w := W_w\cdot L_w$
	$W_w = 16.633\cdot kips$	$L_w = 29.818\,ft$	$R_w = 495.97\cdot ft\_K$
4) Passive pressure	$Pe_p := T_f\cdot B\cdot P_{pave}$	$L_p := \frac{T_f}{3}$	$R_p := Pe_p\cdot L_p$
	$Pe_p = 86.429\cdot kips$	$L_p = 1.417\,ft$	$R_p = 122.441\cdot ft\_K$
5) Vertical	$Pv = 32\cdot kips$		
	$S_{w1} := L\cdot B\cdot D_f\cdot\gamma_s$ $S_{w1} = 393.167\cdot kips$ <--- for net calcs	$L_v := \frac{L}{2}$	$R_v := Pv\cdot L_v$
Total weight=	$T_w := C_w + S_w + W_w + Pv$ $T_w = 584.771\cdot kips$	$L_v = 14.5\,ft$	$R_v = 464\cdot ft\_K$

Total resisting Moment= $M_r := R_c + R_s + R_w + R_p + R_v$ $M_r = 8856.405\cdot ft\_K$

Overturning Moments

component	value, kips	lever arm, ft	Overturning Moment ft-kips
1) Moment on foundation due to eccentric location of tower	$Pv = 32\cdot kips$	$L_{pe} = 0$	$M_{pe} := L_{pe}\cdot Pv$ $M_{pe} = 0\cdot ft\_K$
2) Moment on foundation	-	-	$M = 2533\cdot ft\_K$
3) Moment due to horizontal shear	$S_t := S$	$L_{hs} := D_f + E_g$	$O_{hs} := L_{hs}\cdot S_t$
		$L_{hs} = 4.25\,ft$	$O_{hs} = 131.75\cdot ft\_K$

Total Overturning Moment= $M_o := M + O_{hs} + M_{pe}$ $M_o = 2664.75 \cdot ft\_K$

Check Safety Factor against Overturning about mid axis parallel to base

$SF := \frac{M_r}{M_o}$ $SF = 3.324$ > 1.5 OK! Calculate eccentricity, e $e := \frac{L}{2} - \frac{M_r - M_o}{T_w}$ $e = 3.912\ ft$

Check location of eccentricity and determine pressure distribution under the mat

$L_{loc} := \frac{L}{6}$ $L_{loc} = 4.833\ ft$ For net bearing calcs $T_{w1} := S_{w1} + W_w$ $T_{w1} = 409.801 \cdot kips$

$P_{max1} := if\left[e \le L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[1 + \left(6 \cdot \frac{e}{L}\right)\right], 4 \cdot \frac{T_w}{3 \cdot B \cdot (L - 2 \cdot e)}\right]$ $P_{max1} = 1.258 \cdot ksf$

$P_{max2} := \left(\frac{T_{w1}}{L \cdot B}\right)$ $P_{max2} = 0.487 \cdot ksf$ $P_{net} := P_{max1} - P_{max2}$ $P_{max} := P_{net}$

Net soil pressure, $P_{net} = 0.771 \cdot ksf$ < $Brg_{allw} = 5 \cdot ksf$ **Pass!** $\frac{P_{net}}{0.75 Brg_{uc}} = 10.277 \cdot \%$

$P_{min} := if\left[e \le L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[1 - \left(6 \cdot \frac{e}{L}\right)\right], 0 \cdot ksf\right]$ $P_{min} = 0.133 \cdot ksf$

Check for horizontal shear $P_{hor} := Pe_p + Pv \cdot 0.35$

$P_{hor} = 97.629 \cdot kips$ $S = 31 \cdot kips$ Since P.hor > S it is safe! $\frac{S}{P_{hor}} = 31.753 \cdot \%$

Check for uplift

Component	Down load value, kips	
1) Soil Weight	$S_{w1} := \left[L \cdot B \cdot (D_f - T_f) - Area_{ped} \cdot (D_f - T_f) \cdot Nped\right] \cdot \gamma_s$	$S_{w1} = 0 \cdot kips$
2) Wt. of soil wedge	$W_{w1} := (D_f) \cdot \frac{1}{2} \cdot (D_f \cdot \tan(\phi)) \cdot B \cdot (\gamma_s)$	$W_{w1} = 16.633 \cdot kips$
3)Concrete wt.	$C_{w1} := L \cdot B \cdot T_f \cdot (\gamma_c) + Area_{ped} \cdot \gamma_c \cdot (D_f + E_g - T_f) \cdot Nped$	$C_{w1} = 536.137 \cdot kips$

Total down load:

$TWT1 := S_{w1} + W_{w1} + C_{w1}$ $TWT1 = 552.771 \cdot kips$ Total down load

Skin friction around footing:

$SKF := FF \cdot c_u \cdot (L + B) \cdot 2 \cdot 2 \cdot ft$ $SKF = 0 \cdot kips$

$T_{down} := (TWT1 + SKF)$ $T_{down} = 552.771 \cdot kips$ > $P_{up} = 220 \cdot kips$ $\frac{P_{up}}{T_{down}} = 39.799 \cdot \%$ **OK!**

REINFORCED CONCRETE CHECK CALCULATIONS

General Input parameters

Concrete Cover, $cc := 3.0 \cdot in$

Reduction factors as per respective ACI sections

$\phi_{shear} := 0.85$ as per ACI 9.3.2.3

$\phi_{compr} := 0.75$ as per ACI 9.3.2.2

$\phi_{axten} := 0.9$ as per ACI 9.3.2.2 a

Reinforced concrete load factor as per EIA 3.1.16 $RC_{fac} := 1.0$

(Loads already factored under TIA/EIA-222-G Code)

Check for wide beam or single shear in mat

Allowable shear stress in concrete for wide beam shear criteria =

$\nu_{wide} := 2 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}$ $\nu_{wide} = 93.113 \cdot psi$

Effective depth of stee $d := T_f - cc$ $d = 48 \cdot in$ $L_{eff} := if\left(e \le L_{loc}, L, L - 2 \cdot e\right)$ $L_{eff} = 29\,ft$

$$dist := if\left[Nped = 3, \left(\frac{L}{2} - \frac{1}{3} \cdot \sin(60 \cdot deg) \cdot TWFW - \frac{1}{2} \cdot Ped_s - d\right), \left(\frac{L}{2} - \frac{TWFW}{2} - \frac{1}{2} \cdot Ped_s - d\right)\right]$$

Factor load by RC $P_{maxf} := P_{max} \cdot RC_{fac}$ $P_{minf} := P_{min} \cdot RC_{fac}$

shear on the face of concrete=

$$Shear_{wide} := (dist) \cdot B \cdot \left[\frac{P_{maxf} + \left[P_{maxf} - \frac{P_{maxf} - P_{minf}}{L_{eff}} \cdot (dist)\right]}{2}\right] \qquad Shear_{wide} = 89.238 \cdot kips$$

Area of concrete in shear= $A_{shear} := B \cdot d$ $A_{shear} = 16704 \cdot in^2$

Shear stress acting on concrete fa $\nu_{act} := \frac{Shear_{wide}}{A_{shear}}$ $\nu_{act} = 5.342 \cdot psi$

$\nu_{act} = 5.342 \cdot psi$ < $\nu_{wide} = 93.113 \cdot psi$ **O.K!**

Check for punching or two-way shear in mat

Calculate allowable shear stress in concrete for punching/two-way shear

$\beta := \frac{L}{B}$ $\beta = 1$ $\nu_{punch} := if\left[\left(2 + \frac{4}{\beta}\right) \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi} \le 4 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}, \left(2 + \frac{4}{\beta}\right) \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}, 4 \cdot \phi_{shear} \cdot \sqrt{f_c \cdot psi}\right]$

