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

April 24, 2017

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

Notice of Exempt Modification
1 Hartford Square, New Britain, CT 06052
41.6663919 N
-72.8127989 W
AT&T #: 10071149_LTE

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 162-foot level of the existing 175-foot Self-Support Tower at 1 Hartford Square. The tower is owned by SBA Towers. The property is owned by Hartford Square Associates. AT&T does not propose any change to the antenna configuration at this time, but does intend to make the following upgrades:

Remove:
- None

Remove and Replace:
- Remove (3) Ericsson RRUS-11 Remote Radio Units and replace with (3) Ericsson RRUS-32 B2s Remote Radio Units

Install:
- (3) V-stabilizers

Existing Equipment to Remain (including entitlements):
- (3) Kathrein 800 10121 panel antennas
- (3) Quintel Technology QS66412-2 panel antennas
- (6) KMW AM-X-CD-16-65-OOT panel antennas (3 are reserved entitlements)
- (3) Ericsson RRUS-32 Remote Radio Units
- (3) Ericsson RRUS-11 Remote Radio Units
- (6) Powerwave LGP 21401
- (6) CCI TPX-070821
- (6) Kathrein 860-10025
- (2) Raycap DC6-48-60-18-8F
- (3) T-Frames

- (12) 1-5/8 coax
- (2) ½" fiber
- (4) ¾" DC power
- (1) 3" Flex Conduit

This facility was approved by the Department of Municipal Development for the City of New Britain on 7/17/00. Associated construction drawings state tenants are to have a maximum of four panel antennas per sector. This modification complies with the aforementioned condition.

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 Erin Stewart, Mayor of the City of New Britain, The Municipal Development Group for the City of New Britain, as well as the property owner Hartford Square Associates, LLC. (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 Erin Stewart, Mayor of the City of New Britain–as elected official
City Hall Room 204, 27 West Main St., New Britain, CT 06051
New Britain Municipal Development–as representative for respective planning and zoning department
City Hall Room 311, 27 West Main St., New Britain, CT 06051
Hartford Square Associates, LLC– as property owner
1 Hartford Square Do~~or #19~~, New Britain, CT 06052
West - Box #15

POWER DENSITY

AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Kathrein 800-10121	Make / Model:	Kathrein 800-10121	Make / Model:	Kathrein 800-10121
Gain:	11.45 / 14.35 dBd	Gain:	11.45 / 14.35 dBd	Gain:	11.45 / 14.35 dBd
Height (AGL):	**162 feet**	Height (AGL):	**162 feet**	Height (AGL):	**162 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 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,471.44	ERP (W):	2,471.44	ERP (W):	2,471.44
Antenna A1 MPE%	**0.46 %**	Antenna B1 MPE%	**0.46 %**	Antenna C1 MPE%	**0.46 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2
Gain:	13.85 / 14.85 dBd	Gain:	13.85 / 14.85 dBd	Gain:	13.85 / 14.85 dBd
Height (AGL):	**162 feet**	Height (AGL):	**162 feet**	Height (AGL):	**162 feet**
Frequency Bands	1900 MHz (PCS) / 2300 MHz (WCS)	Frequency Bands	1900 MHz (PCS) / 2300 MHz (WCS)	Frequency Bands	1900 MHz (PCS) / 2300 MHz (WCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	6,577.84	ERP (W):	6,577.84	ERP (W):	6,577.84
Antenna A2 MPE%	**0.97 %**	Antenna B2 MPE%	**0.97 %**	Antenna C2 MPE%	**0.97 %**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	KMW AM-X-CD-16-65-00T-RET
Gain:	13.35 dBd	Gain:	13.35 dBd	Gain:	13.35 dBd
Height (AGL):	**162 feet**	Height (AGL):	**162 feet**	Height (AGL):	**162 feet**
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,595.26	ERP (W):	2,595.26	ERP (W):	2,595.26
Antenna A3 MPE%	**0.82 %**	Antenna B3 MPE%	**0.82 %**	Antenna C3 MPE%	**0.82 %**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**2.25 %**
Nextel	0.21 %
Clearwire	0.07 %
T-Mobile	1.89 %
MetroPCS	0.79 %
Verizon Wireless	3.69 %
Site Total MPE %:	**8.90 %**

AT&T Sector A Total:	2.25 %
AT&T Sector B Total:	2.25 %
AT&T Sector C Total:	2.25 %
Site Total:	8.90 %

AT&T _ Frequency Band / Technology 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	2	418.91	162	1.24	850 MHz	567	0.22%
AT&T 1900 MHz (PCS) UMTS	2	816.81	162	2.41	1900 MHz (PCS)	1000	0.24%
AT&T 1900 MHz (PCS) LTE	2	1,455.97	162	4.30	1900 MHz (PCS)	1000	0.43%
AT&T 2300 MHz (WCS) LTE	2	1,832.95	162	5.42	2300 MHz (WCS)	1000	0.54%
AT&T 700 MHz LTE	2	1,297.63	162	3.83	700 MHz	467	0.82%
						Total:	2.25%

1 HARTFORD SQ

Location	1 HARTFORD SQ	**Mblu**	F4A/ 2/ / /
Acct#	44950001	**Owner**	HARTFORD SQUARE ASSOCIATES LLC
Assessment	$4,579,890	**Appraisal**	$6,542,700
PID	764	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2012	$4,466,700	$2,076,000	$6,542,700
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2012	$3,126,690	$1,453,200	$4,579,890

Owner of Record

Owner	HARTFORD SQUARE ASSOCIATES LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	1 HARTFORD SQ WEST BOX #15 NEW BRITAIN, CT 06052	**Book & Page**	1903/1103
		Sale Date	12/03/2014

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
HARTFORD SQUARE ASSOCIATES LLC	$0		1903/1103	12/03/2014
HARTFORD SQUARE ASSOCIATES LLC	$0		1895/ 267	07/22/2014
HARTFORD SQUARE ASSOCIATES LLC	$0		1895/ 157	07/22/2014
HARTFORD SQUARE ASSOCIATES LLC	$0	1	1830/ 539	12/06/2011
HARTFORD SQUARE ASSOCIATES LLC	$3,500,000		1813/ 22	02/14/2011

Building Information

Building 1 : Section 1

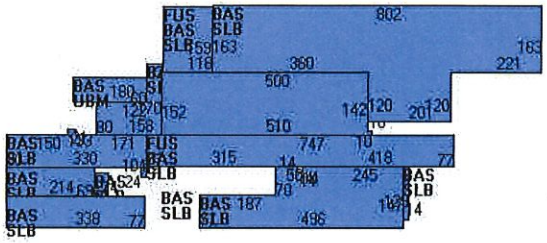
Year Built:	1940
Living Area:	542,561
Replacement Cost:	$19,840,566
Building Percent Good:	20
Replacement Cost Less Depreciation:	$3,968,100

Building Photo

Building Attributes	
Field	**Description**
STYLE	Warehouse
MODEL	Ind/Comm
Grade	C
Stories:	2
Occupancy	31
Exterior Wall 1	Brick/Masonry
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Metal/Tin
Interior Wall 1	Minimum/Masonr
Interior Wall 2	
Interior Floor 1	Finished Concr
Interior Floor 2	
Central Heat	Yes
AC Type	Partial
Bldg Use	Ind Whse MDL-96
Apt Units	
Total Bedrms	00
Total Baths	0
Comm Units	
Ind Units	
1st Floor Use:	4010
Heat/AC	Unit Heat
Frame Type	Steel
Baths/Plumbing	Average
Ceiling/Wall	Ceil & Min WL
Rooms/Prtns	Average
Wall Height	18
% Comn Wall	

(http://images.vgsi.com/photos/NewBritainCTPhotos//\00\03\49/90.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	466,084	466,084
FUS	Finished Upper Story	76,477	76,477
SLB	Slab	0	0
UBM	Basement	10,800	0
		553,361	542,561

Building 1 : Section 1

Year Built: 1940
Living Area: 0
Replacement Cost: $19,840,566
Building Percent Good: 20
Replacement Cost Less Depreciation: $3,968,100

Building Photo

Building Attributes	
Field	**Description**
Style	Outbuildings
Model	
Grade	

Stories	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Central Heat Sys	
AC Type	
Total Bedrooms	
Total Full Baths	
Total Half Baths	
Total Xtra Fixtrs	
Total Rooms	
Bath Style	
Kitchen Style	
Whirlpool Tub	
Fireplaces	
Rec Room Finish	
Rec Room Qual	
Bsmt Garages	
Bldg Nbhd	

(http://images.vgsi.com/photos/NewBritainCTPhotos//\00\03\49/91.jpg)

Building Layout

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
A/C	Central A/C	18000 S.F.	$11,700	1
LDL2	Load Lv Manual	8 Units	$1,900	1

Land

Land Use

Use Code	4010
Description	Ind Whse MDL-96
Zone	I2
Neighborhood	101G
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	31.10
Depth	
Assessed Value	$1,453,200
Appraised Value	$2,076,000

Outbuildings

Outbuildings	Legend

Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
PAV5	Conc Pad			1836 S.F.	$22,000	1
UST2	Utility Metal			3036 S.F.	$21,900	1
CB4	PreCastConcCel			200 S.F.	$33,000	1
UST3	Utility Masonr			484 S.F.	$4,600	1
CB3	PreCastConcCel			240 S.F.	$55,400	1
UST2	Utility Metal			320 S.F.	$2,300	1
CB3	PreCastConcCel			360 S.F.	$83,200	1
UST1	Utility Frame			320 S.F.	$2,800	1
FN4	Fence-8' Chain			272 L.F.	$3,500	1
UST2	Utility Metal			2000 S.F.	$14,400	1
SCL1	Scales-Mech			60 Tons	$37,800	1
TNK2	Tank Bulk			300000 Gal	$1,200	1
PAV1	Paving Asphalt			50000 S.F.	$48,000	1
BLB2	Billboard 2 Side			2 Units	$0	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$4,466,700	$2,076,000	$6,542,700
2015	$4,466,700	$2,076,000	$6,542,700
2014	$4,466,700	$2,076,000	$6,542,700

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$3,126,690	$1,453,200	$4,579,890
2015	$3,126,690	$1,453,200	$4,579,890
2014	$3,126,690	$1,453,200	$4,579,890

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: CT5254

New Britain West
1 Hartford Square
New Britain, CT 06052

November 11, 2016

EBI Project Number: 6216005158

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	8.90 %

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

November 11, 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: **CT5254 – New Britain West**

EBI Consulting was directed to analyze the proposed AT&T facility located at **1 Hartford Square, New Britain, 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 **1 Hartford Square, New Britain, 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) 2 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) 2 UMTS channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 2 LTE channels (2300 MHz (WCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 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.

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

7) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **Kathrein 800-10121, Quintel QS66512-2 and the KMW AM-X-CD-16-65-00T-RET** for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) 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.

9) The antenna mounting height centerlines of the proposed antennas are **162 feet** above ground level (AGL) for **Sector A**, **162 feet** above ground level (AGL) for **Sector B** and **162 feet** above ground level (AGL) for Sector C.

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

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

AT&T Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Kathrein 800-10121	Make / Model:	Kathrein 800-10121	Make / Model:	Kathrein 800-10121
Gain:	11.45 / 14.35 dBd	Gain:	11.45 / 14.35 dBd	Gain:	11.45 / 14.35 dBd
Height (AGL):	**162 feet**	Height (AGL):	**162 feet**	Height (AGL):	**162 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 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,471.44	ERP (W):	2,471.44	ERP (W):	2,471.44
Antenna A1 MPE%	**0.46 %**	Antenna B1 MPE%	**0.46 %**	Antenna C1 MPE%	**0.46 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2
Gain:	13.85 / 14.85 dBd	Gain:	13.85 / 14.85 dBd	Gain:	13.85 / 14.85 dBd
Height (AGL):	**162 feet**	Height (AGL):	**162 feet**	Height (AGL):	**162 feet**
Frequency Bands	1900 MHz (PCS) / 2300 MHz (WCS)	Frequency Bands	1900 MHz (PCS) / 2300 MHz (WCS)	Frequency Bands	1900 MHz (PCS) / 2300 MHz (WCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	6,577.84	ERP (W):	6,577.84	ERP (W):	6,577.84
Antenna A2 MPE%	**0.97 %**	Antenna B2 MPE%	**0.97 %**	Antenna C2 MPE%	**0.97 %**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	KMW AM-X-CD-16-65-00T-RET
Gain:	13.35 dBd	Gain:	13.35 dBd	Gain:	13.35 dBd
Height (AGL):	**162 feet**	Height (AGL):	**162 feet**	Height (AGL):	**162 feet**
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,595.26	ERP (W):	2,595.26	ERP (W):	2,595.26
Antenna A3 MPE%	**0.82 %**	Antenna B3 MPE%	**0.82 %**	Antenna C3 MPE%	**0.82 %**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**2.25 %**
Nextel	0.21 %
Clearwire	0.07 %
T-Mobile	1.89 %
MetroPCS	0.79 %
Verizon Wireless	3.69 %
Site Total MPE %:	**8.90 %**

AT&T Sector A Total:	2.25 %
AT&T Sector B Total:	2.25 %
AT&T Sector C Total:	2.25 %
Site Total:	8.90 %

AT&T _ Frequency Band / Technology 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	2	418.91	162	1.24	850 MHz	567	0.22%
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AT&T 1900 MHz (PCS) LTE	2	1,455.97	162	4.30	1900 MHz (PCS)	1000	0.43%
AT&T 2300 MHz (WCS) LTE	2	1,832.95	162	5.42	2300 MHz (WCS)	1000	0.54%
AT&T 700 MHz LTE	2	1,297.63	162	3.83	700 MHz	467	0.82%
						Total:	2.25%

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 A:	2.25 %
Sector B:	2.25 %
Sector C:	2.25 %
AT&T Maximum Total (per sector):	2.25 %
Site Total:	8.90 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.90 %** 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.

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 Modification Design Report for
SBA Communications Corporation

Existing 175' Self Support Tower

SBA Site Name: New Britain 2, CT
SBA Site Number: CT04382-S-02
Carrier Name: AT&T
Carrier Site ID/Name: 15210/New Britain West Tenant
Fixed Asset #10071149
App #: 47583, v1.

Site Location:
1 Hartford Square,
New Britain,
CT 06052-1161

Latitude: 41.666209°
Longitude: -72.811634°

ACGI Job # 17-0378
(Refer to previous failing SA ACGI Job # 16-4300)

ANALYSIS RESULTS		
Tower Components	98.6 %	**Pass with Modification**
Tower Foundation Capacity	63.6 %	**Pass**

Prepared By:
Jingcheng Li, EIT

02/17/2017
Approved By:
Joji Geroge, P.E.
CT PE #24444

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1. ANALYSIS SUMMARY

The existing 175' Self Support Tower located in New Britain, 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 mentioned proposed and existing loading is found **to be in code compliance** with *TIA-222-G, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and IBC 2012,* ***after proposed modifications installed.***

2. SCOPE & SOURCE OF INFORMATION

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

SOURCE OF INFORMATION		
Tower Data:	Rohn Industries, Inc. FDH Engineering, Inc. Allpro Consulting Group, Inc.	-Original Tower Drawings by Rohn Industries, Inc. (Eng. File No. 44545AE dated 08/18/2000) -Previous Structural Analysis by FDH Engineering, Inc.(FDH Project Number 16BICQ1400, dated 05/13/2016) -Previous failing structural analysis by Allpro Consulting group, Inc., ACGI # 16-4300, dated 12/07/2016
Foundation Data:	Rohn Industries, Inc.	- Existing MAT foundation data is as per original foundation design by Rohn Industries, Inc. (Eng. File No. 44545AE dated 07/26/2000)
Geotechnical Report:	Jaworski Geotech, Inc	Foundation design was based on geotechnical report (No. 00309G dated 07/05/2000)
Loading Data:	Allpro Consulting Group, Inc. SBA Communication Corp.	-Previous failing structural analysis by Allpro Consulting group, Inc., ACGI # 16-4300, dated 12/07/2016 Proposed final loading for AT&T as per SBA Portal, App #47583, v1.
Authorization:	SBA Communication Corp.	

3. ANALYSIS METHODS & DATA

The analysis was performed in accordance with Telecommunication Industry Association specification TIA-222-G. 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-222-G standards. The 3-D model included the tower, with existing appurtenances and all proposed loads.

SITE DATA	
SBA Site Name:	New Britain 2, CT
SBA Site Number:	CT04382-S-02
Carrier Site ID:	AT&T: 15210 / New Britain West Tenant Fixed Asset #10071149
City, State:	Hartford, CT
County:	New Britain County
Code Wind Load Requirement:	ANSI/TIA-222-G &International Building Code (122 mph ultimate wind speed equivalent to 95 mph basic wind speed)
Wind Load Used:	ANSI/TIA-222-G Code: • Basic wind speed of 95 mph (3 second gust wind speed) • Structure Class II. • Exposure Category C. • Topographic Category 1. • Crest Height 0.00 ft. • A wind speed of 50 mph is used in combination with ice • Nominal ice thickness of 1.0 in.

TOWER DATA	
Tower Type:	Self Support Tower
Height:	175'
Cross Section:	Triangular
Steel Strength:	Legs – 50 ksi , Braces – 36 ksi
Type of Foundation:	Mat Foundation with (3) Pedestals

TOWER HISTORY	
Tower Manufacturer / Model:	Rohn Industries, Inc.
Date of Original Design:	08/18/2000
Previous Modifications:	N/A
Original Design Code Requirements:	TIA-222-F 2005, 80 mph wind speed + 1" radical ice 38 mph wind speed

4. CONCLUSIONS

RESULT SUMMARY		
MEMBER	*% Capacity*	*Pass/Acceptable*
Legs	**66.2 %**	**Pass**
Diagonals	**98.6 %**	**Pass w/ Modification**
Top Girt	**2.9 %**	**Pass**
Bolt checks	**98.6 %**	**Pass**
Foundation (see attached MathCAD for details)	**Net Soil Pressure (22.2 %)**	**Pass**
	Horizontal shear (30.3 %)	**Pass**
	Safety against overturning (63.6 %)	**Pass**
OVERALL TOWER RATING = 98.6 %		

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

Upon installation of proposed modifications, maximum tower member stress **is less than allowable,** making **it in code compliance** under the TIA-222-G code and 2012 International Building Code.

5. DISCLAIMER

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

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

6. ASSUMPTIONS

This analysis was completed based on the following assumptions:

- Tower has been properly maintained.
- Tower erection was in accordance to manufacturer drawings and modification reports.
- Leg flanges have been properly designed by manufacturer to not be a limiting reaction.
- Welds have been properly designed and installed by manufacturer to not be a limiting reaction.
- Foundation data was not provided. It is assumed that the foundation is designed to resist the original tower reactions.
- Foundation does not have structural damage.
- Bolts have been properly tightened according to manufacturer specifications.
- Appurtenance, mount and transmission line sizes and weights are best estimates using the tnxTower database and manufacturer information.

7. RECOMMANDATIONS

The existing tower is recommended for the final loading listed under Section 8 "Appurtenances Listing", after installing proposed tower modifications.