$\nu_{punch} = 186.226 \cdot psi$ $Area_{col} := if\left[col_t = 0, \frac{\pi}{4} \cdot \left(Ped_s + d\right)^2, \left(Ped_s + d\right)^2\right]$

$P_{avg} := \frac{P_{maxf} + P_{minf}}{2}$ $Peri_{col} := if\left[col_t = 0, 2 \cdot \pi \cdot \frac{Ped_s + d}{2}, 4 \cdot \left(Ped_s + d\right)\right]$

Factor vertical load $Pvf := RC_{fac} \cdot Pv$

Shear stress acting on the concrete face= $\nu_{act} := \frac{P_c - Area_{col} \cdot P_{avg}}{Peri_{col} \cdot d \cdot 4}$

$\nu_{act} = 8.715 \cdot psi$ < $\nu_{punch} = 186.226 \cdot psi$ **O.K!**

Check of mat footing

$C_{wped} := Area_{ped} \cdot \gamma_c \cdot (D_f + E_g - T_f) \cdot Nped$ Wt. of concrete pedestals

$P_{upnet} := P_{up} - \frac{C_{wped} + S_w \cdot 0.95}{Nped}$ $P_{upnet} = 220 \cdot kips$

Net uplift acting at mat level creating bending moment in the slab. Soil wt. reduced by 5 % to account for variation in compaction . ACI 9.3.2.2

Calculate bending moment for mat design:

$\phi_{bend} := 0.9$ $Langle := if(Nped = 3, sin(60 \cdot deg), 1)$

$\beta_1 := if\left[f_c \le 4000 \cdot psi, 0.85, if\left[f_c \ge 8000 \cdot psi, 0.65, 0.85 - \left(\frac{f_c}{psi} - 4000\right) \cdot 0.05\right]\right]$ ACI 10.2.7.3

$B_{mo} := RC_{fac} \cdot \left[(TWFW \cdot P_{upnet}) \cdot Langle + S_t \cdot (D_f + E_g)\right]$ $B_{mo} = 2881.75 \cdot ft\_K$

$B_{mo1} := \frac{P_{max} - P_{min}}{(L - 2 \cdot e) \cdot 2} \cdot \left(TWFW \cdot Langle \cdot \frac{1}{3} + \frac{Ped_s}{2}\right) \cdot \left[\left[(L - 2 \cdot e) - \left(TWFW \cdot Langle \cdot \frac{1}{3} + \frac{Ped_s}{2}\right)\right]^2 \cdot 0.5\right] \cdot B$

$W_e := TWFW \cdot Langle + Ped_s$ $W_e = 12.5\,ft$

Reinforcement middle bandwidth.

$B_{mo1} = 263422.047\,ft \cdot lb$

required R_u $R_u := \frac{B_{mo}}{\phi_{bend} \cdot B \cdot d^2}$ $R_u = 47.922 \cdot psi$ $m := \frac{f_y}{\beta_1 \cdot f_c}$ $m = 23.529$

required

$\rho := \frac{1}{m} \cdot \left[1 - \sqrt{1 - \left(\frac{2 \cdot m \cdot R_u}{f_y}\right)}\right]$ $\rho = 0.001$

Required area of steel for mat =

$Ast_f := \rho \cdot B \cdot d$ $Ast_f = 13.469 \cdot in^2$

minimum area of steel required,

$Ast_{minf} := .0018 \cdot B \cdot T_f$ $Ast_{minf} = 31.946 \cdot in^2$ per ACI 10.5.3 & 7.12

$Ast_{fuse} := if(Ast_f > Ast_{minf}, Ast_f, Ast_{minf})$ $Ast_{fuse} = 31.946 \cdot in^2$

Bar size provided = $f_{bar} := 8$ $f_{dia} := \frac{f_{bar}}{8} \cdot in$ $f_{dia} = 1 \cdot in$

Bar area = $f_{abar} := \pi \cdot \frac{f_{dia}^2}{4}$ $f_{abar} = 0.785 \cdot in^2$

Number of bars required = $Nf_{bars} := if\left(Ast_{fuse} = Ast_{minf}, ceil\left(\frac{Ast_{fuse}}{f_{abar}}\right), ceil\left(\frac{Ast_{fuse}}{f_{abar}} \cdot \frac{L}{W_e}\right)\right)$ $Nf_{bars} = 41$

Used $Nf_{bars\_used} := 27 \cdot 2 = 54$ > $Nf_{bars} = 41$

($Nf_{bars\_used} = 54$) # $f_{bar} = 8$ bars at the Top and Bottom of the mat is OK!

Reinforcement ratio, $Reinf_{ratio} := \frac{Nf_{bars}}{Nf_{bars\_used}} = 75.926 \cdot \%$

Foundation Check Summary

-Foundation Reactions-

Shear; $S = 31 \cdot kips$

Down load; $Pv = 32 \cdot kips$

Uplift load; $P_{up} = 220 \cdot kips$

Moment; $M = 2533 \cdot ft\_K$

Stability Calculations

Safety Factor against Overturning, $SF = 3.324$ > 1.5 OK! $\frac{1.5}{SF} = 45.133 \cdot \%$

Net soil pressure, $P_{net} = 0.771 \cdot ksf$ < $Brg_{allw} = 5 \cdot ksf$ **OK!** $\frac{P_{net}}{Brg_{allw}} = 15.416 \cdot \%$

Check for horizontal shear, $P_{hor} = 97.629 \cdot kips$ > $S = 31 \cdot kips$ **OK!** $\frac{S}{P_{hor}} = 31.753 \cdot \%$

Check for Uplift, $T_{down} = 552.771 \cdot kips$ > $P_{up} = 220 \cdot kips$ **OK!** $\frac{P_{up}}{T_{down}} = 39.799 \cdot \%$

Steel Reinforcement Check, $Reinf_{ratio} = 75.926 \cdot \%$ OK!

EBI Consulting
environmental | engineering | due diligence

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

AT&T Existing Facility

Site ID: CT1148

Bloomfield East
1021 Blue Hills Avenue
Bloomfield, CT 06002

January 19, 2016

EBI Project Number: 6216000225

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	22.07 %

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

EBI Consulting
environmental | engineering | due diligence

January 19, 2016

AT&T Mobility – New England
Attn: Cameron Syme, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT1148 – Bloomfield East**

EBI Consulting was directed to analyze the proposed AT&T facility located at **1021 Blue Hills Avenue, Bloomfield, CT**, for the purpose of determining whether the emissions from the Proposed AT&T 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 limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **1021 Blue Hills Avenue, Bloomfield, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T 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) 4 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 4 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 (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 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.

5) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

6) 2 GSM channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

7) 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.

8) 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.

9) The antennas used in this modeling are the **Powerwave 7770.00**, **CCI HPA-65R-BUU-H8 and the CCI HPA-65R-BUU-H6** for transmission in the 700 MHz, 850 MHz and1900 MHz (PCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. 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.

10) The antenna mounting height centerline of the proposed antennas is **98 feet** above ground level (AGL).

11) 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.

EBI Consulting
environmental | engineering | due diligence

AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	98 feet	Height (AGL):	98 feet	Height (AGL):	98 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	4,281.78	ERP (W):	4,281.78	ERP (W):	4,281.78
Antenna A1 MPE%	**2.36**	Antenna B1 MPE%	**2.36**	Antenna C1 MPE%	**2.36**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI HPA-65R-BUU-H8	Make / Model:	CCI HPA-65R-BUU-H8	Make / Model:	CCI HPA-65R-BUU-H6
Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd	Gain:	11.95 / 14.75 dBd
Height (AGL):	98 feet	Height (AGL):	98 feet	Height (AGL):	98 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	6,229.75	ERP (W):	6,229.75	ERP (W):	5,462.56
Antenna A2 MPE%	**3.85**	Antenna B2 MPE%	**3.85**	Antenna C2 MPE%	**3.23**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	98 feet	Height (AGL):	98 feet	Height (AGL):	98 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A3 MPE%	**1.18**	Antenna B3 MPE%	**1.18**	Antenna C3 MPE%	**1.18**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**7.38 %**
Verizon Wireless	7.16 %
T-Mobile	0.08 %
MetroPCS	2.55 %
Clearwire	0.15 %
Sprint	2.32 %
Nextel	0.44 %
XM Satellite Radio	0.16 %
PageNet	0.08 %
Blue Hills FD	1.75 %
Site Total MPE %:	**22.07 %**

AT&T Sector 1 Total:	7.38 %
AT&T Sector 2 Total:	7.38 %
AT&T Sector 3 Total:	6.77 %
Site Total:	22.07 %

AT&T _ 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
AT&T 850 MHz UMTS	4	414.12	98	7.04	850	567	1.24 %
AT&T 1900 MHz (PCS) UMTS	4	656.33	98	11.15	1900	1000	1.12 %
AT&T 700 MHz LTE	2	1239.23	98	10.53	700	467	2.25 %
AT&T 1900 MHz (PCS) LTE	2	1875.65	98	15.93	1900	1000	1.59 %
AT&T 850 MHz GSM	2	414.12	98	3.52	850	567	0.62 %
AT&T 1900 MHz (PCS) GSM	2	656.33	98	5.58	1900	1000	0.56 %
						Total:	7.38 %

EBI Consulting
environmental | engineering | due diligence

Summary

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

The anticipated maximum composite contributions from the AT&T 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:

AT&T Sector	Power Density Value (%)
Sector 1:	7.38 %
Sector 2:	7.38 %
Sector 3 :	6.77 %
AT&T Maximum Total (per sector):	7.38 %
Site Total:	22.07 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **22.07%** 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

PROJECT INFORMATION

SCOPE OF WORK:
- AT&T ANTENNAS: (1) NEW ANTENNA PER SECTOR, FOR A TOTAL (3) NEW ANTENNAS. (2) EXISTING ANTENNAS PER SECTOR FOR 3 SECTORS, FOR A TOTAL OF (6) EXISTING ANTENNAS TO REMAIN. (1) EXISTING ANTENNA PER SECTOR FOR (3) SECTORS, FOR A TOTAL OF (3) EXISTING ANTENNAS TO BE REMOVED.
- AT&T RRUs: (1) NEW RRUs PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (3) NEW RRUs. (1) NEW A2 MODULE PER SECTOR FOR (3) SECTORS, FOR A TOTAL OF (3) NEW A2 MODULES. (1) EXISTING RRU PER SECTOR TO BE REUSED, FOR A TOTAL OF (3) EXISTING RRUs.
- AT&T SQUID: (1) EXISTING DC-6 SQUID TO REMAIN.

SITE ADDRESS:	1021 BLUE HILLS AVENUE BLOOMFIELD, CT 06002
LATITUDE:	41.8201031 41° 49' 12.37116"N
LONGITUDE:	-72.6965269 -72° 41' 47.49684"W
USID:	14526
TOWER OWNER:	TBD
TYPE OF SITE:	SELF SUPPORT/INDOOR EQUIPMENT
MONOPOLE HEIGHT:	125'-0"±
RAD CENTER:	98'-0"±
CURRENT USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
PROPOSED USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

at&t MOBILITY

FA CODE: 10035110
SITE NUMBER: CT1148
SITE NAME: BLOOMFIELD EAST

PROJECT TEAM

CLIENT REPRESENTATIVE
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

SITE ACQUISITION:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

ENGINEERING:
COMPANY: COM-EX CONSULTANTS, LLC
ADDRESS: 115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
CONTACT: NICHOLAS D. BARILE, P.E.
PHONE: 862-209-4300
EMAIL: nbarile@comexconsultants.com

RF ENGINEER:
COMPANY: AT&T MOBILITY – NEW ENGLAND
ADDRESS: 550 COCHITUATE ROAD
SUITE 550 13 & 14
FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
PHONE: 508-596-7146
EMAIL: cs6970@att.com

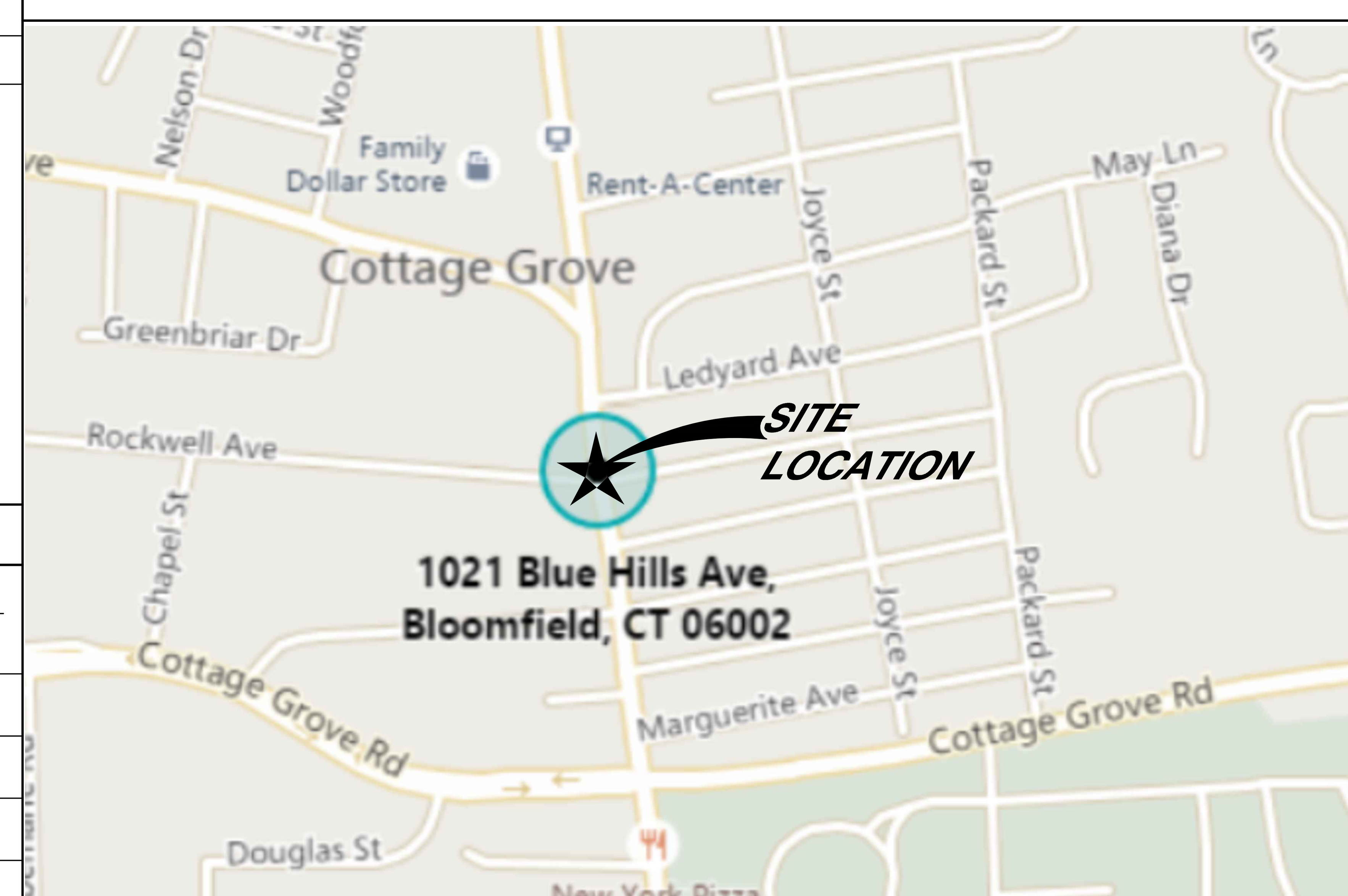
CONSTRUCTION MANAGEMENT:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: GRZEGORZ "GREG" DORMAN
PHONE: 484-683-1750
EMAIL: gdorman@empiretelecomm.com