Modification Summary:

1. Reinforce existing diagonals using same size angle steel members to make it C-Section. For Elevations:
   80'-86.7'

8. APPURTENANCE LISTING

EXISTING LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
172±	3	Kathrein 840-10054	(3) T-Frames	(6)5/16" Fiber	Clearwire
	4	Andrew VHLP2.5			
	3	Samsung U-RAS Flexible RRH			
	3	Dragonwave Horizon Duo			
162±	3	Kathrein 800 10121	(3) T-Frames	(12) 1-5/8" Coax (2) 1/2" Fiber (4) 3/4" DC Power (1)3" Flex Conduit	AT&T
	3	Quintel Technology QS66512-2			
	6	KMW AM-X-CD-16-65-00T			
	3	Ericsson RRUS-32			
	6	Ericsson RRUS-11			
	6	Powerwave LGP 21401			
	6	CCI TPX-070821			
	6	Kathrein 860-10025			
	2	Raycap DC6-48-60-18-8F			
152±	3	Commscope LNX-6515DS-A1M	(3) T-Frames	(12) 1-5/8" Coax (1) 1-5/8" Fiber	T-Mobile
	3	Ericsson S11B12			
	3	Ericsson AIR 21 B2A/B4P			
	3	Ericsson AIR 21 B4A/B2P			
	3	Ericsson KRY 112 144/1			
140±	6	Andrew SBNHH-1D65B	(3) T-Frames	(12) 1-5/8" Coax (2) 1-5/8" Hybrid	Verizon
	3	Kathrein 800 10735v01			
	3	Antel BXA-80080/4CF			
	3	Alcatel Lucent RRH-2x60-AWS			
	3	Alcatel Lucent RRH-2x60-PCS			
	3	Alcatel Lucent RRH-2X60W-700U			
	1	RFS DB-T1-6Z-8AB-0Z			
130±	3	Kathrein 742 213	(3) Pipe Mounts	(6) 1-5/8" Coax	Metro PCS

FINAL AT&T LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
162±	3	Kathrein 800 10121	(3) T-Frames	(12) 1-5/8" Coax (2) 1/2" Fiber (4) 3/4" DC Power (1)3" Flex Conduit*	AT&T
	3	Quintel Technology QS66512-2			
	6	KMW AM-X-CD-16-65-00T			
	3	Ericsson RRUS-32			
	3	Ericsson RRUS-11			
	3	**Ericsson RRUS-32 B2s**			
	6	Powerwave LGP 21401			
	6	CCI TPX-070821			
	6	Kathrein 860-10025			
	2	Raycap DC6-48-60-18-8F			

1. ACGI should be notified of any discrepancies found in the data listed in this report.
2. Notify ACGI if any potential physical and other interference with existing antennas for a redesign.
3. *The (2) 1/2" Fiber Cable and (4) 3/4" DC Power Cable for ATT will be installed in (1) 3" Flex Conduit

9. SUMMARY OF WORKING PERCENTAGE OF STRUCTURAL COMPONENTS

Section Capacity Table

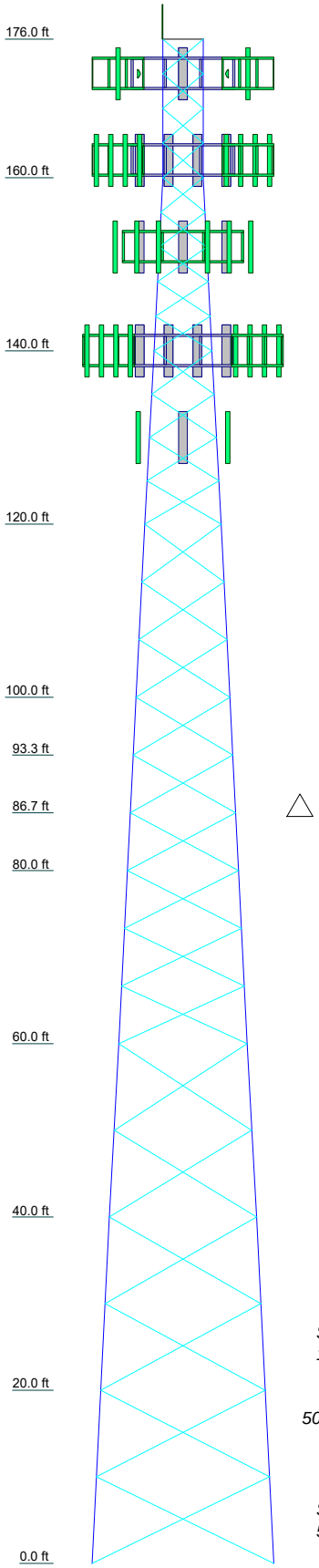
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$øP_{allow}$ K	% Capacity	Pass Fail
T1	176 - 160	Leg	ROHN 3 EH	2	-11.51	119.12	9.7	Pass
T2	160 - 140	Leg	ROHN 4 EH	32	-53.06	183.54	28.9	Pass
T3	140 - 120	Leg	ROHN 5 EH	66	-102.15	254.38	40.2	Pass
T4	120 - 100	Leg	ROHN 6 EHS	93	-143.98	274.77	52.4	Pass
T5	100 - 93.3333	Leg	ROHN 6 EH	114	-157.85	343.10	46.0	Pass
T6	93.3333 - 86.6667	Leg	ROHN 6 EH	123	-170.95	343.10	49.8	Pass
T7	86.6667 - 80	Leg	ROHN 6 EH	132	-183.97	343.10	53.6	Pass
T8	80 - 60	Leg	ROHN 6 EH	141	-222.29	343.10	64.8	Pass
T9	60 - 40	Leg	ROHN 8 EHS	162	-255.74	386.39	66.2	Pass
T10	40 - 20	Leg	ROHN 8 X-STR	177	-291.44	505.55	57.6	Pass
							59.5 (b)	
T11	20 - 0	Leg	ROHN 8 EH	192	-325.83	505.55	64.5	Pass
T1	176 - 160	Diagonal	L2x2x1/4	9	-2.85	19.13	14.9	Pass
							29.2 (b)	
T2	160 - 140	Diagonal	L2x2x3/16	37	-4.74	11.91	39.8	Pass
							69.0 (b)	
T3	140 - 120	Diagonal	L2x2x3/16	70	-6.62	7.89	83.9	Pass
							98.6 (b)	
T4	120 - 100	Diagonal	L2 1/2x2 1/2x3/16	97	-7.45	9.76	76.3	Pass
							94.4 (b)	
T5	100 - 93.3333	Diagonal	L2 1/2x2 1/2x3/16	118	-7.55	8.87	85.0	Pass
							96.4 (b)	
T6	93.3333 - 86.6667	Diagonal	L2 1/2x2 1/2x3/16	127	-7.52	8.09	92.9	Pass
							95.2 (b)	
T7	86.6667 - 80	Diagonal	L2.5x2.5x3/16 + L2.5x2.5x3/16 (C-shape)	135	-8.06	32.06	25.1	Pass
							64.9 (b)	
T8	80 - 60	Diagonal	L3x3x1/4	144	-8.29	13.19	62.8	Pass
T9	60 - 40	Diagonal	L3 1/2x3 1/2x1/4	165	-9.84	14.60	67.4	Pass
							69.1 (b)	
T10	40 - 20	Diagonal	L3 1/2x3 1/2x1/4	180	-10.32	12.18	84.7	Pass
T11	20 - 0	Diagonal	L4x4x1/4	195	-11.05	15.47	71.4	Pass
							76.3 (b)	
T1	176 - 160	Top Girt	L2x2x1/4	5	-0.33	12.90	2.6	Pass
							2.9 (b)	
							Summary	
						Leg (T9)	66.2	Pass
						Diagonal (T3)	98.6	Pass
						Top Girt (T1)	2.9	Pass
						Bolt Checks	98.6	Pass
						RATING =	**98.6**	**Pass**

APPENDIX

COAX LAYOUT

TOWER ELEVATION DRAWING

Section		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11										
Legs		ROHN 3 EH	ROHN 4 EH	ROHN 5 EH	ROHN 6 EHS			ROHN 6 EH		ROHN 8 EHS	ROHN 8 X-STR	ROHN 8 EH										
Leg Grade		A572-50																				
Diagonals		L2x2x1/4		L2x2x3/16		L2 1/2x2 1/2x3/16		A	L3x3x1/4		L3 1/2x3 1/2x1/4	L4x4x1/4										
Diagonal Grade		A36							A572-50													
Top Girts		L2x2x1/4							N.A.													
Face Width (ft)	21	4.6875		6.72656	8.76563	10.8047	11.4844	12.1641	12.8438	14.8828	16.9219	18.9609										
# Panels @ (ft)		9 @ 4		4 @ 5	9 @ 6.66667						6 @ 10											
Weight (K)	24.9	1.1	1.5	1.9	2.1	0.9	0.9	1.2	3.2	3.4	4.2	4.8										



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2.5x2.5x3/16 + L2.5x2.5x3/16 (C-shape)		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 95 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 98.6%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 334 K
SHEAR: 35 K

UPLIFT: -288 K
SHEAR: 31 K

AXIAL 178 K
SHEAR 17 K *MOMENT 1910 kip-ft*
TORQUE 4 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 61 K
SHEAR 56 K *MOMENT 5710 kip-ft*
TORQUE 15 kip-ft
REACTIONS - 95 mph WIND

Allpro Consulting Group, Inc.
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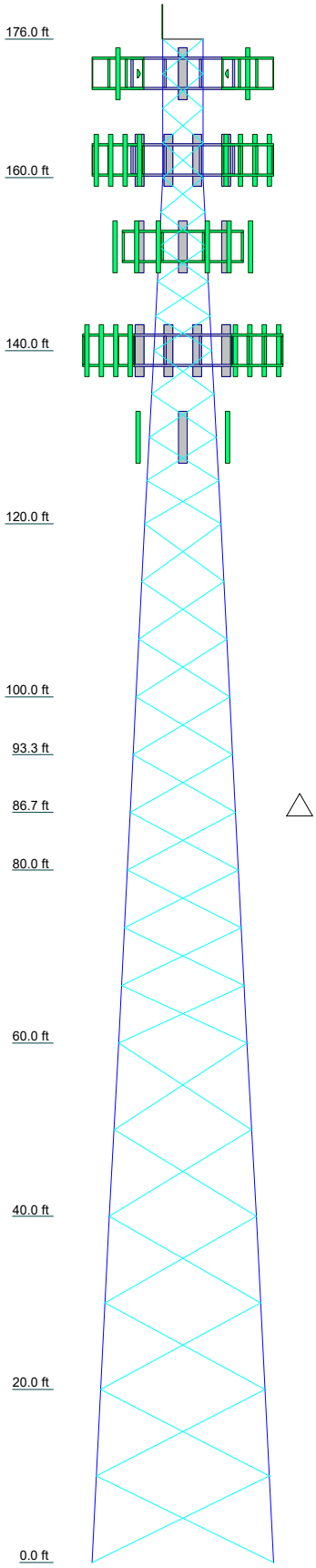
Dallas, TX 75243
Phone: 972-231-8893
FAX: 866-364-8375

Job: 17-0378			
Project: CT04382-S-02 New Britain 2, CT Modification Desig			
Client: SBA Network Services, Inc.	Drawn by: JLi	App'd:	
Code: TIA-222-G	Date: 02/17/17	Scale: NTS	
Path:		Dwg No. E-1	

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	
Legs	ROHN 3 EH	ROHN 4 EH	ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH				ROHN 8 EHS	ROHN 8 X-STR	ROHN 8 EH	
Leg Grade	A572-50											
Diagonals	L2x2x1/4	L2x2x3/16		L2 1/2x2 1/2x3/16			A	L3x3x1/4	L3 1/2x3 1/2x1/4		L4x4x1/4	
Diagonal Grade	A36							A572-50				
Top Girts	L2x2x1/4	N.A.										
Face Width (ft)	4.6875	6.72656		8.76563	10.8047	11.4844	12.1641	12.8438	14.8828	16.9219	18.9609	21
# Panels @ (ft)	9 @ 4		4 @ 5		9 @ 6.66667					6 @ 10		
Weight (K)	1.1	1.5	1.9	2.1	0.9	0.9	1.2	3.2	3.4	4.2	4.8	24.9



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	176	(2) AM-X-CD-16-65-00T	162
840-10054 w/ Mount Pipe	172	(2) AM-X-CD-16-65-00T	162
840-10054 w/ Mount Pipe	172	AIR 21 B2A/B4P w/ Mount Pipe	152
840-10054 w/ Mount Pipe	172	AIR 21 B2A/B4P w/ Mount Pipe	152
URAS-FLEXIBLE	172	AIR 21 B2A/B4P w/ Mount Pipe	152
URAS-FLEXIBLE	172	AIR 21 B4A/B2P w/ Mount Pipe	152
URAS-FLEXIBLE	172	AIR 21 B4A/B2P w/ Mount Pipe	152
Horizon Duo	172	AIR 21 B4A/B2P w/ Mount Pipe	152
Horizon Duo	172	S11B12	152
Horizon Duo	172	S11B12	152
(3) Empty Pipe Mount	172	S11B12	152
(3) Empty Pipe Mount	172	KRY 112 144/1	152
(3) Empty Pipe Mount	172	KRY 112 144/1	152
(3) T-Frames	172	KRY 112 144/1	152
(2) VHLP2.5 Dish	172	Empty Pipe Mount	152
VHLP2.5 Dish	172	Empty Pipe Mount	152
VHLP2.5 Dish	172	Empty Pipe Mount	152
Kathrein 800-10121	162	(3) T-Frames	152
Kathrein 800-10121	162	LNX-6515DS-A1M w/ Mount Pipe	152
Kathrein 800-10121	162	LNX-6515DS-A1M w/ Mount Pipe	152
QS65512-2	162	LNX-6515DS-A1M w/ Mount Pipe	152
QS65512-2	162	800 10735v01 w/ Mount Pipe	140
QS65512-2	162	800 10735v01 w/ Mount Pipe	140
(2) LGP 21401	162	800 10735v01 w/ Mount Pipe	140
(2) LGP 21401	162	BXA-80080/4CF w/ Mount Pipe	140
(2) LGP 21401	162	BXA-80080/4CF w/ Mount Pipe	140
(2) Katherin 860-10025	162	BXA-80080/4CF w/ Mount Pipe	140
(2) Katherin 860-10025	162	RRH-2x60-AWS	140
(2) Katherin 860-10025	162	RRH-2x60-AWS	140
Ericsson RRUS 11	162	RRH-2x60-AWS	140
Ericsson RRUS 11	162	RRH-2x60-PCS	140
Ericsson RRUS 11	162	RRH-2x60-PCS	140
Ericsson RRUS 32	162	RRH-2x60-PCS	140
Ericsson RRUS 32	162	RRH 2x60-700	140
Ericsson RRUS 32	162	RRH 2x60-700	140
Ericsson RRUS 32 B2s	162	RRH 2x60-700	140
Ericsson RRUS 32 B2s	162	DB-T1-6Z-8AB-0Z	140
Ericsson RRUS 32 B2s	162	(3) T-Frames	140
(2) TPX-070821	162	(2) SBNHH-1D65B w/ Mount Pipe	140
(2) TPX-070821	162	(2) SBNHH-1D65B w/ Mount Pipe	140
(2) TPX-070821	162	(2) SBNHH-1D65B w/ Mount Pipe	140
DC6-48-60-18-8F	162	(3) Pipe Mounts	130
DC6-48-60-18-8F	162	742 213 w/ Mount Pipe	130
(3) T-Frames	162	742 213 w/ Mount Pipe	130
(2) AM-X-CD-16-65-00T	162	742 213 w/ Mount Pipe	130

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2.5x2.5x3/16 + L2.5x2.5x3/16 (C-shape)		

MATERIAL STRENGTH

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

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6. Tower Structure Class II.
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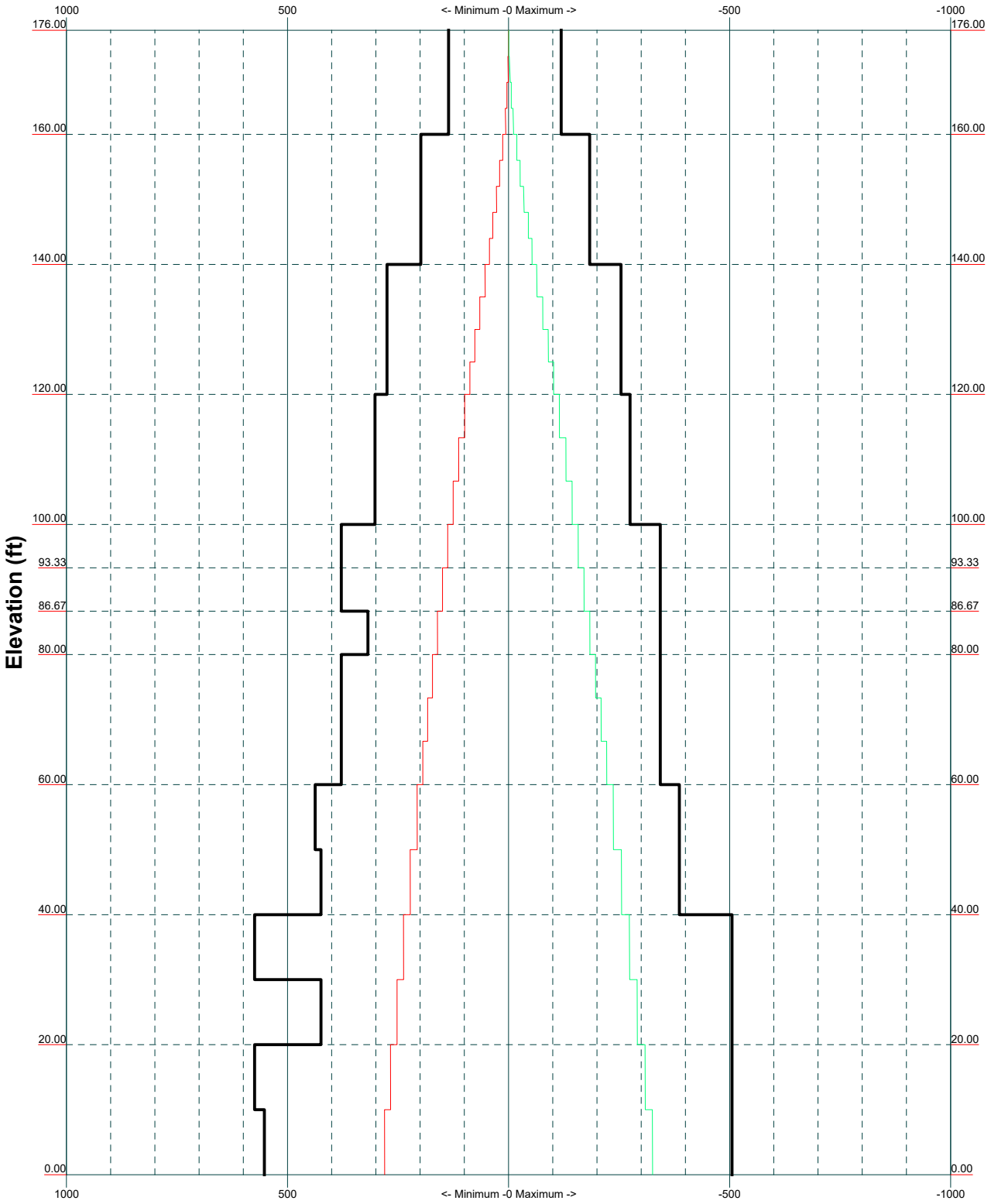
Job: *17-0378*			
Project: *CT04382-S-02 New Britain 2, CT Modification Desig*			
Client: SBA Network Services, Inc.	Drawn by: JLi	App'd:	
Code: TIA-222-G	Date: 02/17/17	Scale: NTS	
Path:		Dwg No. E-1	

MISCELLANEOUS PLOTS

TIA-222-G - 95 mph/50 mph 1.0000 in Ice Exposure C

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



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Client: SBA Network Services, Inc.	Drawn by: JLi	App'd:	
Code: TIA-222-G	Date: 02/17/17	Scale: NTS	
Path:		Dwg No. E-3	