DRAWING INDEX

	DRAWING INDEX	REV.
T-1	TITLE SHEET	0
GN-1	GROUNDING & GENERAL NOTES	0
A-1	COMPOUND LAYOUT	0
A-2	EQUIPMENT LAYOUTS	0
A-3	ANTENNA LAYOUTS & ELEVATIONS	0
A-4	DETAILS	0
G-1	GROUNDING, ONE-LINE DIAGRAM & DETAILS	0

VICINITY MAP

START OUT GOING NE ON ENTERPRISE DR TOWARD CAPITOL BLVD, TURN LEFT ONTO CAPITOL BLVD, TURN LEFT ONTO WEST ST, TURN LEFT TO TAKE RAMP ONTO I-91 N. TOWARD HARTFORD, TAKE EXIT 35A-35-B/WINDSOR/BLOOMFIELD/MANCHESTER, TURN LEFT ON CT-218, TURN RIGHT ON BLUE HILLS AVE, SITE WILL BE ON THE LEFT.



GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY, AND COPYRIGHTED WORK OF AT&T. 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 AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CONNECTICUT ONE CALL SYSTEM, INC. 1-800-922-4455 STOP-CALL BEFORE YOU DIG!

CONNECTICUT LAW REQUIRES TWO WORKING DAYS NOTICE PRIOR TO ANY EARTH MOVING ACTIVITIES BY CALLING 800-922-4455 OR DIAL 811

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN, ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AMD MAY IMPOSE CHANGES OR SITE MODIFICATIONS.

DISCIPLINE:	NAME:	
SITE ACQUISITION:		
CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CTU1148
SITE NAME: BLOOMFIELD EAST
1021 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/27/16	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL: STATE OF CONNECTICUT NICHOLAS D. BARILE No. 28643 LICENSED PROFESSIONAL ENGINEER
NICHOLAS D. BARILE
PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE: TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
15112-EMP	T-1	0

GROUNDING NOTES:

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

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

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471-000-3PS-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.

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

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

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

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

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

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

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

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

12. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV-G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').

14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE ½" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR – EMPIRE TELECOM
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY
   OEM – ORIGINAL EQUIPMENT MANUFACTURER

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 (EMPIRE TELECOM).

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

7. 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.

8. 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. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR

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

10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF 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.

11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

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

13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

14. 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). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

16. 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.

17. 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 MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

18. SINCE THE CELL SITE MAY BE 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 REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

19. 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.
    - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
    - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
    - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS

20. 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, THIRTEENTH EDITION
    - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
    - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
    - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
    - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
    - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
    - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

21. 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.

22. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

23. INFORMATION SHOWN ON THIS SET OF PLANS TAKEN FROM DRAWINGS PREPARED BY HUDSON DESIGN GROUP FOR A RECENT UPGRADE DATED 04/06/2012. CONTRACTOR TO NOTIFY DESIGN ENGINEER OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CTU1148

SITE NAME: BLOOMFIELD EAST

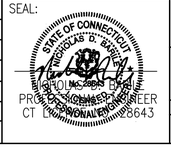
1021 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/27/16	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL:

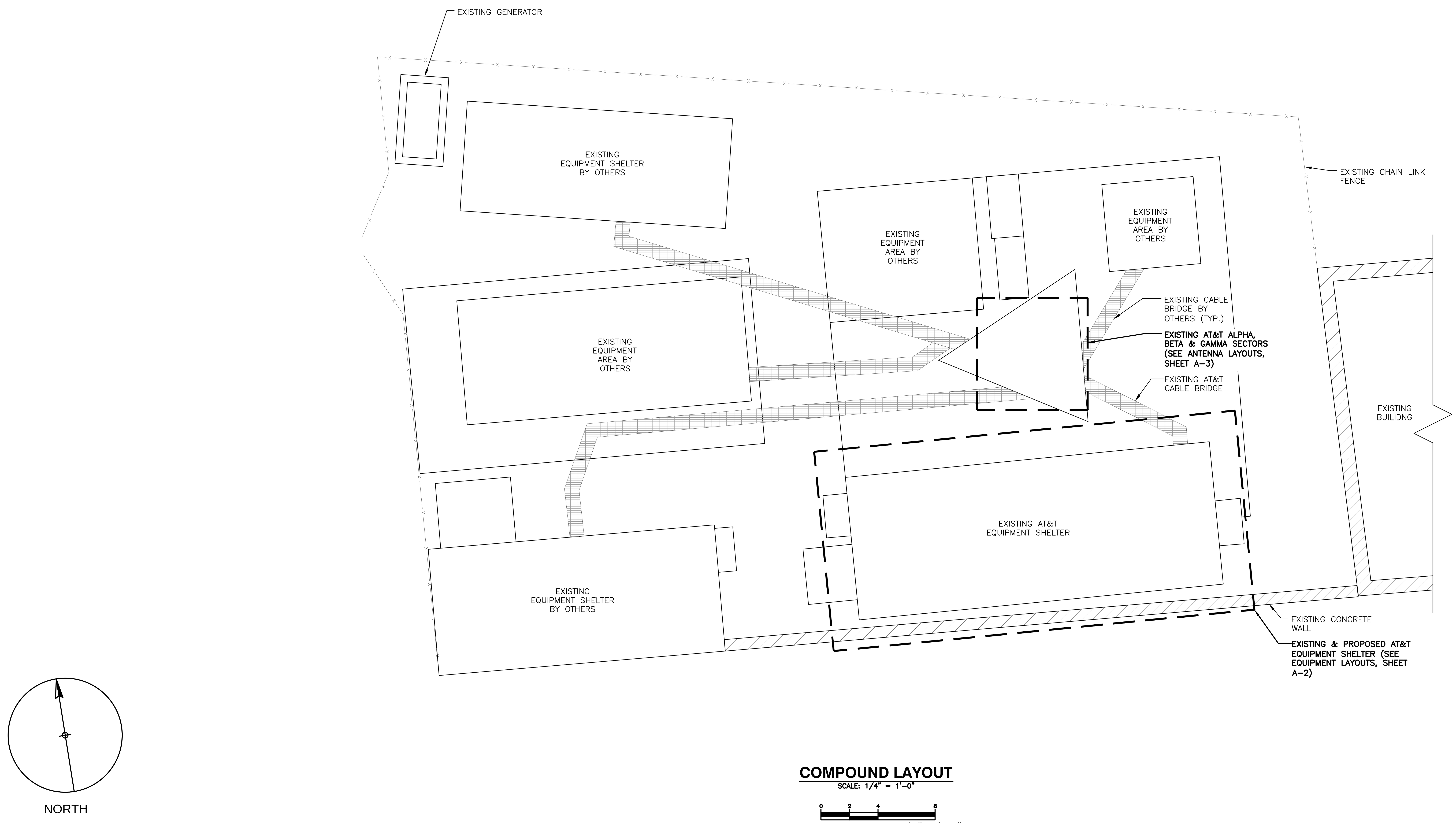


PROFESSIONAL ENGINEER
CT LICENSE NO. 23643

AT&T

DRAWING TITLE:
GROUNDING & GENERAL NOTES

JOB NUMBER	DRAWING NUMBER	REV
15112-EMP	GN-1	0



COMPOUND LAYOUT

SCALE: 1/4" = 1'-0"