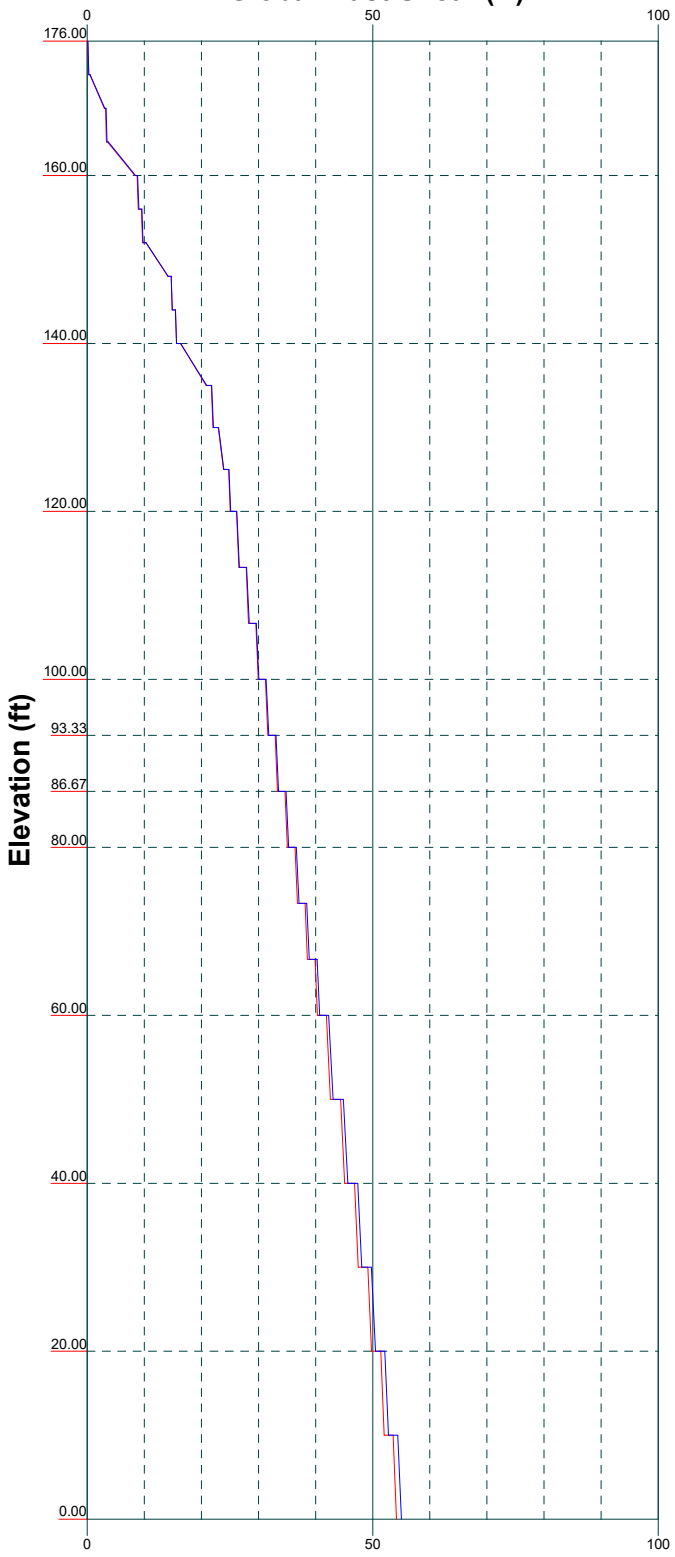
TIA-222-G - 95 mph/50 mph 1.0000 in Ice Exposure C

Vx Vz

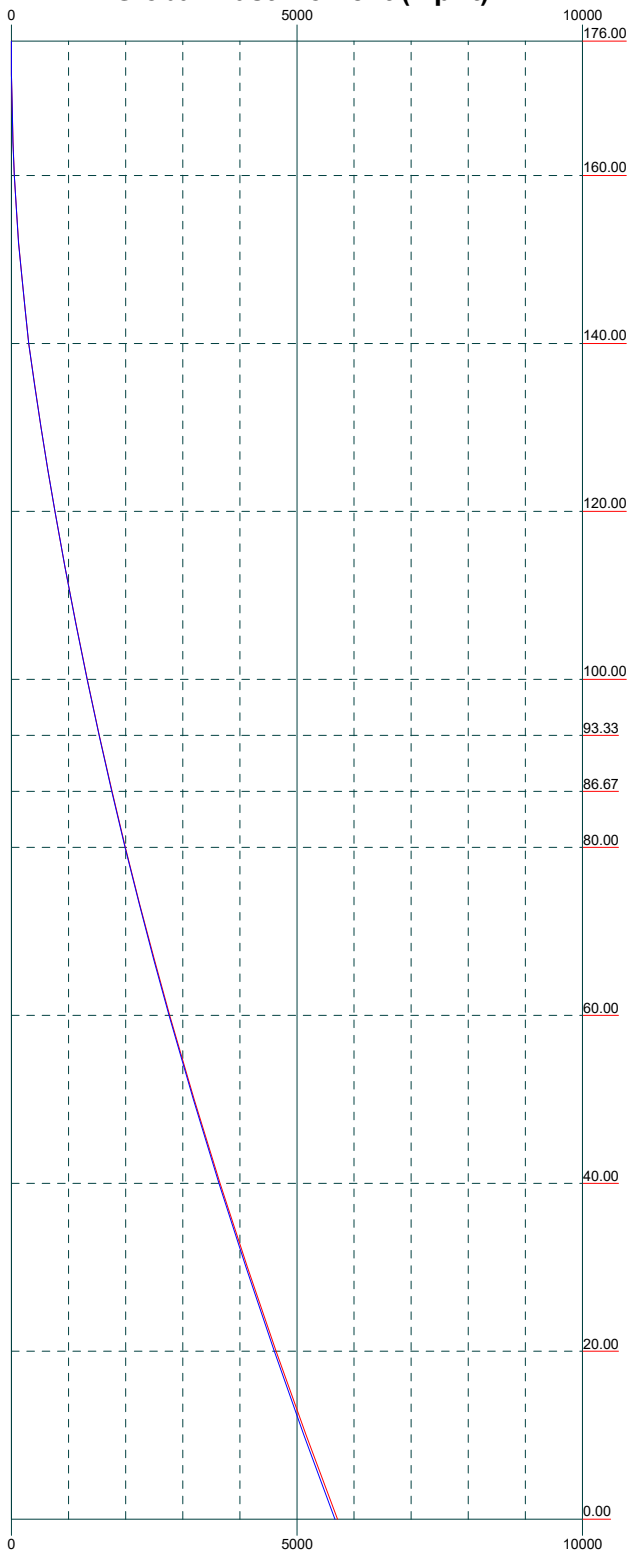
Maximum Values

Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)



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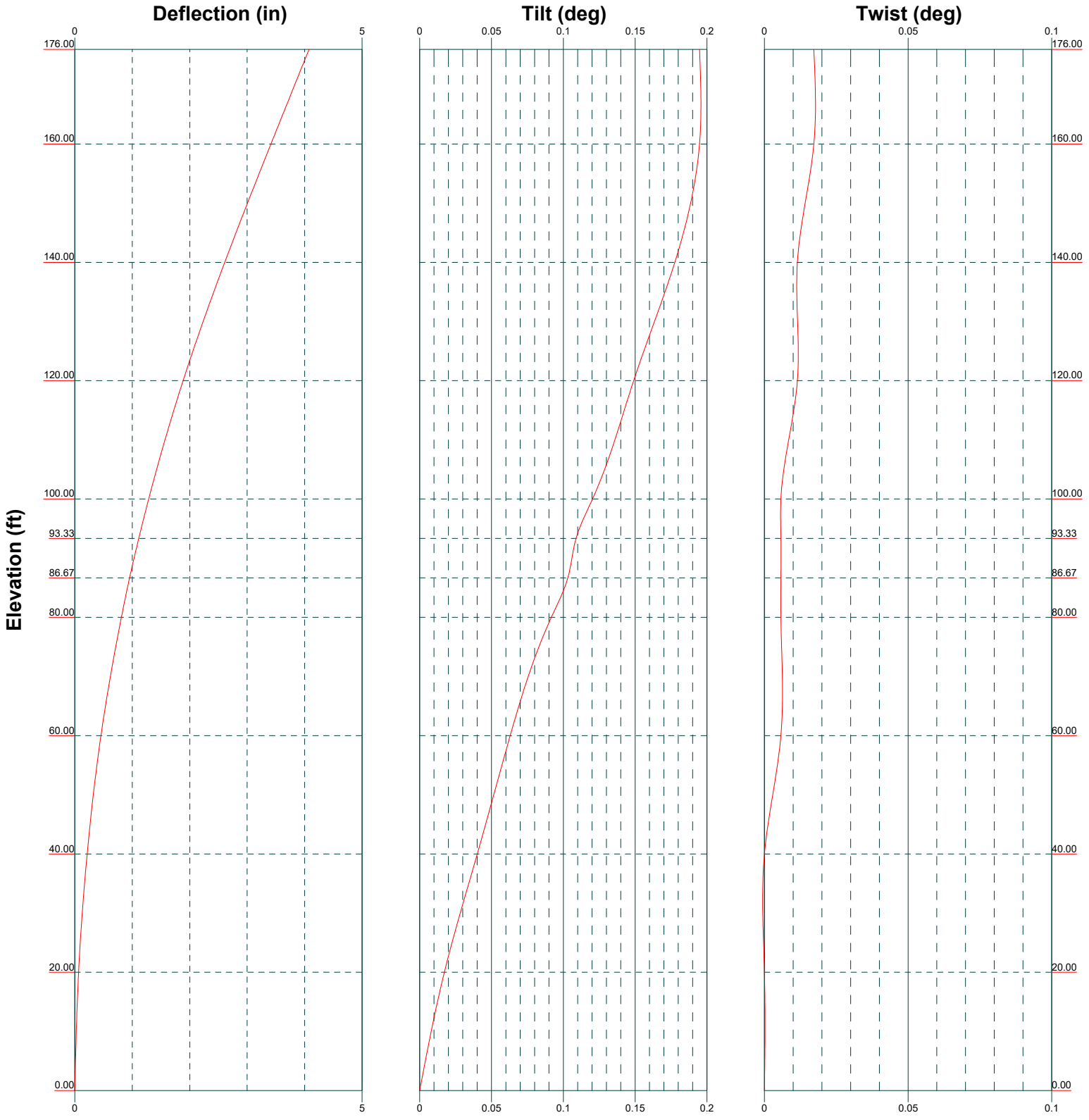
Code: TIA-222-G	Date: 02/17/17	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-G - Service - 60 mph

Maximum Values



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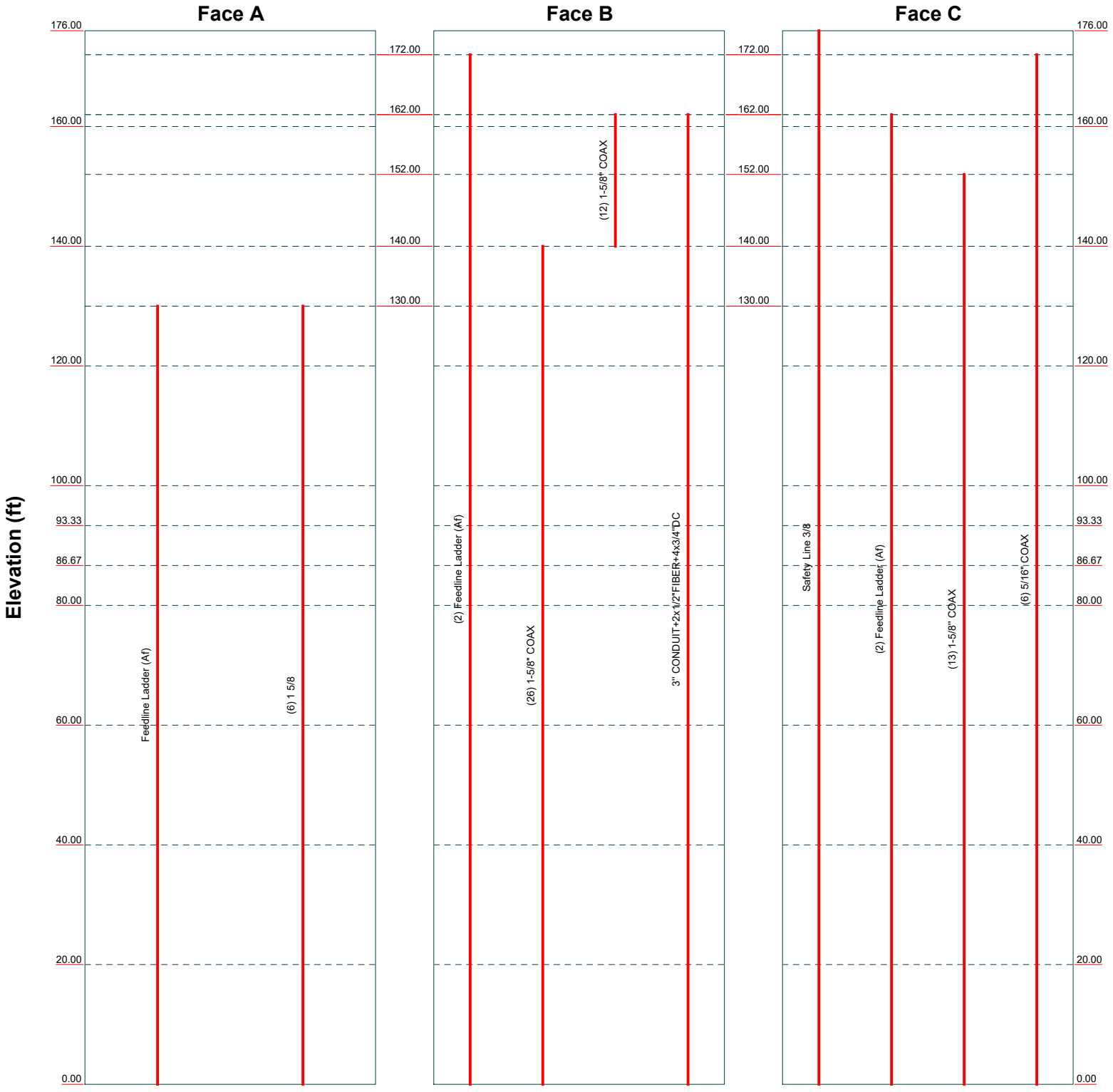
Job: ***17-0378***			
Project: ***CT04382-S-02 New Britain 2, CT Modification Desig***			
Client: SBA Network Services, Inc.	Drawn by: JLi	App'd:	
Code: TIA-222-G	Date: 02/17/17	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 176'

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



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

Job: *17-0378*			
Project: *CT04382-S-02 New Britain 2, CT Modification Desig*			
Client: SBA Network Services, Inc.	Drawn by: JLi	App'd:	
Code: TIA-222-G	Date: 02/17/17	Scale: NTS	
Path:		Dwg No. E-7	

TNX TOWER CALCULATION PRINTOUT

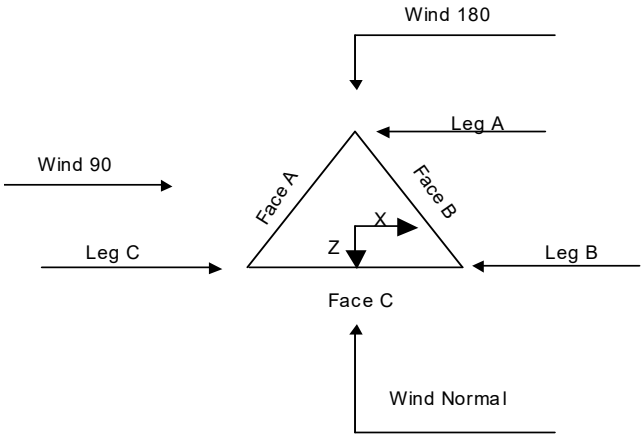
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 176.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.69 ft at the top and 21.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 95 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
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	176.00-160.00			4.69	1	16.00
T2	160.00-140.00			4.69	1	20.00
T3	140.00-120.00			6.73	1	20.00
T4	120.00-100.00			8.77	1	20.00
T5	100.00-93.33			10.80	1	6.67
T6	93.33-86.67			11.48	1	6.67
T7	86.67-80.00			12.16	1	6.67
T8	80.00-60.00			12.84	1	20.00
T9	60.00-40.00			14.88	1	20.00
T10	40.00-20.00			16.92	1	20.00
T11	20.00-0.00			18.96	1	20.00

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	176.00-160.00	4.00	X Brace	No	No	0.0000	0.0000
T2	160.00-140.00	4.00	X Brace	No	No	0.0000	0.0000
T3	140.00-120.00	5.00	X Brace	No	No	0.0000	0.0000
T4	120.00-100.00	6.67	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T5	100.00-93.33	6.67	X Brace	No	No	0.0000	0.0000
T6	93.33-86.67	6.67	X Brace	No	No	0.0000	0.0000
T7	86.67-80.00	6.67	X Brace	No	No	0.0000	0.0000
T8	80.00-60.00	6.67	X Brace	No	No	0.0000	0.0000
T9	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T10	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T11	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 176.00-160.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T2 160.00-140.00	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T3 140.00-120.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 120.00-100.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 100.00-93.33	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 93.33-86.67	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 86.67-80.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Arbitrary Shape	L2.5x2.5x3/16 + L2.5x2.5x3/16 (C-shape)	A36 (36 ksi)
T8 80.00-60.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A572-50 (50 ksi)
T9 60.00-40.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T10 40.00-20.00	Pipe	ROHN 8 X-STR	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T11 20.00-0.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A572-50 (50 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 176.00-160.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Flat Bar		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	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 176.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T4 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T5 100.00-93.33	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T6 93.33-86.67	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T7 86.67-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T8 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T9 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T10 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T11 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 176.00-160.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 160.00-140.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 140.00-120.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 120.00-100.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 100.00-93.33	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 93.33-86.67	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 86.67-80.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 80.00-60.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 60.00-40.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 40.00-20.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T11 20.00-0.00	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 176.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 100.00-93.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 93.33-86.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 86.67-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		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 176.00-160.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 160.00-140.00	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 140.00-120.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 120.00-100.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 100.00-93.33	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 93.33-86.67	Flange	1.0000 A325N	0	0.6250 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 86.67-80.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 80.00-60.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 60.00-40.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 40.00-20.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T11 20.00-0.00	Flange	1.0000 A354-BC	10	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
***												
Safety Line 3/8	C	No	Ar (CaAa)	176.00 - 0.00	0.0000	-0.5	1	1	0.5000	0.3750		0.22
Feedline Ladder (Af)	A	No	Af (CaAa)	130.00 - 0.00	0.0000	0	1	1	3.0000	2.5000		8.40
Feedline Ladder (Af)	B	No	Af (CaAa)	172.00 - 0.00	-2.0000	0	2	1	3.0000	2.5000		8.40
Feedline Ladder (Af)	C	No	Af (CaAa)	162.00 - 0.00	-2.0000	0	2	1	3.0000	2.5000		8.40
***												
1 5/8	A	No	Ar (CaAa)	130.00 - 0.00	0.0000	-0.5	6	3	1.9800	1.9800		1.04
***												
1-5/8" COAX	C	No	Ar (CaAa)	152.00 - 0.00	-0.5000	-0.5	13	12	0.5000	1.9800		1.04
***												
5/16" COAX	C	No	Ar (CaAa)	172.00 - 0.00	-1.5000	-0.5	6	6	0.5000	0.0300		1.00
***												
1-5/8" COAX	B	No	Ar (CaAa)	140.00 - 0.00	0.0000	-0.5	26	12	0.5000	1.9800		1.04
***												
1-5/8" COAX	B	No	Ar (CaAa)	162.00 - 140.00	-0.5000	-0.5	12	12	0.5000	1.9800		1.04
3" CONDUIT+2 x1/2"FIBER+4 x3/4"DC	B	No	Ar (CaAa)	162.00 - 0.00	0.0000	0	1	1	0.5000	3.0000		2.25