GRAPHIC SCALE: 1/4"=1'-0"

NOTE:
CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CTU1148
SITE NAME: BLOOMFIELD EAST
1021 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/27/16	ISSUED AS FINAL	NJM	NDB	NDB

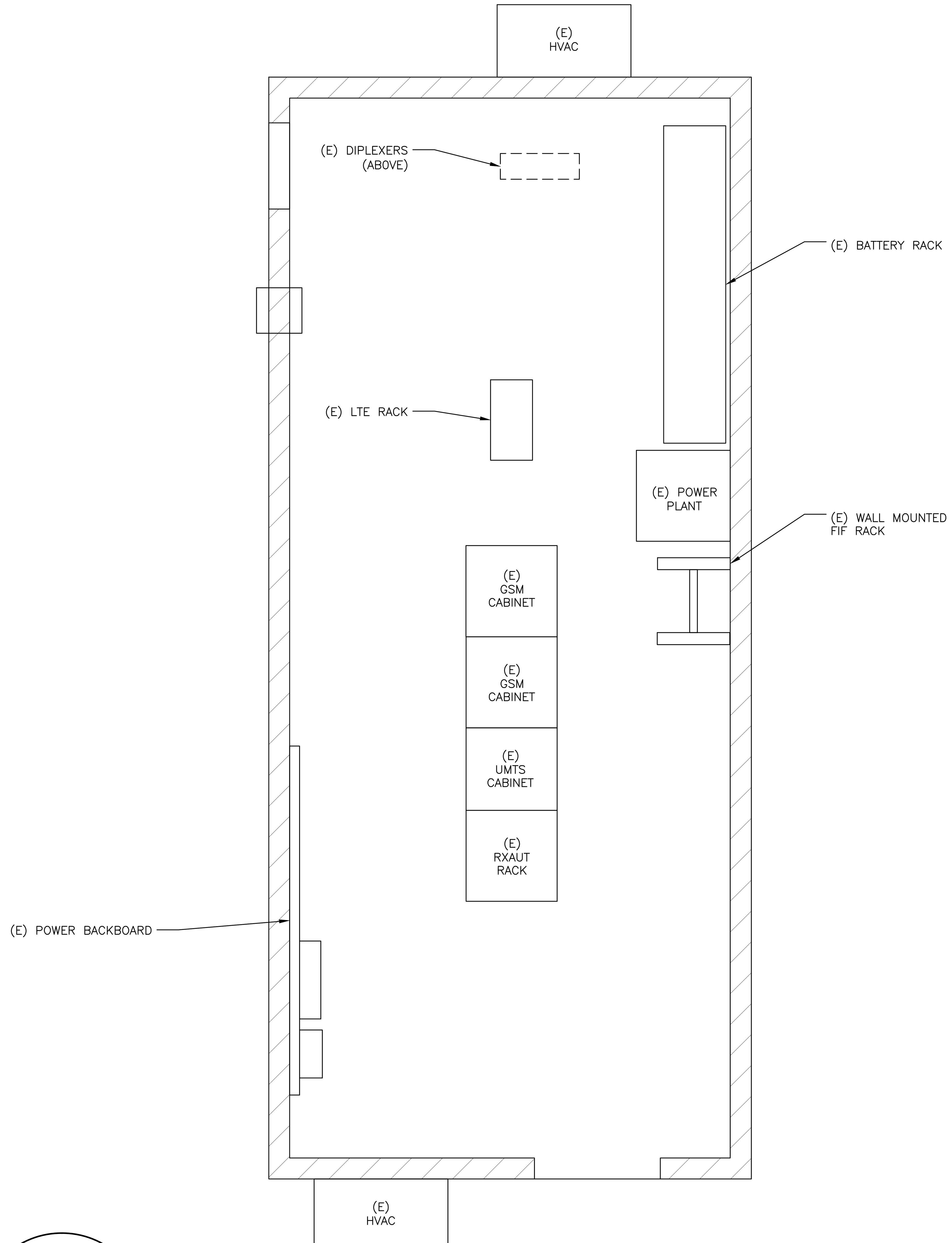
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

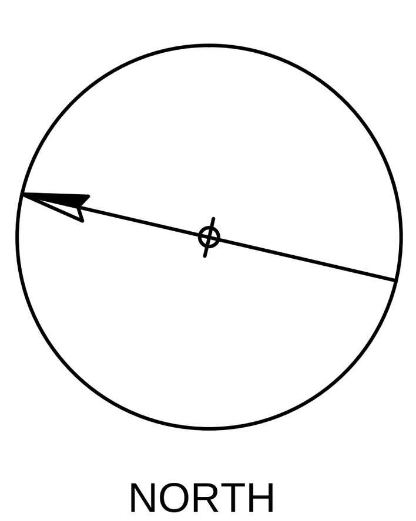
SEAL: STATE OF CONNECTICUT NICHOLAS D. BARILE ... PROFESSIONAL ENGINEER CT ...8643

AT&T

DRAWING TITLE: COMPOUND LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
15112-EMP	A-1	0