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	176.00-160.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	15.352	0.000	0.23
		C	0.000	0.000	2.483	0.000	0.11
T2	160.00-140.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	70.187	0.000	0.63
		C	0.000	0.000	48.665	0.000	0.62
T3	140.00-120.00	A	0.000	0.000	16.047	0.000	0.15
		B	0.000	0.000	125.627	0.000	0.92
		C	0.000	0.000	69.257	0.000	0.73
T4	120.00-100.00	A	0.000	0.000	32.093	0.000	0.29
		B	0.000	0.000	125.627	0.000	0.92
		C	0.000	0.000	69.257	0.000	0.73
T5	100.00-93.33	A	0.000	0.000	10.698	0.000	0.10

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
		B	0.000	0.000	41.876	0.000	0.31
		C	0.000	0.000	23.086	0.000	0.24
T6	93.33-86.67	A	0.000	0.000	10.698	0.000	0.10
		B	0.000	0.000	41.876	0.000	0.31
		C	0.000	0.000	23.086	0.000	0.24
T7	86.67-80.00	A	0.000	0.000	10.698	0.000	0.10
		B	0.000	0.000	41.876	0.000	0.31
		C	0.000	0.000	23.086	0.000	0.24
T8	80.00-60.00	A	0.000	0.000	32.093	0.000	0.29
		B	0.000	0.000	125.627	0.000	0.92
		C	0.000	0.000	69.257	0.000	0.73
T9	60.00-40.00	A	0.000	0.000	32.093	0.000	0.29
		B	0.000	0.000	125.627	0.000	0.92
		C	0.000	0.000	69.257	0.000	0.73
T10	40.00-20.00	A	0.000	0.000	32.093	0.000	0.29
		B	0.000	0.000	125.627	0.000	0.92
		C	0.000	0.000	69.257	0.000	0.73
T11	20.00-0.00	A	0.000	0.000	32.093	0.000	0.29
		B	0.000	0.000	125.627	0.000	0.92
		C	0.000	0.000	69.257	0.000	0.73

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	176.00-160.00	A	2.353	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	26.579	0.000	0.72
		C		0.000	0.000	24.025	0.000	0.43
T2	160.00-140.00	A	2.327	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	128.818	0.000	2.84
		C		0.000	0.000	111.607	0.000	2.41
T3	140.00-120.00	A	2.294	0.000	0.000	31.141	0.000	0.76
		B		0.000	0.000	131.453	0.000	3.57
		C		0.000	0.000	145.928	0.000	3.07
T4	120.00-100.00	A	2.256	0.000	0.000	61.864	0.000	1.50
		B		0.000	0.000	130.792	0.000	3.52
		C		0.000	0.000	145.013	0.000	3.02
T5	100.00-93.33	A	2.227	0.000	0.000	20.515	0.000	0.49
		B		0.000	0.000	43.429	0.000	1.16
		C		0.000	0.000	48.105	0.000	0.99
T6	93.33-86.67	A	2.211	0.000	0.000	20.457	0.000	0.49
		B		0.000	0.000	43.337	0.000	1.16
		C		0.000	0.000	47.978	0.000	0.99
T7	86.67-80.00	A	2.194	0.000	0.000	20.395	0.000	0.49
		B		0.000	0.000	43.239	0.000	1.15
		C		0.000	0.000	47.842	0.000	0.98
T8	80.00-60.00	A	2.156	0.000	0.000	60.769	0.000	1.45
		B		0.000	0.000	129.058	0.000	3.41
		C		0.000	0.000	142.615	0.000	2.90
T9	60.00-40.00	A	2.085	0.000	0.000	59.986	0.000	1.41
		B		0.000	0.000	127.818	0.000	3.32
		C		0.000	0.000	140.900	0.000	2.81
T10	40.00-20.00	A	1.981	0.000	0.000	58.846	0.000	1.36
		B		0.000	0.000	126.015	0.000	3.21
		C		0.000	0.000	138.408	0.000	2.69
T11	20.00-0.00	A	1.775	0.000	0.000	56.585	0.000	1.26
		B		0.000	0.000	122.439	0.000	2.98

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
		C		0.000	0.000	133.471	0.000	2.46

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	176.00-160.00	0.7935	-1.2317	1.6066	-0.4404
T2	160.00-140.00	2.5104	-2.0365	2.3781	-0.8059
T3	140.00-120.00	2.8076	-2.8805	2.9818	-0.7111
T4	120.00-100.00	2.2712	-2.9066	2.8299	-0.7589
T5	100.00-93.33	2.5424	-3.2574	3.1778	-0.8443
T6	93.33-86.67	2.6761	-3.4302	3.3488	-0.8871
T7	86.67-80.00	2.7589	-3.5379	3.5872	-0.9483
T8	80.00-60.00	3.0112	-3.8644	3.8109	-1.0059
T9	60.00-40.00	3.3342	-4.2827	4.3816	-1.1618
T10	40.00-20.00	3.7030	-4.7597	4.8972	-1.3181
T11	20.00-0.00	3.9917	-5.1337	5.3798	-1.5090

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	Safety Line 3/8	160.00 - 176.00	0.6000	0.4161
T1	4	Feedline Ladder (Af)	160.00 - 172.00	0.6000	0.4161
T1	5	Feedline Ladder (Af)	160.00 - 162.00	0.6000	0.4161
T1	11	5/16" COAX	160.00 - 172.00	0.6000	0.4161
T1	15	1-5/8" COAX	160.00 - 162.00	0.6000	0.4161
T1	16	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	160.00 - 162.00	0.6000	0.4161
T2	2	Safety Line 3/8	140.00 - 160.00	0.6000	0.4841
T2	4	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.4841
T2	5	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.4841
T2	9	1-5/8" COAX	140.00 - 152.00	0.6000	0.4841
T2	11	5/16" COAX	140.00 - 160.00	0.6000	0.4841
T2	15	1-5/8" COAX	140.00 - 160.00	0.6000	0.4841
T2	16	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	140.00 - 160.00	0.6000	0.4841

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	2	Safety Line 3/8	120.00 - 140.00	0.6000	0.5808
T3	3	Feedline Ladder (Af)	120.00 - 130.00	0.6000	0.5808
T3	4	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5808
T3	5	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5808
T3	7	1 5/8	120.00 - 130.00	0.6000	0.5808
T3	9	1-5/8" COAX	120.00 - 140.00	0.6000	0.5808
T3	11	5/16" COAX	120.00 - 140.00	0.6000	0.5808
T3	13	1-5/8" COAX	120.00 - 140.00	0.6000	0.5808
T3	16	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	120.00 - 140.00	0.6000	0.5808
T4	2	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T4	3	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T4	4	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T4	5	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T4	7	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	9	1-5/8" COAX	100.00 - 120.00	0.6000	0.6000
T4	11	5/16" COAX	100.00 - 120.00	0.6000	0.6000
T4	13	1-5/8" COAX	100.00 - 120.00	0.6000	0.6000
T4	16	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	100.00 - 120.00	0.6000	0.6000
T5	2	Safety Line 3/8	93.33 - 100.00	0.6000	0.6000
T5	3	Feedline Ladder (Af)	93.33 - 100.00	0.6000	0.6000
T5	4	Feedline Ladder (Af)	93.33 - 100.00	0.6000	0.6000
T5	5	Feedline Ladder (Af)	93.33 - 100.00	0.6000	0.6000
T5	7	1 5/8	93.33 - 100.00	0.6000	0.6000
T5	9	1-5/8" COAX	93.33 - 100.00	0.6000	0.6000
T5	11	5/16" COAX	93.33 - 100.00	0.6000	0.6000
T5	13	1-5/8" COAX	93.33 - 100.00	0.6000	0.6000
T5	16	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	93.33 - 100.00	0.6000	0.6000
T6	2	Safety Line 3/8	86.67 - 93.33	0.6000	0.6000
T6	3	Feedline Ladder (Af)	86.67 - 93.33	0.6000	0.6000
T6	4	Feedline Ladder (Af)	86.67 - 93.33	0.6000	0.6000
T6	5	Feedline Ladder (Af)	86.67 - 93.33	0.6000	0.6000
T6	7	1 5/8	86.67 - 93.33	0.6000	0.6000
T6	9	1-5/8" COAX	86.67 - 93.33	0.6000	0.6000
T6	11	5/16" COAX	86.67 - 93.33	0.6000	0.6000
T6	13	1-5/8" COAX	86.67 - 93.33	0.6000	0.6000
T6	16	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	86.67 - 93.33	0.6000	0.6000
T7	2	Safety Line 3/8	80.00 - 86.67	0.6000	0.6000
T7	3	Feedline Ladder (Af)	80.00 - 86.67	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	4	Feedline Ladder (Af)	80.00 - 86.67	0.6000	0.6000
T7	5	Feedline Ladder (Af)	80.00 - 86.67	0.6000	0.6000
T7	7	1 5/8	80.00 - 86.67	0.6000	0.6000
T7	9	1-5/8" COAX	80.00 - 86.67	0.6000	0.6000
T7	11	5/16" COAX	80.00 - 86.67	0.6000	0.6000
T7	13	1-5/8" COAX	80.00 - 86.67	0.6000	0.6000
T7	16	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	80.00 - 86.67	0.6000	0.6000
T8	2	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T8	3	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	4	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	5	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	7	1 5/8	60.00 - 80.00	0.6000	0.6000
T8	9	1-5/8" COAX	60.00 - 80.00	0.6000	0.6000
T8	11	5/16" COAX	60.00 - 80.00	0.6000	0.6000
T8	13	1-5/8" COAX	60.00 - 80.00	0.6000	0.6000
T8	16	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	60.00 - 80.00	0.6000	0.6000
T9	2	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T9	3	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T9	4	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T9	5	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T9	7	1 5/8	40.00 - 60.00	0.6000	0.6000
T9	9	1-5/8" COAX	40.00 - 60.00	0.6000	0.6000
T9	11	5/16" COAX	40.00 - 60.00	0.6000	0.6000
T9	13	1-5/8" COAX	40.00 - 60.00	0.6000	0.6000
T9	16	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	40.00 - 60.00	0.6000	0.6000
T10	2	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T10	3	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	4	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	5	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	7	1 5/8	20.00 - 40.00	0.6000	0.6000
T10	9	1-5/8" COAX	20.00 - 40.00	0.6000	0.6000
T10	11	5/16" COAX	20.00 - 40.00	0.6000	0.6000
T10	13	1-5/8" COAX	20.00 - 40.00	0.6000	0.6000
T10	16	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	20.00 - 40.00	0.6000	0.6000
T11	2	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T11	3	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T11	4	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T11	5	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T11	7	1 5/8	0.00 - 20.00	0.6000	0.6000
T11	9	1-5/8" COAX	0.00 - 20.00	0.6000	0.6000
T11	11	5/16" COAX	0.00 - 20.00	0.6000	0.6000
T11	13	1-5/8" COAX	0.00 - 20.00	0.6000	0.6000
T11	16	3" CONDUIT+2x1/2"FIBER+4x 3/4"DC	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod	C	From Leg	0.00	0.0000	176.00	No Ice	0.25	0.25	0.03
			0.00			1/2" Ice	0.66	0.66	0.03
			2.00			1" Ice	0.97	0.97	0.04
***									
840-10054 w/ Mount Pipe	A	From Leg	3.00	0.0000	172.00	No Ice	5.58	2.69	0.06
			0.00			1/2" Ice	6.03	3.25	0.10
			0.00			1" Ice	6.50	3.83	0.14
840-10054 w/ Mount Pipe	B	From Leg	3.00	0.0000	172.00	No Ice	5.58	2.69	0.06
			0.00			1/2" Ice	6.03	3.25	0.10
			0.00			1" Ice	6.50	3.83	0.14
840-10054 w/ Mount Pipe	C	From Leg	3.00	0.0000	172.00	No Ice	5.58	2.69	0.06
			0.00			1/2" Ice	6.03	3.25	0.10
			0.00			1" Ice	6.50	3.83	0.14
URAS-FLEXIBLE	A	From Leg	3.00	0.0000	172.00	No Ice	1.80	0.78	0.03
			0.00			1/2" Ice	1.99	0.92	0.04
			0.00			1" Ice	2.18	1.07	0.06
URAS-FLEXIBLE	B	From Leg	3.00	0.0000	172.00	No Ice	1.80	0.78	0.03
			0.00			1/2" Ice	1.99	0.92	0.04
			0.00			1" Ice	2.18	1.07	0.06
URAS-FLEXIBLE	C	From Leg	3.00	0.0000	172.00	No Ice	1.80	0.78	0.03
			0.00			1/2" Ice	1.99	0.92	0.04
			0.00			1" Ice	2.18	1.07	0.06
Horizon Duo	A	From Leg	3.00	0.0000	172.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			0.00			1" Ice	0.76	0.52	0.02
Horizon Duo	B	From Leg	3.00	0.0000	172.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			0.00			1" Ice	0.76	0.52	0.02
Horizon Duo	C	From Leg	3.00	0.0000	172.00	No Ice	0.55	0.34	0.01
			0.00			1/2" Ice	0.65	0.43	0.01
			0.00			1" Ice	0.76	0.52	0.02
(3) Empty Pipe Mount	A	From Leg	3.00	0.0000	172.00	No Ice	2.00	0.90	0.07
			0.00			1/2" Ice	3.00	1.12	0.08
			0.00			1" Ice	4.00	1.34	0.09
(3) Empty Pipe Mount	B	From Leg	3.00	0.0000	172.00	No Ice	2.00	0.90	0.07
			0.00			1/2" Ice	3.00	1.12	0.08
			0.00			1" Ice	4.00	1.34	0.09
(3) Empty Pipe Mount	C	From Leg	3.00	0.0000	172.00	No Ice	2.00	0.90	0.07
			0.00			1/2" Ice	3.00	1.12	0.08
			0.00			1" Ice	4.00	1.34	0.09
(3) T-Frames	A	None		0.0000	172.00	No Ice	33.11	33.11	1.54
						1/2" Ice	44.90	44.90	2.16
						1" Ice	56.69	56.69	2.78
***									
(2) AM-X-CD-16-65-00T	A	From Leg	3.00	0.0000	162.00	No Ice	8.26	4.64	0.05
			0.00			1/2" Ice	8.97	5.14	0.10
			0.00			1" Ice	9.60	5.69	0.14
(2) AM-X-CD-16-65-00T	B	From Leg	3.00	0.0000	162.00	No Ice	8.26	4.64	0.05
			0.00			1/2" Ice	8.97	5.14	0.10
			0.00			1" Ice	9.60	5.69	0.14
(2) AM-X-CD-16-65-00T	C	From Leg	3.00	0.0000	162.00	No Ice	8.26	4.64	0.05
			0.00			1/2" Ice	8.97	5.14	0.10
			0.00			1" Ice	9.60	5.69	0.14
Kathrein 800-10121	A	From Leg	3.00	0.0000	162.00	No Ice	5.46	3.29	0.04
			0.00			1/2" Ice	6.01	3.72	0.08
			0.00			1" Ice	6.57	4.18	0.11

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
Kathrein 800-10121	B	From Leg	3.00	0.0000	162.00	No Ice	5.46	3.29	0.04
			0.00			1/2" Ice	6.01	3.72	0.08
			0.00			1" Ice	6.57	4.18	0.11
Kathrein 800-10121	C	From Leg	3.00	0.0000	162.00	No Ice	5.46	3.29	0.04
			0.00			1/2" Ice	6.01	3.72	0.08
			0.00			1" Ice	6.57	4.18	0.11
QS65512-2	A	From Leg	3.00	0.0000	162.00	No Ice	8.40	6.80	0.11
			0.00			1/2" Ice	9.11	7.41	0.17
			0.00			1" Ice	9.83	8.11	0.23
QS65512-2	B	From Leg	3.00	0.0000	162.00	No Ice	8.40	6.80	0.11
			0.00			1/2" Ice	9.11	7.41	0.17
			0.00			1" Ice	9.83	8.11	0.23
QS65512-2	C	From Leg	3.00	0.0000	162.00	No Ice	8.40	6.80	0.11
			0.00			1/2" Ice	9.11	7.41	0.17
			0.00			1" Ice	9.83	8.11	0.23
(2) LGP 21401	A	From Leg	3.00	0.0000	162.00	No Ice	1.95	0.53	0.03
			0.00			1/2" Ice	2.19	0.69	0.04
			0.00			1" Ice	2.45	0.86	0.05
(2) LGP 21401	B	From Leg	3.00	0.0000	162.00	No Ice	1.95	0.53	0.03
			0.00			1/2" Ice	2.19	0.69	0.04
			0.00			1" Ice	2.45	0.86	0.05
(2) LGP 21401	C	From Leg	3.00	0.0000	162.00	No Ice	1.95	0.53	0.03
			0.00			1/2" Ice	2.19	0.69	0.04
			0.00			1" Ice	2.45	0.86	0.05
(2) Katherin 860-10025	A	From Leg	3.00	0.0000	162.00	No Ice	0.14	0.12	0.00
			0.00			1/2" Ice	0.22	0.19	0.00
			0.00			1" Ice	0.31	0.28	0.00
(2) Katherin 860-10025	B	From Leg	3.00	0.0000	162.00	No Ice	0.14	0.12	0.00
			0.00			1/2" Ice	0.22	0.19	0.00
			0.00			1" Ice	0.31	0.28	0.00
(2) Katherin 860-10025	C	From Leg	3.00	0.0000	162.00	No Ice	0.14	0.12	0.00
			0.00			1/2" Ice	0.22	0.19	0.00
			0.00			1" Ice	0.31	0.28	0.00
Ericsson RRUS 11	A	From Leg	3.00	0.0000	162.00	No Ice	2.94	1.19	0.06
			0.00			1/2" Ice	3.42	1.40	0.07
			0.00			1" Ice	3.56	1.63	0.09
Ericsson RRUS 11	B	From Leg	3.00	0.0000	162.00	No Ice	2.94	1.19	0.06
			0.00			1/2" Ice	3.42	1.40	0.07
			0.00			1" Ice	3.56	1.63	0.09
Ericsson RRUS 11	C	From Leg	3.00	0.0000	162.00	No Ice	2.94	1.19	0.06
			0.00			1/2" Ice	3.42	1.40	0.07
			0.00			1" Ice	3.56	1.63	0.09
Ericsson RRUS 32	A	From Leg	3.00	0.0000	162.00	No Ice	1.93	0.67	0.08
			0.00			1/2" Ice	2.19	0.88	0.09
			0.00			1" Ice	2.47	1.11	0.10
Ericsson RRUS 32	B	From Leg	3.00	0.0000	162.00	No Ice	1.93	0.67	0.08
			0.00			1/2" Ice	2.19	0.88	0.09
			0.00			1" Ice	2.47	1.11	0.10
Ericsson RRUS 32	C	From Leg	3.00	0.0000	162.00	No Ice	1.93	0.67	0.08
			0.00			1/2" Ice	2.19	0.88	0.09
			0.00			1" Ice	2.47	1.11	0.10
Ericsson RRUS 32 B2s	A	From Leg	3.00	0.0000	162.00	No Ice	3.52	2.51	0.05
			0.00			1/2" Ice	3.86	2.83	0.08
			0.00			1" Ice	4.22	3.16	0.11
Ericsson RRUS 32 B2s	B	From Leg	3.00	0.0000	162.00	No Ice	3.52	2.51	0.05
			0.00			1/2" Ice	3.86	2.83	0.08
			0.00			1" Ice	4.22	3.16	0.11