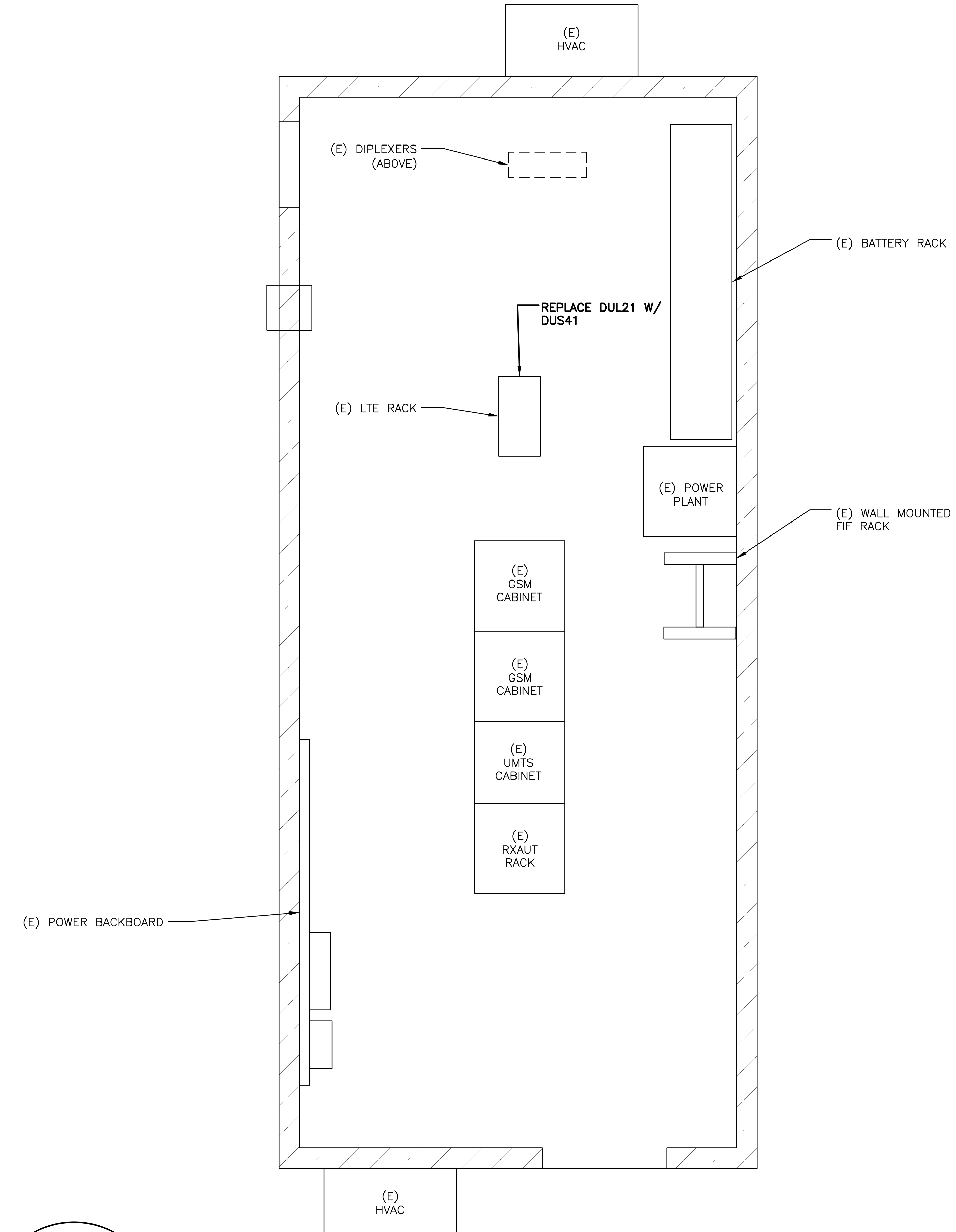


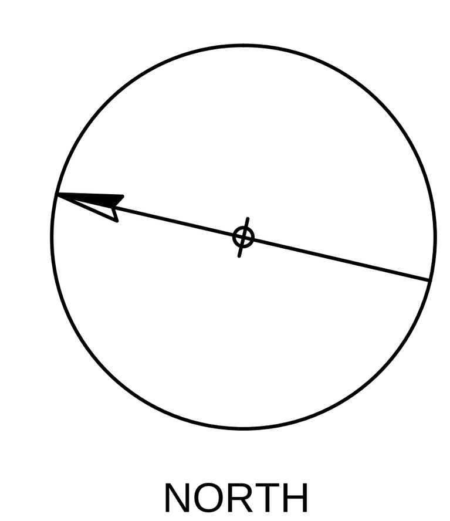
EXISTING EQUIPMENT LAYOUT

SCALE: 1/2" = 1'-0"

0 1 2 4

GRAPHIC SCALE: 1/2"=1'-0"





PROPOSED EQUIPMENT LAYOUT

SCALE: 1/2" = 1'-0"

0 1 2 4

GRAPHIC SCALE: 1/2"=1'-0"

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CTU1148
SITE NAME: BLOOMFIELD EAST
1021 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/27/16	ISSUED AS FINAL	NJM	NDB	NDB

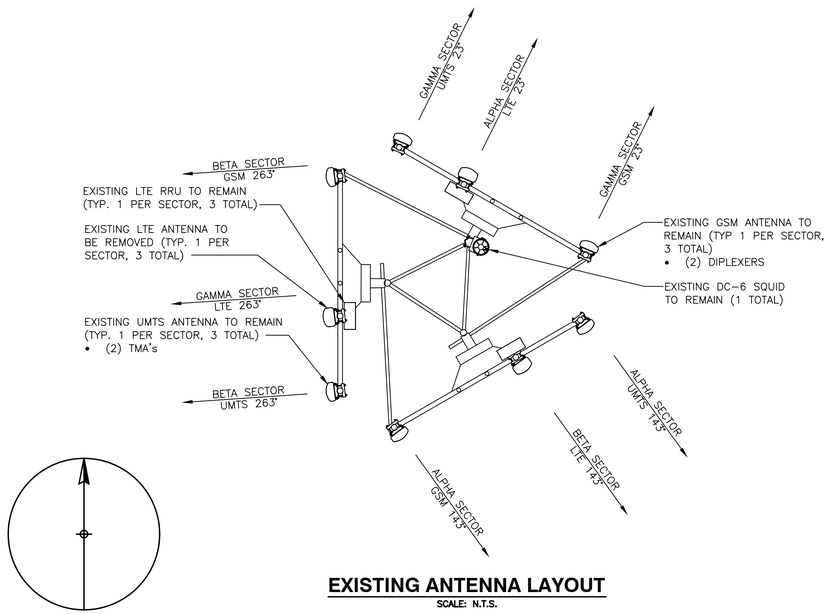
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL:
STATE OF CONNECTICUT
NICHOLAS D. BARILE
No. 28643
PROFESSIONAL ENGINEER
CT 28643

AT&T

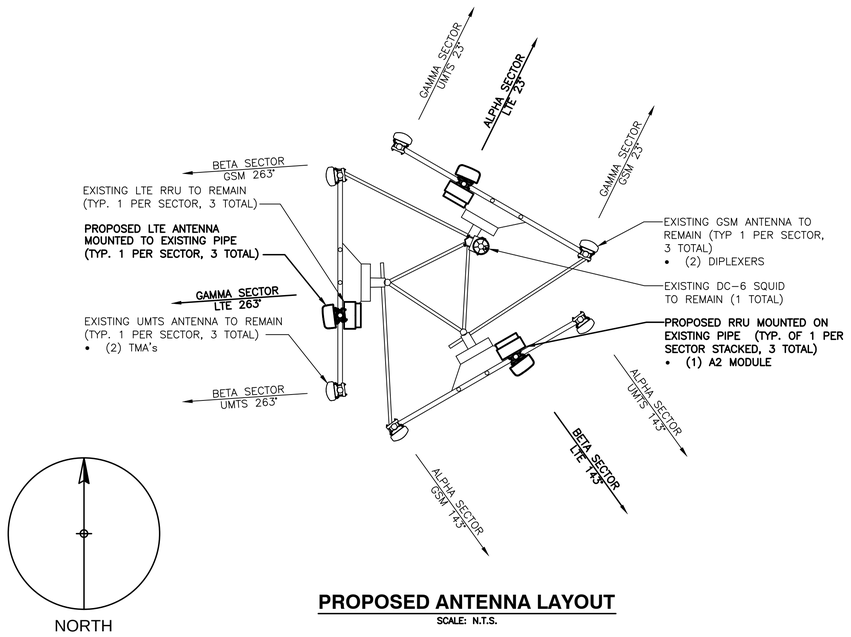
DRAWING TITLE:
EQUIPMENT LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
15112-EMP	A-2	0