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
Ericsson RRUS 32 B2s	C	From Leg	3.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice	3.52 3.86 4.22	2.51 2.83 3.16	0.05 0.08 0.11
(2) TPX-070821	A	From Leg	3.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice	0.55 0.68 0.84	0.12 0.19 0.28	0.01 0.01 0.01
(2) TPX-070821	B	From Leg	3.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice	0.55 0.68 0.84	0.12 0.19 0.28	0.01 0.01 0.01
(2) TPX-070821	C	From Leg	3.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice	0.55 0.68 0.84	0.12 0.19 0.28	0.01 0.01 0.01
DC6-48-60-18-8F	A	From Leg	3.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice	2.57 2.87 3.18	4.32 4.68 5.06	0.03 0.06 0.10
DC6-48-60-18-8F	B	From Leg	3.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice	2.57 2.87 3.18	4.32 4.68 5.06	0.03 0.06 0.10
(3) T-Frames	C	None		0.0000	162.00	No Ice 1/2" Ice 1" Ice	33.11 44.90 56.69	33.11 44.90 56.69	1.54 2.16 2.78
***									
LNX-6515DS-A1M w/ Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice	11.45 12.06 12.69	9.36 10.68 11.71	0.08 0.16 0.25
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice	11.45 12.06 12.69	9.36 10.68 11.71	0.08 0.16 0.25
LNX-6515DS-A1M w/ Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice	11.45 12.06 12.69	9.36 10.68 11.71	0.08 0.16 0.25
AIR 21 B2A/B4P w/ Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice	7.09 7.78 8.37	6.02 7.17 8.03	0.12 0.18 0.25
AIR 21 B2A/B4P w/ Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice	7.09 7.78 8.37	6.02 7.17 8.03	0.12 0.18 0.25
AIR 21 B2A/B4P w/ Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice	7.09 7.78 8.37	6.02 7.17 8.03	0.12 0.18 0.25
AIR 21 B4A/B2P w/ Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice	7.09 7.78 8.37	6.02 7.17 8.03	0.12 0.18 0.24
AIR 21 B4A/B2P w/ Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice	7.09 7.78 8.37	6.02 7.17 8.03	0.12 0.18 0.24
AIR 21 B4A/B2P w/ Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice	7.09 7.78 8.37	6.02 7.17 8.03	0.12 0.18 0.24
S11B12	A	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice	3.31 3.55 3.80	1.36 1.54 1.73	0.05 0.07 0.10
S11B12	B	From Leg	3.00 0.00 0.00	0.0000	152.00	No Ice 1/2" Ice 1" Ice	3.31 3.55 3.80	1.36 1.54 1.73	0.05 0.07 0.10
S11B12	C	From Leg	3.00 0.00	0.0000	152.00	No Ice 1/2" Ice	3.31 3.55	1.36 1.54	0.05 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	3.80	1.73	0.10
KRY 112 144/1	A	From Leg	3.00	0.0000	152.00	No Ice	0.41	0.19	0.01
			0.00			1/2" Ice	0.50	0.26	0.01
			0.00			1" Ice	0.60	0.33	0.02
KRY 112 144/1	B	From Leg	3.00	0.0000	152.00	No Ice	0.41	0.19	0.01
			0.00			1/2" Ice	0.50	0.26	0.01
			0.00			1" Ice	0.60	0.33	0.02
KRY 112 144/1	C	From Leg	3.00	0.0000	152.00	No Ice	0.41	0.19	0.01
			0.00			1/2" Ice	0.50	0.26	0.01
			0.00			1" Ice	0.60	0.33	0.02
Empty Pipe Mount	A	From Leg	3.00	0.0000	152.00	No Ice	2.00	0.90	0.07
			0.00			1/2" Ice	3.00	1.12	0.08
			0.00			1" Ice	4.00	1.34	0.09
Empty Pipe Mount	B	From Leg	3.00	0.0000	152.00	No Ice	2.00	0.90	0.07
			0.00			1/2" Ice	3.00	1.12	0.08
			0.00			1" Ice	4.00	1.34	0.09
Empty Pipe Mount	C	From Leg	3.00	0.0000	152.00	No Ice	2.00	0.90	0.07
			0.00			1/2" Ice	3.00	1.12	0.08
			0.00			1" Ice	4.00	1.34	0.09
(3) T-Frames	A	None		0.0000	152.00	No Ice	33.11	33.11	1.54
						1/2" Ice	44.90	44.90	2.16
						1" Ice	56.69	56.69	2.78
***									
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	3.00	0.0000	140.00	No Ice	8.86	7.30	0.07
			0.00			1/2" Ice	9.62	8.58	0.14
			0.00			1" Ice	10.34	9.72	0.22
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	3.00	0.0000	140.00	No Ice	8.86	7.30	0.07
			0.00			1/2" Ice	9.62	8.58	0.14
			0.00			1" Ice	10.34	9.72	0.22
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	3.00	0.0000	140.00	No Ice	8.86	7.30	0.07
			0.00			1/2" Ice	9.62	8.58	0.14
			0.00			1" Ice	10.34	9.72	0.22
800 10735v01 w/ Mount Pipe	A	From Leg	3.00	0.0000	140.00	No Ice	8.96	5.41	0.06
			0.00			1/2" Ice	9.60	6.60	0.12
			0.00			1" Ice	10.23	7.50	0.19
800 10735v01 w/ Mount Pipe	B	From Leg	3.00	0.0000	140.00	No Ice	8.96	5.41	0.06
			0.00			1/2" Ice	9.60	6.60	0.12
			0.00			1" Ice	10.23	7.50	0.19
800 10735v01 w/ Mount Pipe	C	From Leg	3.00	0.0000	140.00	No Ice	8.96	5.41	0.06
			0.00			1/2" Ice	9.60	6.60	0.12
			0.00			1" Ice	10.23	7.50	0.19
BXA-80080/4CF w/ Mount Pipe	A	From Leg	3.00	0.0000	140.00	No Ice	5.49	4.03	0.03
			0.00			1/2" Ice	5.94	4.65	0.08
			0.00			1" Ice	6.40	5.30	0.13
BXA-80080/4CF w/ Mount Pipe	B	From Leg	3.00	0.0000	140.00	No Ice	5.49	4.03	0.03
			0.00			1/2" Ice	5.94	4.65	0.08
			0.00			1" Ice	6.40	5.30	0.13
BXA-80080/4CF w/ Mount Pipe	C	From Leg	3.00	0.0000	140.00	No Ice	5.49	4.03	0.03
			0.00			1/2" Ice	5.94	4.65	0.08
			0.00			1" Ice	6.40	5.30	0.13
RRH-2x60-AWS	A	From Leg	3.00	0.0000	140.00	No Ice	2.35	1.53	0.04
			0.00			1/2" Ice	2.56	1.72	0.06
			0.00			1" Ice	2.79	1.92	0.08
RRH-2x60-AWS	B	From Leg	3.00	0.0000	140.00	No Ice	2.35	1.53	0.04
			0.00			1/2" Ice	2.56	1.72	0.06
			0.00			1" Ice	2.79	1.92	0.08
RRH-2x60-AWS	C	From Leg	3.00	0.0000	140.00	No Ice	2.35	1.53	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	2.56	1.72	0.06
			0.00			1" Ice	2.79	1.92	0.08
RRH-2x60-PCS	A	From Leg	3.00	0.0000	140.00	No Ice	2.45	1.43	0.06
			0.00			1/2" Ice	2.67	1.61	0.07
			0.00			1" Ice	2.90	1.81	0.09
RRH-2x60-PCS	B	From Leg	3.00	0.0000	140.00	No Ice	2.45	1.43	0.06
			0.00			1/2" Ice	2.67	1.61	0.07
			0.00			1" Ice	2.90	1.81	0.09
RRH-2x60-PCS	C	From Leg	3.00	0.0000	140.00	No Ice	2.45	1.43	0.06
			0.00			1/2" Ice	2.67	1.61	0.07
			0.00			1" Ice	2.90	1.81	0.09
RRH 2x60-700	A	From Leg	3.00	0.0000	140.00	No Ice	2.57	1.93	0.03
			0.00			1/2" Ice	2.79	2.13	0.05
			0.00			1" Ice	3.02	2.34	0.07
RRH 2x60-700	B	From Leg	3.00	0.0000	140.00	No Ice	2.57	1.93	0.03
			0.00			1/2" Ice	2.79	2.13	0.05
			0.00			1" Ice	3.02	2.34	0.07
RRH 2x60-700	C	From Leg	3.00	0.0000	140.00	No Ice	2.57	1.93	0.03
			0.00			1/2" Ice	2.79	2.13	0.05
			0.00			1" Ice	3.02	2.34	0.07
DB-T1-6Z-8AB-0Z	A	From Leg	3.00	0.0000	140.00	No Ice	5.60	2.33	0.04
			0.00			1/2" Ice	5.92	2.56	0.08
			0.00			1" Ice	6.24	2.79	0.12
(3) T-Frames	C	None		0.0000	140.00	No Ice	30.02	30.02	0.95
						1/2" Ice	40.48	40.48	1.40
						1" Ice	50.94	50.94	1.86
***									
742 213 w/ Mount Pipe	A	From Leg	1.50	0.0000	130.00	No Ice	5.37	4.62	0.05
			0.00			1/2" Ice	5.95	6.00	0.09
			0.00			1" Ice	6.50	6.98	0.15
742 213 w/ Mount Pipe	B	From Leg	1.50	0.0000	130.00	No Ice	5.37	4.62	0.05
			0.00			1/2" Ice	5.95	6.00	0.09
			0.00			1" Ice	6.50	6.98	0.15
742 213 w/ Mount Pipe	C	From Leg	1.50	0.0000	130.00	No Ice	5.37	4.62	0.05
			0.00			1/2" Ice	5.95	6.00	0.09
			0.00			1" Ice	6.50	6.98	0.15
(3) Pipe Mounts	C	None		0.0000	130.00	No Ice	5.78	5.78	0.16
						1/2" Ice	7.37	7.37	0.18
						1" Ice	8.96	8.96	0.20

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
(2) VHLP2.5 Dish	A	Paraboloid w/o Radome	From Leg	3.00	0.0000		172.00	0.96	No Ice	0.72	0.02
				0.00					1/2" Ice	0.85	0.02
				0.00					1" Ice	0.98	0.03
VHLP2.5 Dish	B	Paraboloid w/o	From	3.00	0.0000		172.00	0.96	No Ice	0.72	0.02

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
		Radome	Leg	0.00						1/2" Ice	0.85	0.02
				0.00						1" Ice	0.98	0.03
VHLP2.5 Dish	C	Paraboloid w/o Radome	From Leg	3.00	0.0000			172.00	0.96	No Ice	0.72	0.02
				0.00						1/2" Ice	0.85	0.02
				0.00						1" Ice	0.98	0.03

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service

Comb. No.	Description
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	176 - 160	4.076	40	0.1975	0.0162
T2	160 - 140	3.413	40	0.1939	0.0159
T3	140 - 120	2.609	40	0.1750	0.0128
T4	120 - 100	1.885	40	0.1496	0.0094
T5	100 - 93.3333	1.286	40	0.1192	0.0068
T6	93.3333 - 86.6667	1.113	40	0.1106	0.0060
T7	86.6667 - 80	0.953	39	0.1018	0.0052
T8	80 - 60	0.811	39	0.0925	0.0048
T9	60 - 40	0.455	39	0.0641	0.0033
T10	40 - 20	0.215	39	0.0388	0.0021
T11	20 - 0	0.066	39	0.0195	0.0010

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.00	Lightning Rod	40	4.076	0.1975	0.0162	763323
172.00	(2) VHLP2.5 Dish	40	3.910	0.1972	0.0163	763323
162.00	(2) AM-X-CD-16-65-00T	40	3.495	0.1949	0.0160	267585
152.00	LNX-6515DS-A1M w/ Mount Pipe	40	3.085	0.1880	0.0150	106945
140.00	(2) SBNHH-1D65B w/ Mount Pipe	40	2.609	0.1750	0.0128	58735
130.00	742 213 w/ Mount Pipe	40	2.233	0.1630	0.0110	43714

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	176 - 160	16.175	2	0.7821	0.0652
T2	160 - 140	13.548	2	0.7678	0.0638
T3	140 - 120	10.363	2	0.6928	0.0514
T4	120 - 100	7.494	2	0.5922	0.0376
T5	100 - 93.3333	5.121	2	0.4723	0.0274
T6	93.3333 - 86.6667	4.436	2	0.4383	0.0241
T7	86.6667 - 80	3.798	2	0.4034	0.0210
T8	80 - 60	3.232	2	0.3667	0.0193
T9	60 - 40	1.815	2	0.2543	0.0132
T10	40 - 20	0.859	2	0.1542	0.0086
T11	20 - 0	0.264	2	0.0776	0.0040

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
176.00	Lightning Rod	2	16.175	0.7821	0.0652	201055
172.00	(2) VHLP2.5 Dish	2	15.516	0.7809	0.0653	201055
162.00	(2) AM-X-CD-16-65-00T	2	13.875	0.7716	0.0644	70378
152.00	LNX-6515DS-A1M w/ Mount Pipe	2	12.251	0.7440	0.0600	27453
140.00	(2) SBNHH-1D65B w/ Mount Pipe	2	10.363	0.6928	0.0514	14930
130.00	742 213 w/ Mount Pipe	2	8.874	0.6454	0.0441	11077

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	176	Leg	A325N	0.8750	4	1.82	40.59	0.045	1	Bolt Tension
		Diagonal	A325N	0.6250	1	2.66	9.11	0.292	1	Member Block Shear
		Top Girt	A325N	0.6250	1	0.27	9.11	0.029	1	Member Block Shear
T2	160	Leg	A325N	1.0000	4	10.84	53.01	0.204	1	Bolt Tension
		Diagonal	A325N	0.6250	1	4.71	6.83	0.690	1	Member Block Shear
T3	140	Leg	A325N	1.0000	6	14.56	53.01	0.275	1	Bolt Tension
		Diagonal	A325N	0.6250	1	6.73	6.83	0.986	1	Member Block Shear
T4	120	Leg	A325N	1.0000	6	20.89	53.01	0.394	1	Bolt Tension
		Diagonal	A325N	0.6250	1	7.39	7.83	0.944	1	Member Bearing
T5	100	Diagonal	A325N	0.6250	1	7.55	7.83	0.964	1	Member Bearing
T6	93.3333	Diagonal	A325N	0.6250	1	7.45	7.83	0.952	1	Member Bearing
T7	86.6667	Leg	A325N	1.0000	6	26.80	53.01	0.506	1	Bolt Tension
		Diagonal	A325N	0.6250	1	8.06	12.43	0.649	1	Bolt Shear
T8	80	Leg	A325N	1.0000	8	24.24	53.01	0.457	1	Bolt Tension
		Diagonal	A325N	0.7500	1	8.31	14.14	0.588	1	Member Bearing
T9	60	Leg	A325N	1.0000	8	27.81	53.01	0.525	1	Bolt Tension
		Diagonal	A325N	0.7500	1	9.77	14.14	0.691	1	Member Bearing
T10	40	Leg	A325N	1.0000	8	31.54	53.01	0.595	1	Bolt Tension
		Diagonal	A325N	0.7500	1	10.15	14.14	0.718	1	Member Bearing
T11	20	Leg	A354-BC	1.0000	10	28.05	55.22	0.508	1	Bolt Tension
		Diagonal	A325N	0.7500	1	10.79	14.14	0.763	1	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	176 - 160	ROHN 3 EH	16.00	4.00	42.2 K=1.00	3.0159	-11.51	119.12	0.097 [1]
T2	160 - 140	ROHN 4 EH	20.03	4.01	32.6 K=1.00	4.4074	-53.06	183.54	0.289 [1]
T3	140 - 120	ROHN 5 EH	20.03	5.01	32.7 K=1.00	6.1120	-102.15	254.38	0.402 [1]
T4	120 - 100	ROHN 6 EHS	20.03	6.68	36.0 K=1.00	6.7133	-143.98	274.77	0.524 [1]
T5	100 - 93.3333	ROHN 6 EH	6.68	6.68	36.5 K=1.00	8.4049	-157.85	343.10	0.460 [1]
T6	93.3333 - 86.6667	ROHN 6 EH	6.68	6.68	36.5 K=1.00	8.4049	-170.95	343.10	0.498 [1]
T7	86.6667 - 80	ROHN 6 EH	6.68	6.68	36.5 K=1.00	8.4049	-183.97	343.10	0.536 [1]
T8	80 - 60	ROHN 6 EH	20.03	6.68	36.5 K=1.00	8.4049	-222.29	343.10	0.648 [1]
T9	60 - 40	ROHN 8 EHS	20.03	10.02	41.2 K=1.00	9.7193	-255.74	386.39	0.662 [1]
T10	40 - 20	ROHN 8 X-STR	20.03	10.02	41.8 K=1.00	12.7627	-291.44	505.55	0.576 [1]
T11	20 - 0	ROHN 8 EH	20.03	10.02	41.8 K=1.00	12.7627	-325.83	505.55	0.645 [1]

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	176 - 160	L2x2x1/4	6.16	2.77	93.8 K=1.10	0.9380	-2.85	19.13	0.149 [1]
T2	160 - 140	L2x2x3/16	7.65	3.61	112.4 K=1.02	0.7148	-4.74	11.91	0.398 [1]
T3	140 - 120	L2x2x3/16	9.87	4.70	143.1 K=1.00	0.7148	-6.62	7.89	0.839 [1]
T4	120 - 100	L2 1/2x2 1/2x3/16	12.41	5.96	144.5 K=1.00	0.9023	-7.45	9.76	0.763 [1]
T5	100 - 93.3333	L2 1/2x2 1/2x3/16	12.99	6.25	151.6 K=1.00	0.9023	-7.55	8.87	0.850 [1]
T6	93.3333 - 86.6667	L2 1/2x2 1/2x3/16	13.58	6.55	158.7 K=1.00	0.9023	-7.52	8.09	0.929 [1]
T7	86.6667 - 80	L2.5x2.5x3/16 + L2.5x2.5x3/16 (C-shape)	14.17	6.97	108.2 K=1.00	1.8331	-8.06	32.06	0.251 [1]
T8	80 - 60	L3x3x1/4	16.00	7.75	157.0 K=1.00	1.4400	-8.29	13.19	0.628 [1]
T9	60 - 40	L3 1/2x3 1/2x1/4	19.22	9.35	161.7 K=1.00	1.6900	-9.84	14.60	0.674 [1]
T10	40 - 20	L3 1/2x3 1/2x1/4	20.99	10.24	177.1 K=1.00	1.6900	-10.32	12.18	0.847 [1]
T11	20 - 0	L4x4x1/4	22.80	11.15	168.3 K=1.00	1.9400	-11.05	15.47	0.714 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	176 - 160	L2x2x1/4	4.69	4.16	127.6 K=1.00	0.9380	-0.33	12.90	0.026 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	176 - 160	ROHN 3 EH	16.00	4.00	42.2	3.0159	7.27	135.72	0.054 [1]
T2	160 - 140	ROHN 4 EH	20.03	4.01	32.6	4.4074	43.35	198.34	0.219 [1]
T3	140 - 120	ROHN 5 EH	20.03	5.01	32.7	6.1120	87.35	275.04	0.318 [1]
T4	120 - 100	ROHN 6 EHS	20.03	6.68	36.0	6.7133	125.36	302.10	0.415 [1]
T5	100 - 93.3333	ROHN 6 EH	6.68	6.68	36.5	8.4049	137.74	378.22	0.364 [1]
T6	93.3333 - 86.6667	ROHN 6 EH	6.68	6.68	36.5	8.4049	149.40	378.22	0.395 [1]
T7	86.6667 - 80	ROHN 6 EH	6.68	6.68	36.5	8.4049	160.82	378.22	0.425 [1]
T8	80 - 60	ROHN 6 EH	20.03	6.68	36.5	8.4049	193.92	378.22	0.513 [1]
T9	60 - 40	ROHN 8 EHS	20.03	10.02	41.2	9.7193	222.45	437.37	0.509 [1]
T10	40 - 20	ROHN 8 X-STR	20.03	10.02	41.8	12.7627	252.33	574.32	0.439 [1]
T11	20 - 0	ROHN 8 EH	20.03	10.02	41.8	12.7627	280.53	574.32	0.488 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	176 - 160	L2x2x1/4	6.16	2.77	56.9	0.5629	2.66	24.49	0.109 [1]
T2	160 - 140	L2x2x3/16	7.31	3.44	69.1	0.4307	4.71	18.73	0.251 [1]
T3	140 - 120	L2x2x3/16	9.44	4.48	89.4	0.4307	6.73	18.73	0.359 [1]
T4	120 - 100	L2 1/2x2 1/2x3/16	12.41	5.96	93.7	0.5713	7.39	24.85	0.297 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T5	100 - 93.3333	L2 1/2x2 1/2x3/16	12.99	6.25	98.2	0.5713	7.55	24.85	0.304 [1]
T6	93.3333 - 86.6667	L2 1/2x2 1/2x3/16	13.58	6.55	102.8	0.5713	7.45	24.85	0.300 [1]
T7	86.6667 - 80	L2.5x2.5x3/16 + L2.5x2.5x3/16 (C-shape)	14.17	6.97	108.2	1.8331	7.98	59.39	0.134 [1]
T8	80 - 60	L3x3x1/4	16.00	7.75	101.7	0.9159	8.31	44.65	0.186 [1]
T9	60 - 40	L3 1/2x3 1/2x1/4	19.22	9.35	104.5	1.1034	9.77	53.79	0.182 [1]
T10	40 - 20	L3 1/2x3 1/2x1/4	20.99	10.24	114.2	1.1034	10.15	53.79	0.189 [1]
T11	20 - 0	L4x4x1/4	22.80	11.15	108.3	1.2909	10.79	62.93	0.171 [1]

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	176 - 160	L2x2x1/4	4.69	4.16	86.6	0.5629	0.27	24.49	0.011 [1]

[1] $P_u / \phi P_n$ controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	176 - 160	Leg	ROHN 3 EH	2	-11.51	119.12	9.7	Pass
T2	160 - 140	Leg	ROHN 4 EH	32	-53.06	183.54	28.9	Pass
T3	140 - 120	Leg	ROHN 5 EH	66	-102.15	254.38	40.2	Pass
T4	120 - 100	Leg	ROHN 6 EHS	93	-143.98	274.77	52.4	Pass
T5	100 - 93.3333	Leg	ROHN 6 EH	114	-157.85	343.10	46.0	Pass
T6	93.3333 - 86.6667	Leg	ROHN 6 EH	123	-170.95	343.10	49.8	Pass
T7	86.6667 - 80	Leg	ROHN 6 EH	132	-183.97	343.10	53.6	Pass
T8	80 - 60	Leg	ROHN 6 EH	141	-222.29	343.10	64.8	Pass
T9	60 - 40	Leg	ROHN 8 EHS	162	-255.74	386.39	66.2	Pass
T10	40 - 20	Leg	ROHN 8 X-STR	177	-291.44	505.55	57.6 59.5 (b)	Pass
T11	20 - 0	Leg	ROHN 8 EH	192	-325.83	505.55	64.5	Pass
T1	176 - 160	Diagonal	L2x2x1/4	9	-2.85	19.13	14.9 29.2 (b)	Pass
T2	160 - 140	Diagonal	L2x2x3/16	37	-4.74	11.91	39.8 69.0 (b)	Pass
T3	140 - 120	Diagonal	L2x2x3/16	70	-6.62	7.89	83.9 98.6 (b)	Pass
T4	120 - 100	Diagonal	L2 1/2x2 1/2x3/16	97	-7.45	9.76	76.3 94.4 (b)	Pass
T5	100 - 93.3333	Diagonal	L2 1/2x2 1/2x3/16	118	-7.55	8.87	85.0 96.4 (b)	Pass
T6	93.3333 - 86.6667	Diagonal	L2 1/2x2 1/2x3/16	127	-7.52	8.09	92.9 95.2 (b)	Pass
T7	86.6667 - 80	Diagonal	L2.5x2.5x3/16 + L2.5x2.5x3/16	135	-8.06	32.06	25.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
			(C-shape)				64.9 (b)	
T8	80 - 60	Diagonal	L3x3x1/4	144	-8.29	13.19	62.8	Pass
T9	60 - 40	Diagonal	L3 1/2x3 1/2x1/4	165	-9.84	14.60	67.4	Pass
							69.1 (b)	
T10	40 - 20	Diagonal	L3 1/2x3 1/2x1/4	180	-10.32	12.18	84.7	Pass
T11	20 - 0	Diagonal	L4x4x1/4	195	-11.05	15.47	71.4	Pass
							76.3 (b)	
T1	176 - 160	Top Girt	L2x2x1/4	5	-0.33	12.90	2.6	Pass
							2.9 (b)	
							Summary	
						Leg (T9)	66.2	Pass
						Diagonal (T3)	98.6	Pass
						Top Girt (T1)	2.9	Pass
						Bolt Checks	98.6	Pass
						RATING =	**98.6**	**Pass**

MATHCAD CALCULATION PRINTOUT

Foundation Check for 175' Self Supporting Tower

Customer Name: SBA
Customer Site Number: CT04382-S-02 New Britain 2, CT

CarrierName: AT&T
ACGI JOB # 17-0378

By:

Allpro Consulting Group, Inc.
9221 Lyndon B. Johnson Freeway, Suite 204
Dallas, TX 75243
Tel: 972-231-8893, Fax: 866-364-8375

Feb 17, 2017

Foundation check

-Foundation Reactions-

((As per TNX output results from the Tower Structural Analysis by Allpro Consulting Group Inc.,)

Total Shear	$S := 56 \cdot kips$	Compression on Pedestal:	$P_c := 334 \cdot kips$
Moment	$M := 5710 \cdot ft\_K$	Uplift on Pedestal:	$P_{up} := 288 \cdot kips$
Down load, Tower weight	$Pv := 61 \cdot kips$	Shear on Pedestal:	$Sh := 35 \cdot kips$

-Soil Properties- Soil data as per Geotechnical Evaluation of Subsurface Conditions report by Jaworski Geotech, Inc., Project # 16BICQ1400, dated 07/05/2000

Allowable Bearing Capacity $Brg_{allw} := 5 \cdot ksf$ Safety Factor $SF := 2$ (Estimated)

Umtimate Bearing Capacity $Brg_{ultimate} := Brg_{allw} \cdot SF$ $Brg_{ultimate} = 10 \cdot ksf$

Internal angle of friction for soil, $\phi := 30 \cdot deg$

Unit wt. of soil, $\gamma_s := 0.115 \cdot kcf$

Alowable Passive Pressure see next page

Cohesion of soil, $c_u := 0.0 \cdot ksf$

Friction Factor $FF := .50$

Depth to be neglected $L_{neg} := 1.0 \cdot ft$

-Reinforcement Data-

Typical concrete cover $cc := 3in$

Rebar yield strength, $f_y := 60000 \cdot psi$

-Material Parameters-

Conforming to the design requirements as in ACI 318-10

Unit wt. of concrete, $\gamma_c := 0.150 \cdot kcf$

Concrete compressive strength, $f_c := 3000 \cdot psi$

-Factor of Safety for soil strength-

$\phi_{s\_Bear} := 0.75$	as per TIA-222-G code for bearing, 9.4.1
$\phi_{s\_friction} := 0.75$	as per TIA-222-G code for skin friction resistance, 9.4.1
$\phi_{s\_lateral} := 0.75$	as per TIA-222-G code for lateral resistance, 9.4.1
$\phi_{s\_uplift} := 0.75$	as per TIA-222-G code for lateral resistance, 9.4.1

DIMENSIONS

Tower face width $TWFW := 21 \cdot ft$ Tower ht. $Tw_{ht} := 175 \cdot ft$

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, $D_f := 3.5 \cdot ft$

Thickness of mat, $T_f := 4 \cdot ft$

Pedestal size, $Ped_s := 0 \cdot ft$ No. of pedestals $Nped := 3$

Extension above the grade, $E_g := 0.5 \cdot ft$

-Foundation Data as per original foundation drawing by Rohn Industries, Inc., Eng. File No. 44545AE, dated 7/26/2000

Mat Dimensions, LxB $L := 31.5 \cdot ft$ x $B := L$ $B = 31.5\,ft$

$Brg_{ultimate} = 10 \cdot ksf$ (From Geotech Report)

MAT CALCULATIONS

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

$$P_{pave} := \frac{\left(D_f - T_f - L_{neg}\right)\cdot K_p \cdot \gamma_s + \left(D_f - L_{neg}\right)\cdot K_p \cdot \gamma_s}{2} \qquad P_{pave} = 0.172 \cdot ksf$$

Calculate safety against overturning and location of resultant on the base

Resisting Moments about mid axis parallel to base

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

component	value, kips	lever arm, ft	resisting moment, ft-kips
1) Concrete wt.	$C_w := L\cdot B\cdot T_f\cdot(\gamma_c) + Area_{ped}\cdot\gamma_c\cdot(D_f + E_g - T_f)\cdot Nped$	$L_c := \frac{L}{2}$	$R_c := C_w \cdot L_c$
	$C_w = 595.35 \cdot kips$	$L_c = 15.75\,ft$	$R_c = 9376.763 \cdot ft\_K$
2) Soil wt.	$S_w := 0 \cdot kips$	$L_s := \frac{L}{2}$	$R_s := S_w \cdot L_s$
	$S_w = 0 \cdot kips$	$L_s = 15.75\,ft$	$R_s = 0 \cdot ft\_K$
3) Wt. of soil wedge	$W_w := 0kips$	$L_w := \left[L + \left[\left(D_f - T_f\right)\cdot\frac{\tan(\phi)}{3}\right]\right]$	$R_w := W_w \cdot L_w$
	$W_w = 0 \cdot kips$	$L_w = 31.404\,ft$	$R_w = 0 \cdot ft\_K$

4) Passive pressure $Pe_p := (D_f - E_g) \cdot B \cdot P_{pave}$ $Pe_p = 16.301 \cdot kips$ $L_p := \frac{T_f}{3}$ $L_p = 1.333\,ft$ $R_p := Pe_p \cdot L_p$ $R_p = 21.735 \cdot ft\_K$

5) Vertical $Pv = 61 \cdot kips$

$S_{w1} := L \cdot B \cdot D_f \cdot \gamma_s$ $S_{w1} = 399.381 \cdot kips$ <--- for net calcs $L_v := \frac{L}{2}$ $R_v := Pv \cdot L_v$ $R_v = 960750\,lb \cdot ft$

Total weight $T_w := C_w + S_w + W_w + Pv$ $T_w = 656.35 \cdot kips$ $L_v = 15.75\,ft$ $R_v = 960.75 \cdot ft\_K$

Total resisting Moment= $M_r := R_c + R_s + R_w + R_p + R_v$ $M_r = 10359.248 \cdot ft\_K$

Overturning Moments

component	value, kips	lever arm, ft	Overturning Moment ft-kips
1) Moment on foundation due to eccentric location of tower	$Pv = 61 \cdot kips$	$L_{pe} = 0$	$M_{pe} := L_{pe} \cdot Pv$ $M_{pe} = 0 \cdot ft\_K$
2) Moment on foundation	-	-	$M = 5710 \cdot ft\_K$
3) Moment due to horizontal shear	$S_t := S$	$L_{hs} := D_f + E_g$ $L_{hs} = 4\,ft$	$O_{hs} := L_{hs} \cdot S_t$ $O_{hs} = 224 \cdot ft\_K$

Total Overturning Moment= $M_o := M + O_{hs} + M_{pe}$ $M_o = 5934 \cdot ft\_K$

Check Safety Factor against Overturning about mid axis parallel to base

$SF := \frac{0.9 M_r}{M_o}$ $SF = 1.571$ > 1.0 $\frac{1.0}{SF} = 63.647 \cdot \%$ **O.K!**

Calculate eccentricity, e

$e := \frac{M_o}{T_w}$ $e = 9.041\,ft$

Check location of eccentricity and determine pressure distribution under the mat

$L_{loc} := \frac{L}{6}$ $L_{loc} = 5.25\,ft$ For net bearing calcs $T_{w1} := S_{w1} + W_w$ $T_{w1} = 399.381 \cdot kips$

$P_{max1} := if\left[e \le L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[1 + \left(6 \cdot \frac{e}{L}\right)\right], 4 \cdot \frac{T_w}{3 \cdot B \cdot (L - 2 \cdot e)}\right]$ $P_{max1} = 2.07 \cdot ksf$

$P_{max2} := \left(\frac{T_{w1}}{L \cdot B}\right)$ $P_{max2} = 0.402 \cdot ksf$ $P_{net} := P_{max1} - P_{max2}$ $P_{max} := P_{net}$

Net soil pressure, $P_{net} = 1.668 \cdot ksf$ < $\phi_{s\_Bear} \cdot Brg_{ultimate} = 7.5 \cdot ksf$ $\frac{P_{net}}{(\phi_{s\_Bear} \cdot Brg_{ultimate})} = 22.24 \cdot \%$

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

Check for horizontal shear $P_{hor} := \phi_{s\_lateral} \cdot \left[Pe_p + (Pv + C_w + S_w) \cdot 0.35\right]$

$P_{hor} = 184.518 \cdot kips$ > $S = 56 \cdot kips$ $\frac{S}{P_{hor}} = 30.349 \cdot \%$ **O.K.!**

Since P.hor > S it is safe!

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 $d := T_f - cc$ $d = 45 \cdot in$ $L_{eff} := if(e \le L_{loc}, L, L - 2 \cdot e)$ $L_{eff} = 13.418\,ft$

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

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

shear on the face of concrete=

$Shear_{wide} := (dist) \cdot B \cdot \left[\frac{P_{maxf} + \left[P_{maxf} - \frac{P_{maxf} - P_{minf}}{L_{eff}} \cdot (dist)\right]}{2}\right]$ $Shear_{wide} = 242.951 \cdot kips$

Area of concrete in shear= $A_{shear} := B \cdot d$ $A_{shear} = 17010 \cdot in^2$

Shear stress acting on concrete face= $\nu_{act} := \frac{Shear_{wide}}{A_{shear}}$ $\nu_{act} = 14.283 \cdot psi$

$\nu_{act} = 14.283 \cdot psi$ < $\nu_{wide} = 93.113 \cdot psi$ **O.K!**

Check for punching or two-way shear in mat

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

$\beta := \frac{L}{B}$ $\beta = 1$

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

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

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

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

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

$\nu_{act} = 12.763\cdot psi$ < $\nu_{punch} = 186.226\cdot psi$ **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

$P_{upnet} := P_{up} - \frac{C_{wped} + S_w\cdot 0.95}{Nped}$ $P_{upnet} = 288\cdot kips$

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

$B_{mo} := RC_{fac}\cdot\left[(TWFW\cdot P_{upnet})\cdot Langle + S_t\cdot(D_f + E_g)\right]$ $B_{mo} = 5461.722\cdot ft\_K$

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

$W_e := TWFW\cdot Langle + Ped_s$ $W_e = 18.187\,ft$ Reinforcement middle bandwidth. $B_{mo1} = 321113.909\,lb\cdot ft$

required R_u $R_u := \frac{B_{mo}}{\phi_{bend}\cdot B\cdot d^2}$ $R_u = 95.137\cdot psi$ $m := \frac{f_y}{\beta_1\cdot f_c}$ $m = 23.529$

required

$\rho := \frac{1}{m}\cdot\left[1-\sqrt{1-\left(\frac{2\cdot m\cdot R_u}{f_y}\right)}\right]$ $\rho = 0.002$

required area of steel for mat=

$Ast_f := \rho\cdot B\cdot d$ $Ast_f = 27.494\cdot in^2$

bar size provided $f_{bar} := 9$ $f_{dia} := \frac{f_{bar}}{8}\cdot in$ $f_{dia} = 1.125\cdot in$

Bar area= $f_{abar} := \pi\cdot\frac{f_{dia}^2}{4}$ $f_{abar} = 0.994\cdot in^2$

Number of bars required= $Nf_{bars} := \frac{Ast_f}{f_{abar}}$ $Nf_{bars} = 27.66$

Used $Nf_{bars} := 32$ > 27 OK!

Foundation Check Summary

-Foundation Reactions-

$S = 56\cdot kips$

Down load $Pv = 61\cdot kips$ (Weight)

Uplift load $P_{up} = 288\cdot kips$

$M = 5710\cdot ft\_K$

Stability Calculations

Safety Factor against Overturning $SF = 1.571$ > 1.0 OK! $\frac{1.0}{SF} = 63.647\cdot\%$ **OK!**

Net soil pressure, $P_{net} = 1.668\cdot ksf$ < $0.75Brg_{ultimate} = 7.5\cdot ksf$ $\frac{P_{net}}{0.75Brg_{ultimate}} = 22.24\cdot\%$ **OK!**

Check for horizontal shear $P_{hor} = 184.518\cdot kips$ > $S = 56\cdot kips$ $\frac{S}{P_{hor}} = 30.349\cdot\%$ **OK!**

LTE MULTI CARRIER RRU ADD
CT5254
NEW BRITAIN WEST
1 HARTFORD SQUARE
NEW BRITAIN, CT 06052
FA CODE: 10071149

at&t Mobility

PROJECT TEAM

SITE ACQUISITION & ZONING:

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581

ENGINEERING:

TRYLON TSF
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 75038
KATYA SERAVALLE
PHONE: 519–465–4125

RF ENGINEER:

AT&T MOBILITY – NEW ENGLAND
550 COCHITUATE ROAD
SUITE 550 13 & 14
FRAMINGHAM, MA 01701
CAMERON SYME
508–596–7146
cs6970@att.com

CONSTRUCTION MANAGEMENT:

EMPIRE TELECOM
16 ESQUIRE ROAD
BILLERICA, MA 01821
GRZEGORZ "GREG" DORMAN
484–683–1750
gdorman@empiretelecomm.com

TOWER OWNER:

SBA TOWERS LLC
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581

SBA SITE ID: CT04382–S
SBA SITE NAME: NEW BRITAIN 2, CT

SBA REGIONAL SITE MANAGER: STEPHEN ROTH
(860)539–4920
sroth@sbasite.com

GENERAL NOTES

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

SITE INFORMATION

LATITUDE:	41° 39' 59.01084" N
LONGITUDE:	–72° 48' 46.07604" W
LAT./LONG. TYPE:	NAD 83
GROUND ELEVATION:	N/A
APN/UPC:	N/A
AREA OF CONSTRUCTION:	EXISTING
ZONING/JURISDICTION:	UNKNOWN
CURRENT ZONING:	UNKNOWN
EXISTING USE:	TELECOMMUNICATIONS FACILITY
COUNTY:	HARTFORD
HANDICAP REQUIREMENTS:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS NOT REQUIRED.

VICINITY MAP

NOT TO SCALE

NORTH

DRIVING DIRECTIONS

UPDATED 1/10 NEW BRITAIN WEST CT–254_B054I–84–EAST TO EXIT 36 SLATER ROAD; IT IS A LEFT HAND EXIT, AT THE END OF THE EXIT TAKE A RIGHT HAND TURN ONTO SLATER ROAD, FOLLOW THIS UNTIL YOU CAN'T GO STRAIGHT ANYMORE AND TAKE A RIGHT HAND TURN ONTO WEST MAIN STREET, FOLLOW THIS TO THE FIRST LIGHT AND TAKE A LEFT ONTO WOOSTER ROAD, GO TO HARTFORD SQUARE ROAD AND TAKE A LEFT, GO TO ONE HARTFORD SQUARE ROAD, DRIVE TO THE BACK PARCKING LOT, YOU WILL SEE OUR SHELTER. ADRESS: ONE ARTFORD SQUARE ROAD, NEW BRITAIN, CONNECTICUT.