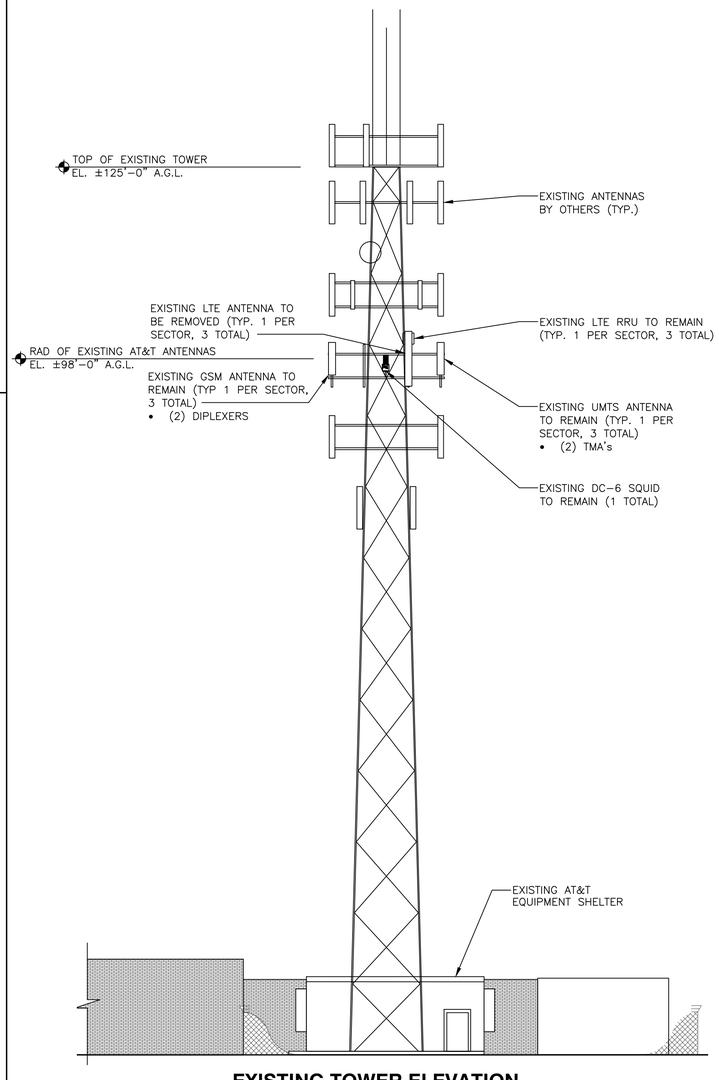
EXISTING ANTENNA LAYOUT

SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT

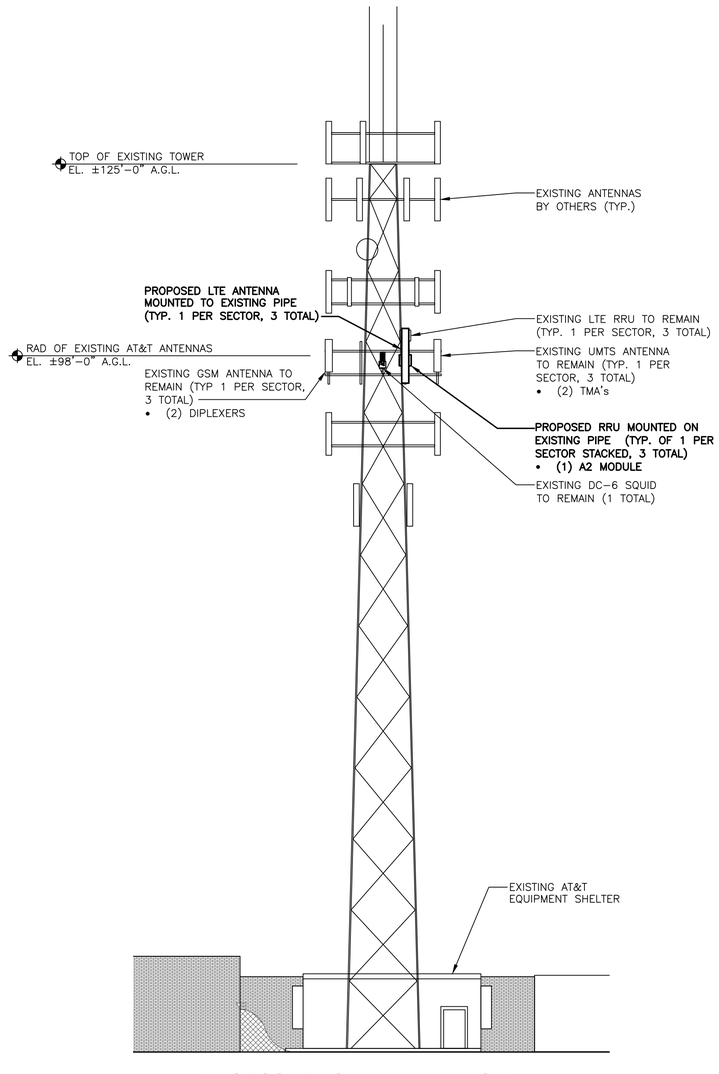
SCALE: N.T.S.



EXISTING TOWER ELEVATION

SCALE: NTS

PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.



PROPOSED TOWER ELEVATION

SCALE: NTS

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CTU1148

SITE NAME: BLOOMFIELD EAST

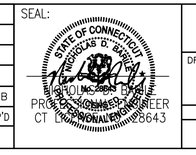
1021 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/27/16	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

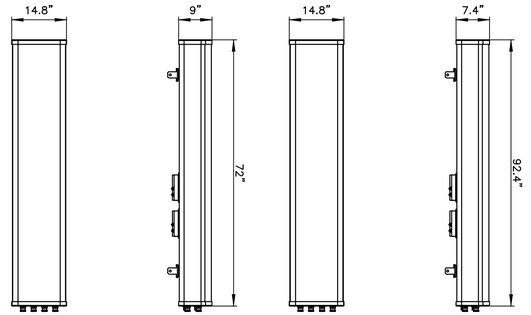
SEAL:



AT&T

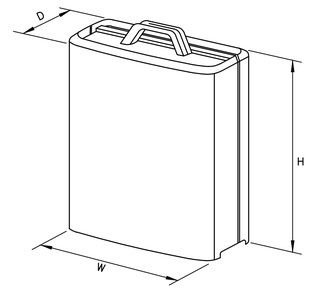
DRAWING TITLE:
ANTENNA LAYOUTS & ELEVATIONS

JOB NUMBER	DRAWING NUMBER	REV
15112-EMP	A-3	0



MANUFACTURER	CCI
MODEL	HPA-65R-BUU-H6
WEIGHT	51 LBS
MODEL	HPA-65R-BUU-H8
WEIGHT	68 LBS

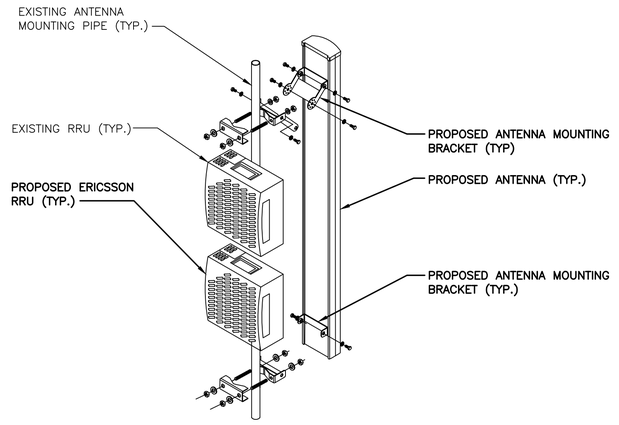
LTE ANTENNA DETAIL
SCALE: N.T.S.



MODEL	L x W x H	WEIGHT
*RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
A2 MODULE	16.4" x 15.2" x 3.4"	22 LBS

*DENOTES EXISTING.

RRUS DETAIL
SCALE: N.T.S.



ANTENNA AND RRU MOUNTING DETAIL
SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	ANDREW	SBNH-1D6565C	96.4"x11.9"x7.1"
	A3	–	–	–
	A4	POWERWAVE	7770	55"x11"x5"
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	ANDREW	SBNH-1D6565C	96.4"x11.9"x7.1"
	B3	–	–	–
	B4	POWERWAVE	7770	55"x11"x5"
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	G3	–	–	–
	G4	POWERWAVE	7770	55"x11"x5"

FINAL ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	**CCI**	**HPA-65R-BUU-H8**	**92.4"x14.8"x7.4"**
	A3	–	–	–
	A4	POWERWAVE	7770	55"x11"x5"
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	**CCI**	**HPA-65R-BUU-H8**	**92.4"x14.8"x7.4"**
	B3	–	–	–
	B4	POWERWAVE	7770	55"x11"x5"
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	**CCI**	**HPA-65R-BUU-H6**	**72"x14.8"x9"**
	G3	–	–	–
	G4	POWERWAVE	7770	55"x11"x5"

PROPOSED RRU SCHEDULE

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	**ERICSSON**	**RRUS-11**	**19.7"x16.9"x7.2"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"	–	–
	–	–	–		
BETA	**ERICSSON**	**RRUS-11**	**19.7"x16.9"x7.2"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"	–	–
	–	–	–		
GAMMA	**ERICSSON**	**RRUS-11**	**19.7"x16.9"x7.2"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"	–	–
	–	–	–		

PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CTU1148

SITE NAME: BLOOMFIELD EAST

1021 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/27/16	ISSUED AS FINAL	NJM	NDB	NDB

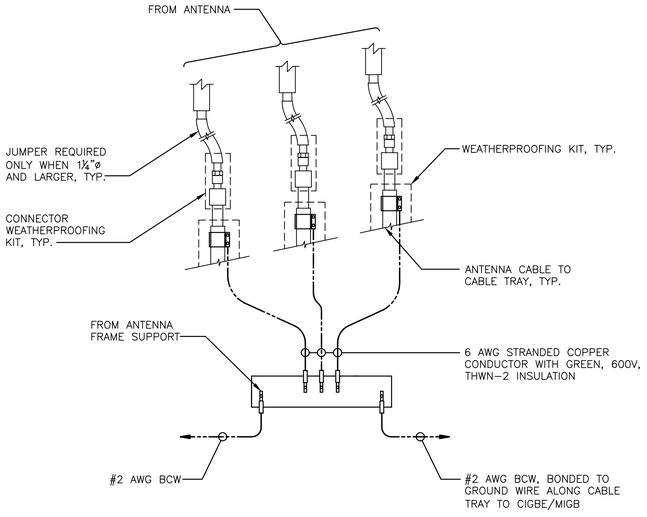
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL:
STATE OF CONNECTICUT
NICHOLAS D. BALLER
LICENSED
PROFESSIONAL ENGINEER
NICHOLAS D. BALLER
CT PROFESSIONAL ENGINEER 28643

AT&T

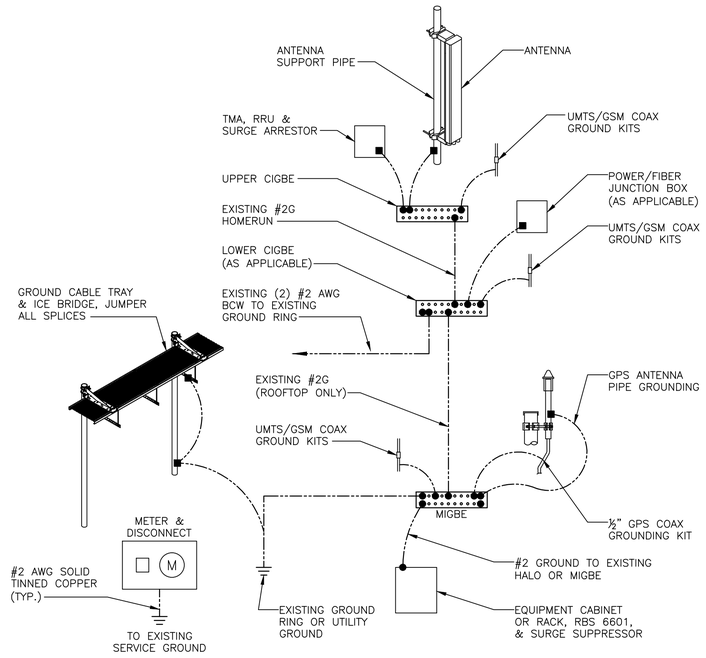
DRAWING TITLE:
DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15112-EMP	A-4	0



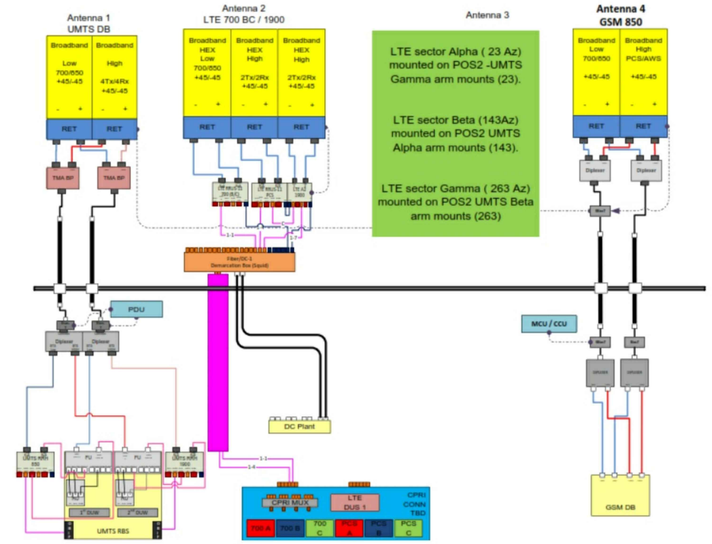
GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



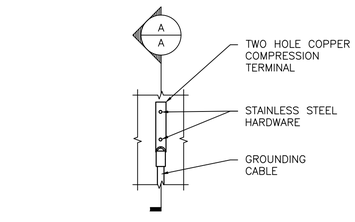
GROUNDING RISER DIAGRAM

SCALE: N.T.S.

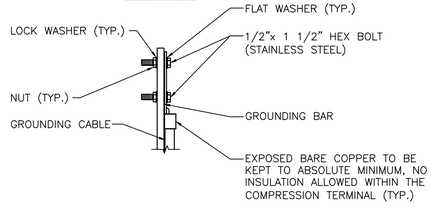


TYPICAL PLUMBING DIAGRAM (PER SECTOR)

SCALE: N.T.S.



ELEVATION



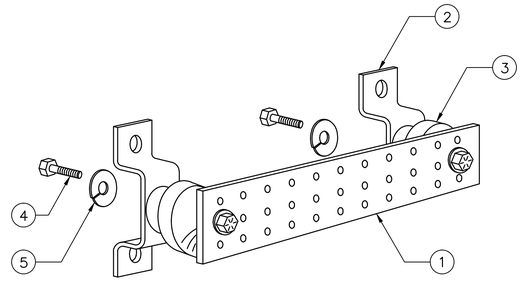
SECTION "A–A"

NOTE:

1. "DOUBLING UP" OR "STACKING" OF CONNECTIONS 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

SCALE: N.T.S.



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅝"–11x1" H.H.C.S.
5	4	⅝" LOCK WASHER

NOTES:

EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION

SECTION "P" – SURGE PRODUCERS
- CABLE ENTRY PORTS (HATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- +24V POWER SUPPLY RETURN BAR (#2)
- –48V POWER SUPPLY RETURN BAR (#2)
- RECTIFIER FRAMES

SECTION "A" – SURGE ABSORBERS
- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

GROUND BAR DETAIL

SCALE: N.T.S.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CTU1148

SITE NAME: BLOOMFIELD EAST

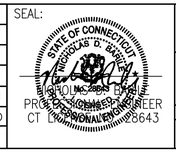
1021 BLUE HILLS AVENUE
BLOOMFIELD, CT 06002
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/27/16	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL:



AT&T

DRAWING TITLE: GROUNDING, ONE–LINE DIAGRAM & DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15112–EMP	G–1	0