CODE COMPLIANCE

2012 INTERNATIONAL BUILDING CODE

2014 NATIONAL ELECTRICAL CODE

TIA/EIA–222–G STRUCTURAL STANDARDS FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS

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.

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.

CONNECTICUT ONE CALL SYSTEM, INC. 1-800-922-4455 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

AT&T (RF): ______________ DATE: ______

AT&T (CONST.): ______________ DATE: ______

AT&T (OPS): ______________ DATE: ______

TOWER OWNER: SBA Landlord Approved by Bryan Bakis December 12, 2016 @ 04:12 pm

JURISDICTIONAL APPROVAL

BASED ON INFORMATION PROVIDED BY AT&T REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW AND LIMITED/PARTIAL ZONING PRE–EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW OR ADMINISTRATIVE REVIEW).

Michael Plahovinsak — Digitally signed by Michael Plahovinsak Date: 2016.12.12 11:06:48 -05'00'

PROJECT DESCRIPTION

THIS PROJECT WILL BE COMPRISED OF:
CHANGES ON THE EXISTING SELF SUPPORT TOWER:

- REMOVE (3) EXISTING RRUS11 (1) PER SECTOR FOR (3) SECTORS.
- INSTALL (3) NEW RRUS–32, (1) PER SECTOR FOR (3) SECTORS.
- REUSE (3) EXISTING RRUS32.
- REUSE (3) EXISTING RRUS11.
- REUSE (2) EXISTING FIBER TRUNK.
- REUSE (4) EXISTING DC TRUNK.
- REUSE (2) EXISTING DC/FIBER SQUID.
- REUSE (12) EXISTING RF CABLES.
- INSTALL MOUNT REINFORCING @ 162.0'

SPECIAL CONSTRUCTION SCHEDULE NOTE (SBA DESIGN–BUILD TOWER MODS REQUIRED):
UNLESS A PRE–MOD CONDITIONAL OR TEMPORARY INSTALLATION IS SPECIFICALLY RECOMMENDED BY SBA TOWER STRUCTURAL ENGINEER AND INCLUDED IN SBA NOTICE–TO–PROCEED, AT&T TOWER TOP EQUIPMENT INSTALLATION IS CONTINGENT UPON COMPLETION OF SBA DESIGN–BUILD FOR ALL REQUIRED TOWER/FOUNDATION STRUCTURAL MODIFICATIONS, ENGINEERING CONSTRUCTION CONTROL INSPECTIONS, AND FINAL ENGINEERING AFFIDAVIT (ALL PREVIOUS ITEMS TO BE DESIGN–BUILD PERFORMED BY SBA UNDER A SEPARATE BUILDING PERMIT).

SHEET	DESCRIPTION
T–1	TITLE SHEET
GN–1	GROUNDING & GENERAL NOTES
A–1	SITE PLAN
A–2	EQUIPMENT LAYOUT
A–3	ANTENNA LAYOUTS & TOWER ELEVATION
A–4	DETAILS
G–1	GROUNDING, ONE–LINE DIAGRAM & DETAILS
S–1	MOUNT REINFORCING @ 162.0'

at&t Mobility
550 COCHITUATE ROAD
FRAMINGHAM,MA 01701

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE
125 WESTBOROUGH, MA 01581

PLANS PREPARED BY:
Trylon
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 5038
519-465-4125

NO.	DATE	DESCRIPTION	BY
A	10/28/16	FOR REVIEW	DBG
B	11/09/16	MOUNT REINFORCING ADDED	DBG
0	12/12/16	UPDATE AS PER CLIENT'S REQUEST	CP

SITE INFORMATION:

CT5254
NEW BRITAIN WEST
FA CODE: 10071149

1 HARTFORD SQUARE
NEW BRITAIN, CT 06052

SEAL:

STATE OF CONNECTICUT MICHAEL F. PLAHOVINSAK No. 25849 LICENSED PROFESSIONAL ENGINEER
12-12-2016

MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

TITLE SHEET

SHEET NUMBER:

T-1

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.

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 SCR1 'AP 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-A0OZ-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.

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-EG0-0001, 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.

at&t Mobility
550 COCHITUATE ROAD
FRAMINGHAM,MA 01701

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE
125 WESTBOROUGH, MA 01581

PLANS PREPARED BY:
Trylon
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 5038
519-465-4125

NO.	DATE	DESCRIPTION	BY
A	10/28/16	FOR REVIEW	DBG
B	11/09/16	MOUNT REINFORCING ADDED	DBG
0	12/12/16	UPDATE AS PER CLIENT'S REQUEST	CP

SITE INFORMATION:

CT5254
NEW BRITAIN WEST
FA CODE: 10071149

1 HARTFORD SQUARE
NEW BRITAIN, CT 06052

SEAL:

STATE OF CONNECTICUT
MICHAEL F. PLAHOVINSAK
No. 25849
REGISTERED PROFESSIONAL ENGINEER
12-12-2016

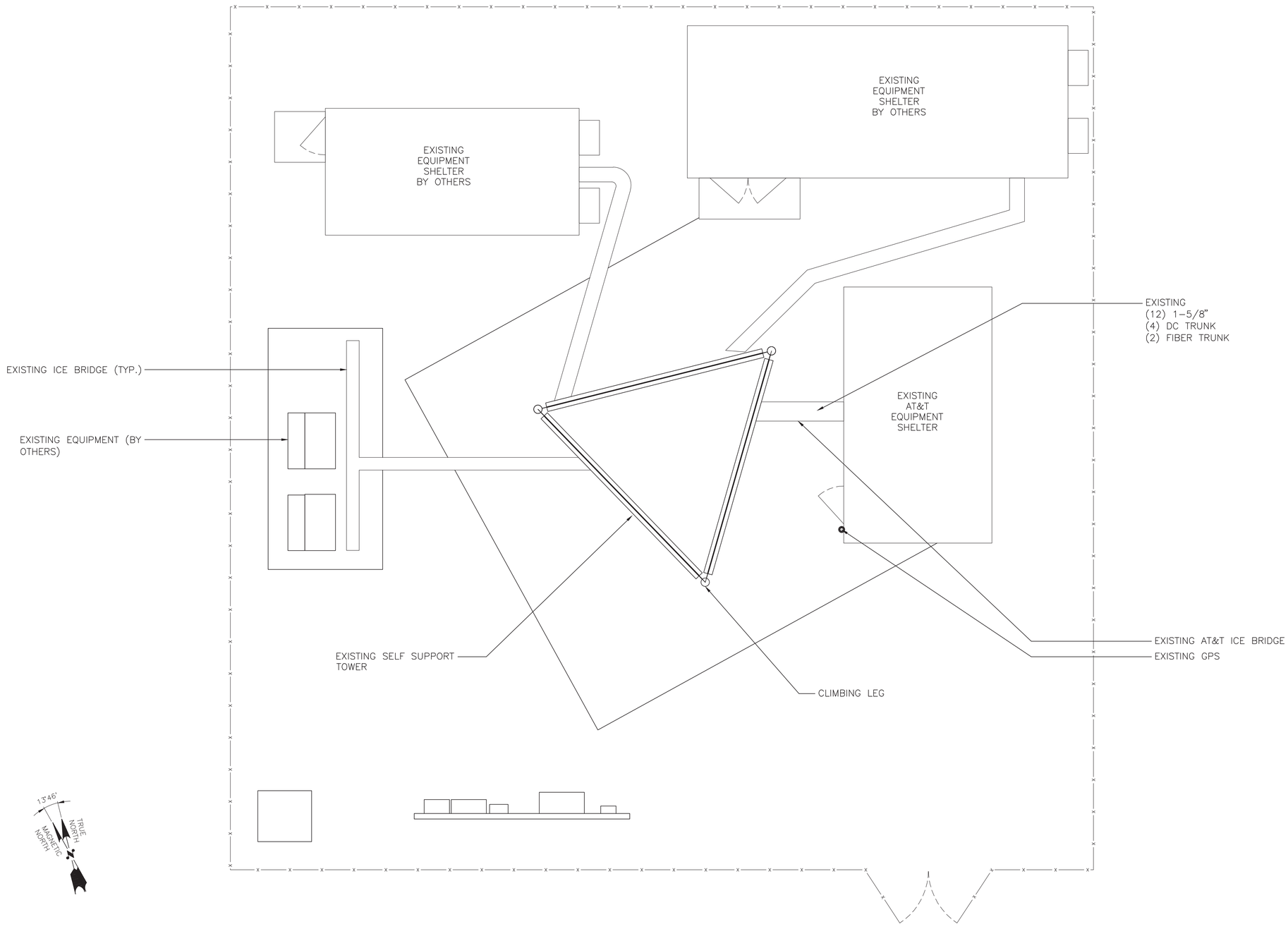
MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

GENERAL NOTES &
GROUNDING NOTES

SHEET NUMBER:

GN-1



SITE PLAN

22"x34" SCALE: 1/4" = 1'-0"
11"x17" SCALE: 1/8" = 1'-0"

4' 3' 2' 1' 0" 4'

at&t Mobility
550 COCHITUATE ROAD
FRAMINGHAM,MA 01701

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SBA
SBA COMMUNICATIONS CORP.
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No. 25849
REGISTERED PROFESSIONAL ENGINEER
SIGNATURE
12-12-2016

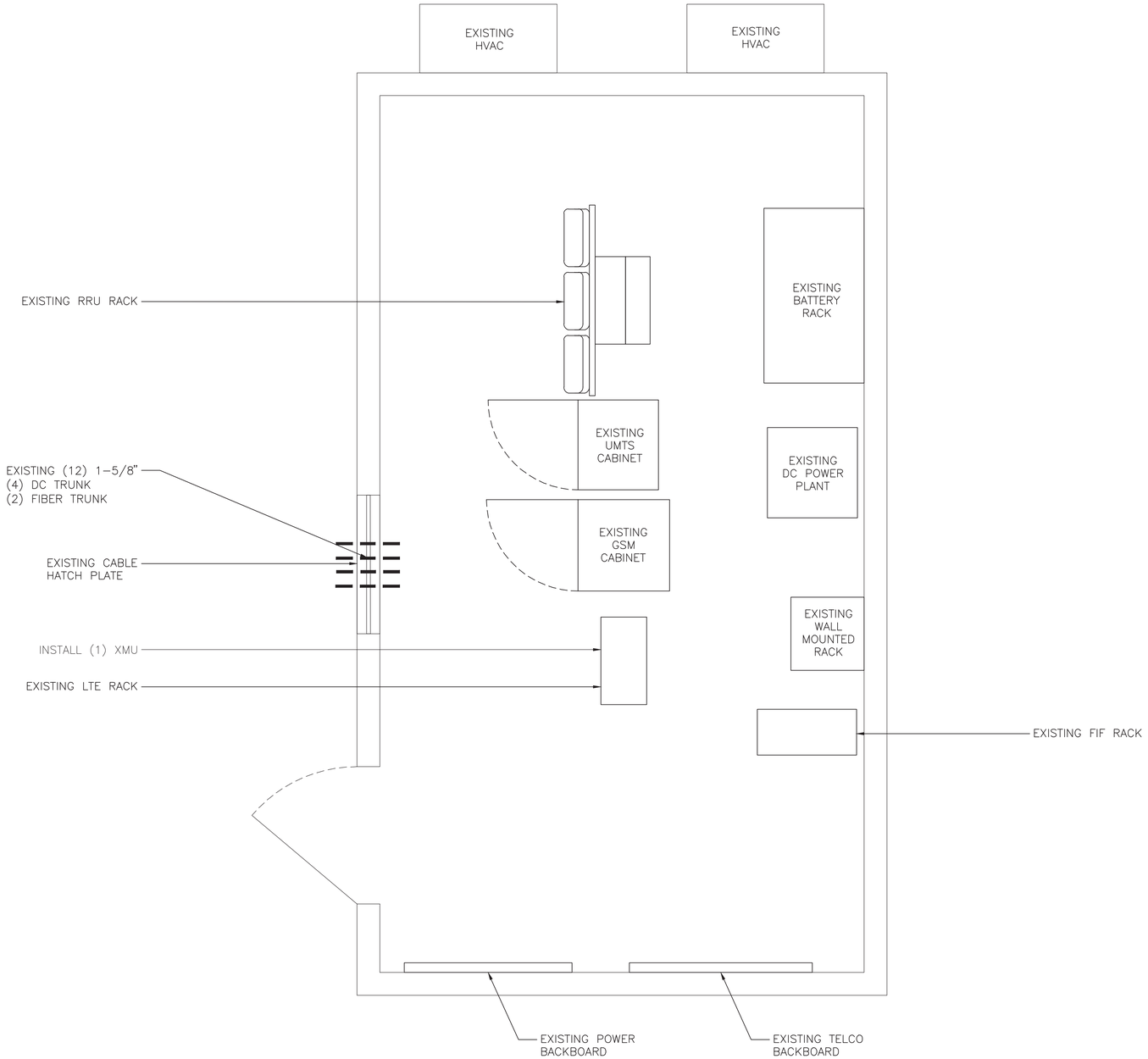
MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-308-6250 / mike@mfpeng.com

SHEET TITLE:

SITE PLAN

SHEET NUMBER:

A-1



ENLARGED PARTIAL SITE PLAN

22"x34" SCALE: 3/4" = 1'-0"
11"x17" SCALE: 3/8" = 1'-0"

1' 6" 0" 1'

at&t Mobility
550 COCHITUATE ROAD
FRAMINGHAM,MA 01701

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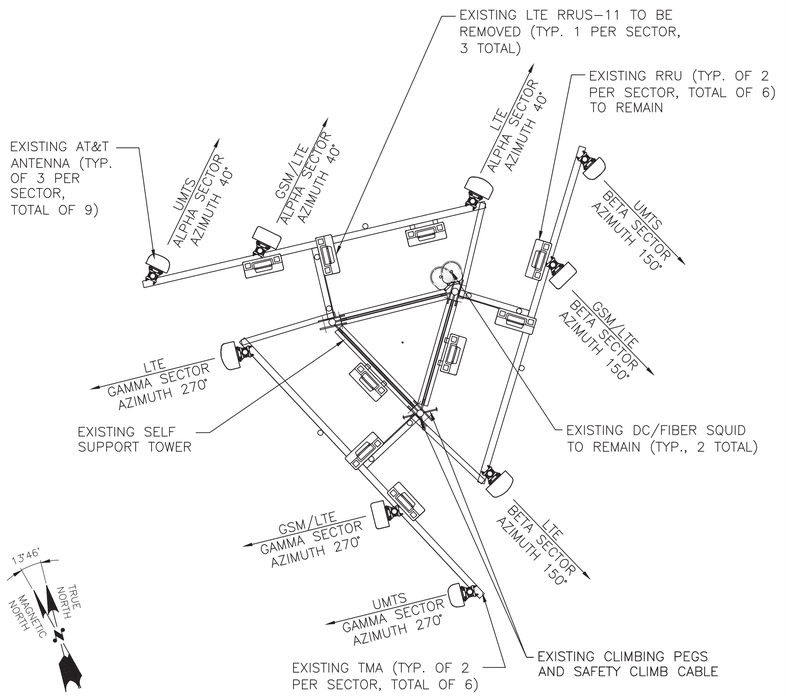
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

EQUIPMENT LAYOUTS

SHEET NUMBER:

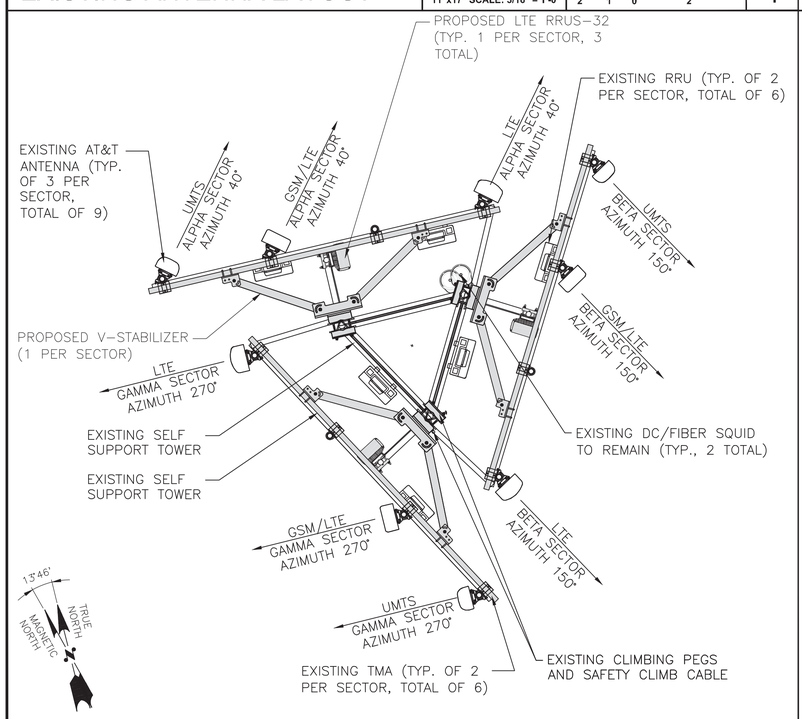
A-2



EXISTING ANTENNA LAYOUT

22"x34" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 3/16" = 1'-0"
2' 1' 0" 2'

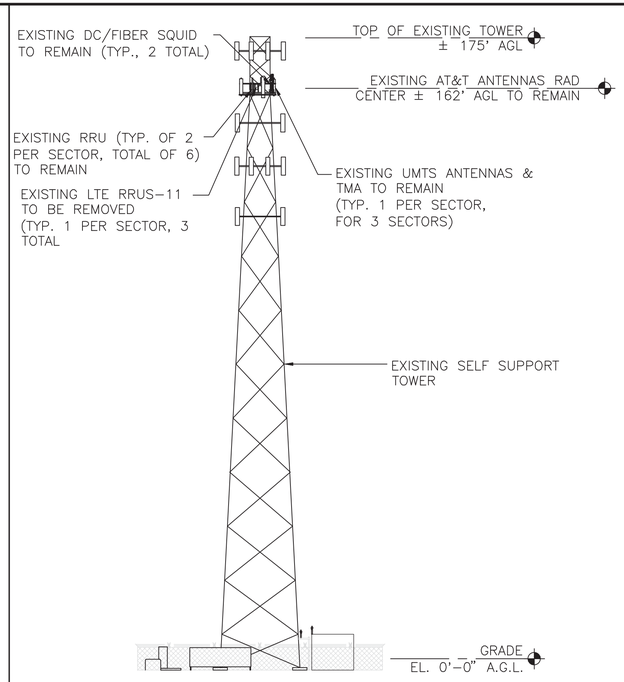
1



PROPOSED ANTENNA LAYOUT

22"x34" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 3/16" = 1'-0"
2' 1' 0" 2'

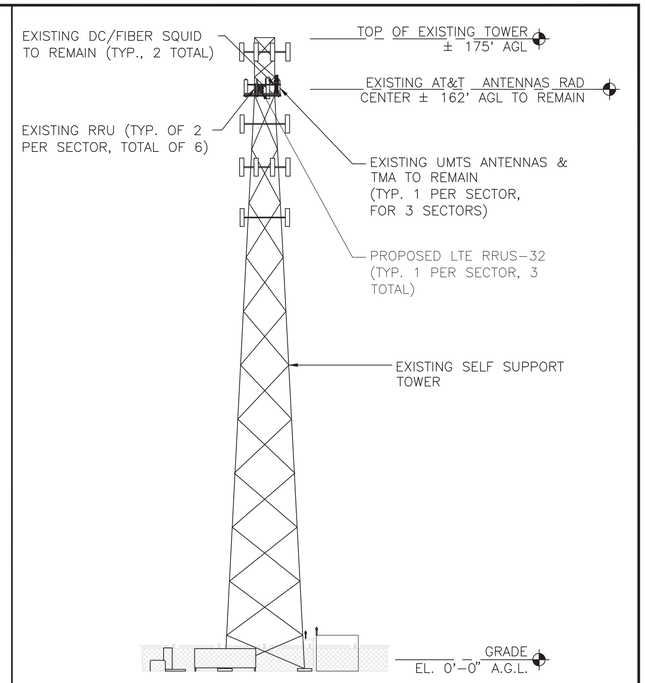
2



EXISTING ELEVATION

22"x34" SCALE: 1" = 20'-0"
11"x17" SCALE: 1" = 40'-0"
20' 10' 0" 20'

3



PROPOSED ELEVATION

22"x34" SCALE: 1" = 20'-0"
11"x17" SCALE: 1" = 40'-0"
20' 10' 0" 20'

4

SPECIAL TOWER TOP EQUIPMENT INSTALLATION WORK NOTE (SAFETY-CLIMB ALIGNMENT REQUIREMENTS):
GENERAL CONTRACTOR SHALL RE-ORIENT EXISTING AT&T PLATFORM COLLAR-MOUNT AND ORIENT PROPOSED PLATFORM REINFORCEMENT KIT COLLAR-MOUNTS SO THAT EXISTING SAFETY CLIMB CABLE IS NOT OBSTRUCTED/RE-ROUTED FROM VERTICAL ALIGNMENT AND IS NOT IN PHYSICAL CONTACT WITH EXISTING OR PROPOSED COLLAR-MOUNT HARDWARE. GENERAL CONTRACTOR SHALL INSTALL NEW OR ADDITIONAL SAFETY-CLIMB CABLE GUIDES IF ADDITIONAL CLEARANCE IS REQUIRED. ADDITIONAL CABLE GUIDES SHALL BE ATTACHED SECURELY TO THE POLE USING MECHANICAL FASTENERS OR FIELD WELDED BY A CERTIFIED WELDING TECHNICIAN.

SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.

SPECIAL CONSTRUCTION SCHEDULE NOTE (SBA DESIGN-BUILD TOWER MODS REQUIRED):
UNLESS A PRE-MOD CONDITIONAL OR TEMPORARY INSTALLATION IS SPECIFICALLY RECOMMENDED BY SBA TOWER STRUCTURAL ENGINEER AND INCLUDED IN SBA NOTICE-TO-PROCEED, AT&T TOWER TOP EQUIPMENT INSTALLATION IS CONTINGENT UPON COMPLETION OF SBA DESIGN-BUILD FOR ALL REQUIRED TOWER/FOUNDATION STRUCTURAL MODIFICATIONS, ENGINEERING CONSTRUCTION CONTROL INSPECTIONS, AND FINAL ENGINEERING AFFIDAVIT (ALL PREVIOUS ITEMS TO BE DESIGN-BUILD PERFORMED BY SBA UNDER A SEPARATE BUILDING PERMIT).

at&t Mobility
550 COCHITUATE ROAD
FRAMINGHAM,MA 01701

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE
125 WESTBOROUGH, MA 01581

PLANS PREPARED BY:
Trylon
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 5038
519-465-4125

NO.	DATE	DESCRIPTION	BY
A	10/28/16	FOR REVIEW	DBG
B	11/09/16	MOUNT REINFORCING ADDED	DBG
0	12/12/16	UPDATE AS PER CLIENT'S REQUEST	CP

SITE INFORMATION:

CT5254
NEW BRITAIN WEST
FA CODE: 10071149

1 HARTFORD SQUARE
NEW BRITAIN, CT 06052

SEAL:

STATE OF CONNECTICUT
MICHAEL F. PLAHOVINSAK
No. 25849
REGISTERED PROFESSIONAL ENGINEER
SIGNATURE
12-12-2016

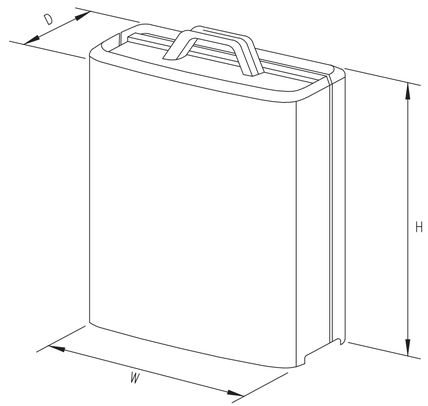
MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

ANTENNA LAYOUTS, TOWER ELEVATION & MOUNTING DETAILS

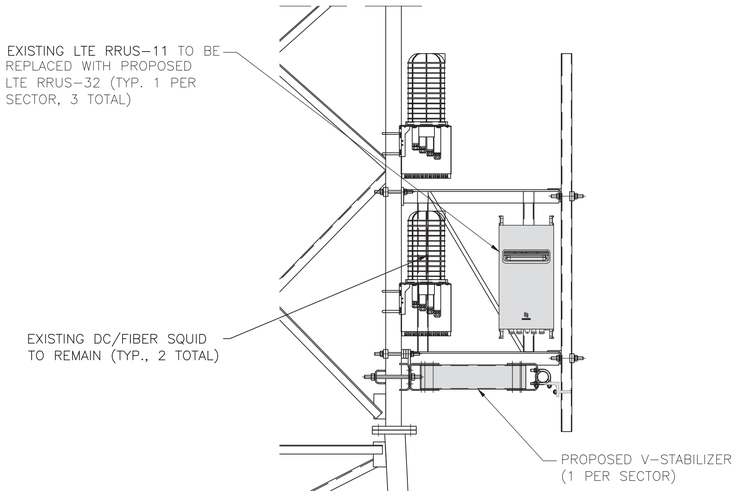
SHEET NUMBER:

A-3

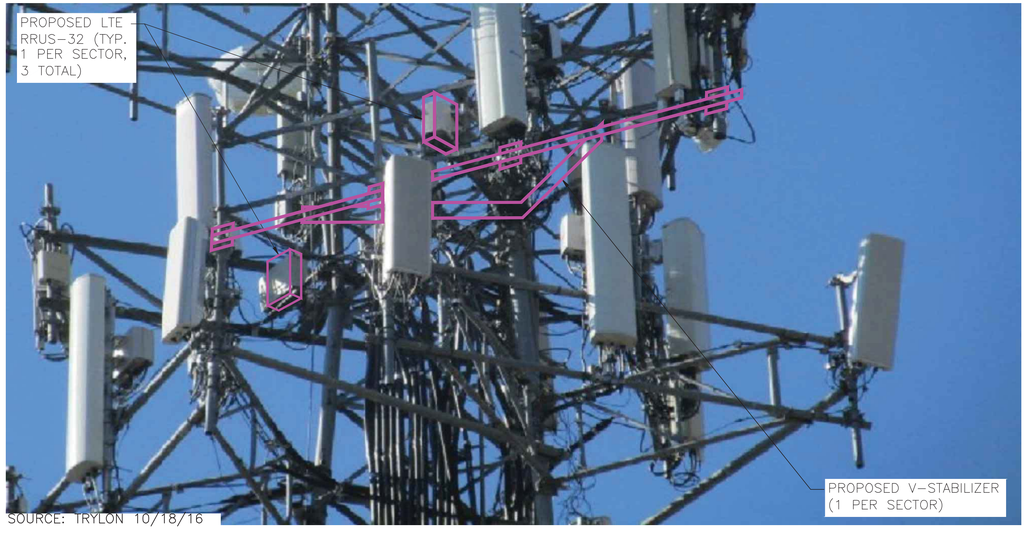


MODEL	H x W x D	WEIGHT
RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS-12	20.4" x 18.5" x 7.5"	58 LBS
RRUS-32	29.9" x 13.3" x 9.5"	77 LBS
RRUS-E2	20.4" x 18.5" x 7.5"	58 LBS
A2 MODULE	16.4" x 15.2" x 3.4"	22 LBS

LTE ANTENNA DETAILS — N.T.S — 1



RRUS DETAILS — N.T.S — 2



SOURCE: TRYLON 10/18/16

MOUNTING DETAIL — 22"x34" SCALE: 3/4" = 1'-0" — 11"x17" SCALE: 3/8" = 1'-0" — 1' 6" 0" 1' — N.T.S — 3

NOT USED

at&t Mobility
550 COCHITUATE ROAD
FRAMINGHAM,MA 01701

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SBA
SBA COMMUNICATIONS CORP.
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125 WESTBOROUGH, MA 01581

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NEW BRITAIN, CT 06052

SEAL:

STATE OF CONNECTICUT — MICHAEL F. PLAHOVINSAK — No. 25849 — PROFESSIONAL ENGINEER — ORIGINAL SIGNATURE

12-12-2016

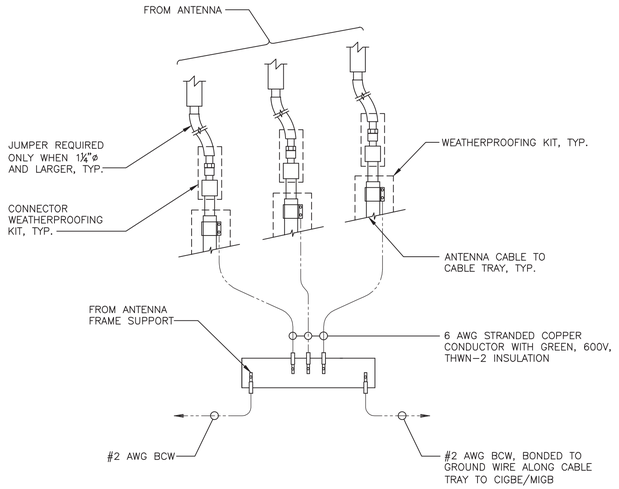
MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18381 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

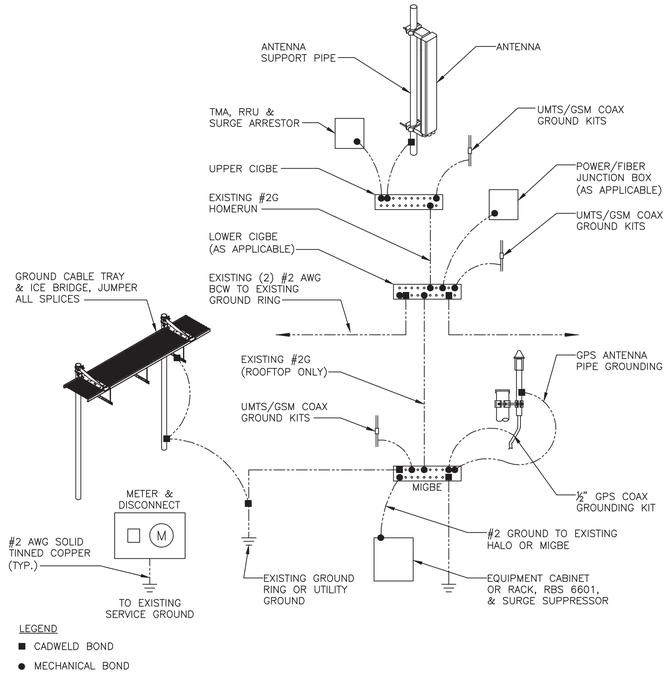
DETAILS

SHEET NUMBER:

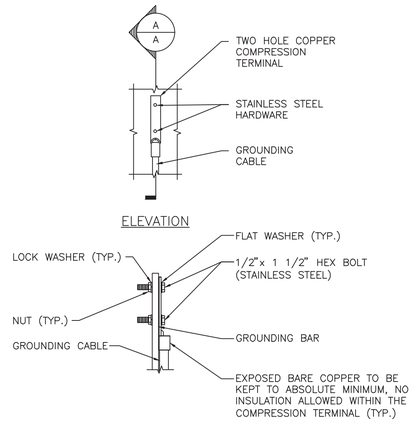
A-4



GROUND WIRE TO GROUND BAR CONNECTION DETAILS | N.T.S | 1



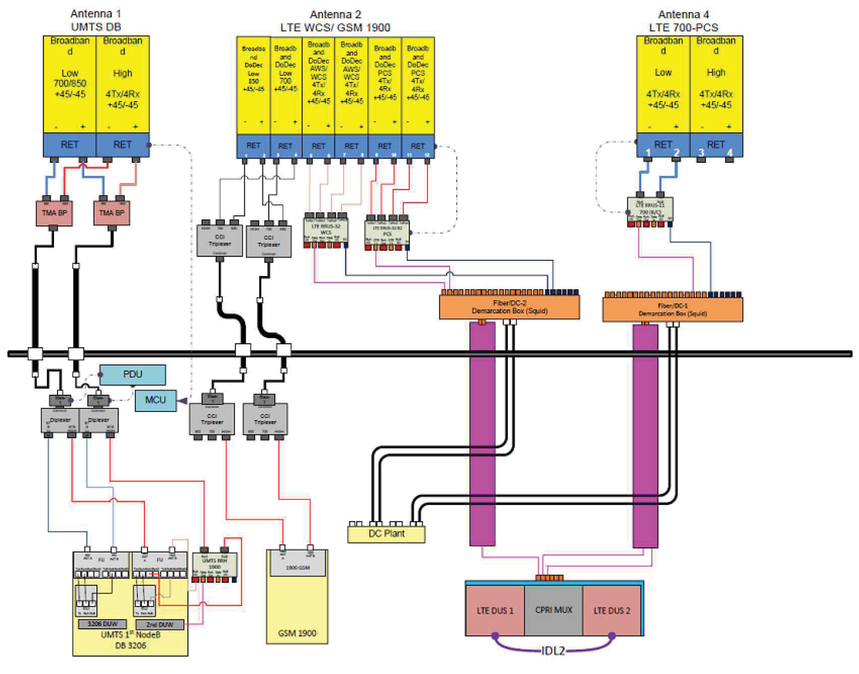
GROUND RISER DIAGRAM | N.T.S | 2



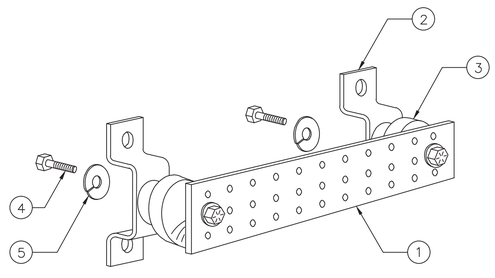
NOTE:

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 DETAILS | N.T.S | 3



RUN WIRING DIAGRAM | N.T.S | 4



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅜"-11x1" H.H.C.S.
5	4	⅜" 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 DETAILS | N.T.S | 5

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PLANS PREPARED BY:
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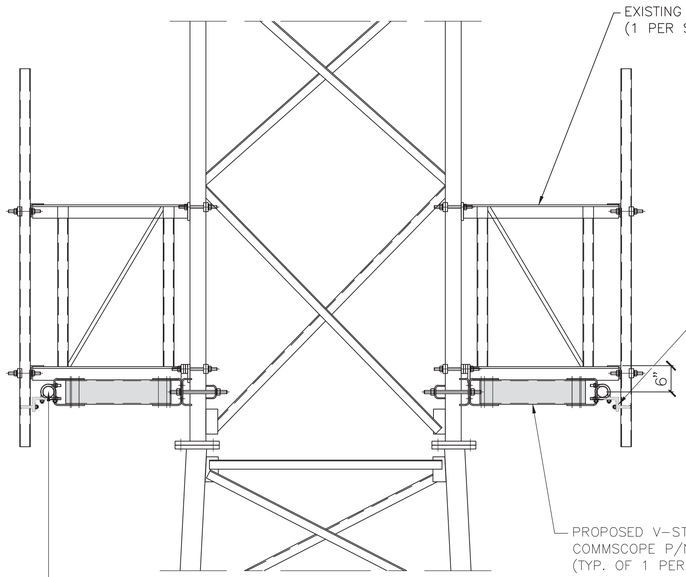
SHEET TITLE:

GROUNDING, ONE-LINE DIAGRAM & DETAILS

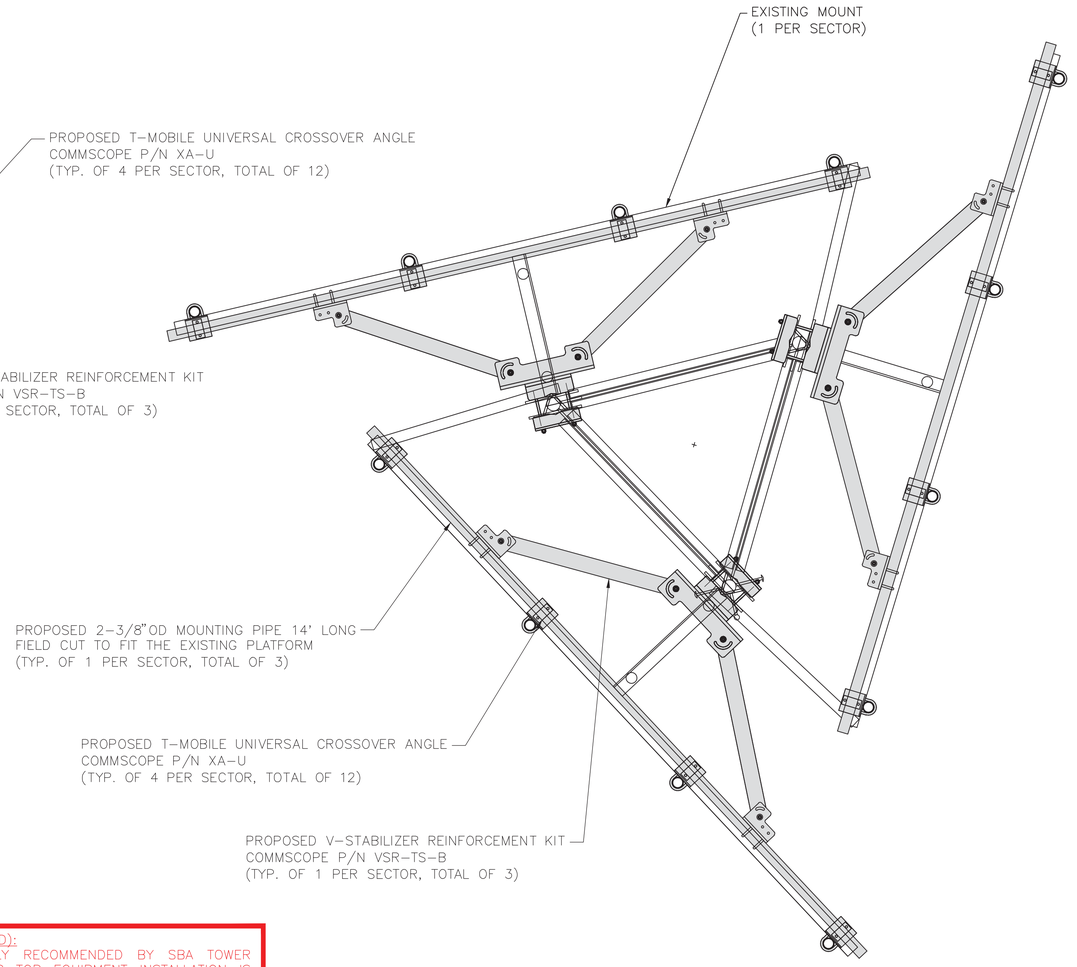
SHEET NUMBER:

G-1

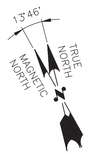


ELEVATION VIEW

PROPOSED 2-3/8"OD MOUNTING PIPE 14' LONG
FIELD CUT TO FIT THE EXISTING PLATFORM
(TYP. OF 1 PER SECTOR, TOTAL OF 3)



PLAN VIEW



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MOUNT REINFORCING

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1' 6" 0" 1'

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Sole Proprietor - Independent Engineer
18391 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

MOUNT REINFORCING
@ 162.0'

SHEET NUMBER:

S-1