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

September 14, 2018

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

Notice of Exempt Modification
2895 State Street, Hamden, CT
41 21 36.03 N
-72 53 8.5 W
T-Mobile #: CT11611B_L600

Dear Ms. Bachman:

T-Mobile currently maintains antennas at the 128-foot level of the existing 136-foot Monopole Tower at 2895 State Street in Hamden, CT. The property is owned by Joseph J. Farricielli. The Tower is owned by SBA 2012 TC Assets, LLC. T-Mobile now intends to replace (6) existing cell antennas with (6) newer technology cell antennas at the 128-foot level of the tower. The proposed full scope of work is as follows:

Remove:

- (1) 1-5/8" fiber

Remove and Replace:

- Remove: (3) Ericsson Air21 B4A/B2P – Panel Antennas
  - Replace with: (3) RFS - APXVAARR24_43-U-NA20 (Octa) – Panel Antennas
- Remove: (3) Commscope LNX-6515DS-A1M – Panel Antennas
  - Replace with: (3) Ericsson - Air 32 KRD901146-1_B66A_B2A (Octo)- Panel Antennas
- Remove: (3) Ericsson KRY 112 144/1 TMAs
  - Replace with: (3) Ericsson - KRY 112 144/2 – TMAs
- Remove: (3) Ericsson S11B12 RRUs
  - Replace with: (3) Ericsson - Radio 4449 B71 + B12 – RRUs
- Remove: (1) platform
  - Replace with: (1) platform with SitePro RMQP-496 HRK

Install:

- (3) 1-1/4" hybrid

Existing Equipment to Remain (Including entitlements):

- (3) Ericsson - AIR 21 B2A/B4P – Panel Antennas
- (12) 1-5/8" lines
- (1) Low Profile Platform

This facility was approved prior to the Council's jurisdiction. The Town Planning and Zoning Department does not have record of the tower's original approval from 1999 and does not indicate any known tower conditions having been set. The Town Clerk's office has provided land records but unfortunately, they do not point to the original approval by date or type. As such, the modification is in full compliance with all known tower conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16.50j-72(b)(2). In accordance with R.C.S.A. § 16.50j-73, a copy of this letter is being sent to the Town's Mayor, Curt Lang, and Town Planner, Daniel Kops, Jr., as well as to the Property Owner. (Separate notice is not being sent to the tower owner, as it belongs to SBA.)

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

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

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

Sincerely,

Kri Pelletier
Property Specialist
SBA COMMUNICATIONS CORPORATION
134 Flanders Rd., Suite 125
Westborough, MA 01581
508.251.0720 x3804 + T - 508.366.2610 + F - kpelletier@sbasite.com

Attachments
cc: Curt B. Leng, Mayor / with attachments
Town of Hamden, Office of the Mayor, 2750 Dixwell Avenue, Hamden, CT 06518
Daniel Kops, Jr., Town Planner / with attachments
Town of Hamden, Planning & Zoning Dept., 2750 Dixwell Avenue, Hamden, CT 06518
Joseph J. Farricielli / with attachments
108 Cherry Hill Road Branford CT 06405

POWER DENSITY

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A	Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A	Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	128 feet	Height (AGL):	128 feet	Height (AGL):	128 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	7,780.90	ERP (W):	7,780.90	ERP (W):	7,780.90
Antenna A1 MPE%	**1.88**	Antenna B1 MPE%	**1.88**	Antenna C1 MPE%	**1.88**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	128 feet	Height (AGL):	128 feet	Height (AGL):	128 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power(W):	95	Total TX Power(W):	95	Total TX Power(W):	95
ERP (W):	3,695.93	ERP (W):	3,695.93	ERP (W):	3,695.93
Antenna A2 MPE%	**0.89**	Antenna B2 MPE%	**0.89**	Antenna C2 MPE%	**0.89**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd
Height (AGL):	128 feet	Height (AGL):	128 feet	Height (AGL):	128 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,443.03	ERP (W):	2,443.03	ERP (W):	2,443.03
Antenna A3 MPE%	**1.40**	Antenna B3 MPE%	**1.40**	Antenna C3 MPE%	**1.40**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**4.17 %**
Verizon Wireless	**2.63 %**
Site Total MPE %:	**6.80 %**

T-Mobile Sector A Total:	4.17 %
T-Mobile Sector B Total:	4.17 %
T-Mobile Sector C Total:	4.17 %
Site Total:	6.80 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile_Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	128	7.52	PCS - 1900 MHz	1000.00	0.75%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	128	11.28	AWS - 2100 MHz	1000.00	1.13%
T-Mobile PCS - 1900 MHz UMTS	1	1,556.18	128	3.76	PCS - 1900 MHz	1000.00	0.37%
T-Mobile PCS - 1900 MHz GSM	1	583.57	128	1.41	PCS - 1900 MHz	1000.00	0.14%
T-Mobile AWS - 2100 MHz UMTS	1	1,556.18	128	3.76	AWS - 2100 MHz	1000.00	0.38%
T-Mobile 600 MHz LTE	2	788.97	128	3.81	600 MHz	400.00	0.95%
T-Mobile 700 MHz LTE	2	432.54	128	2.09	700 MHz	467.00	0.45%
						Total:	**4.17%**

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

2895 STATE ST

Location	2895 STATE ST	**Mblu**	2432/ 021/ / /
Acct#		**Owner**	FARRICIELLI JOSEPH J
Assessment	$696,220	**Appraisal**	$994,600
PID	100130	**Building Count**	4

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$219,000	$775,600	$994,600
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$153,300	$542,920	$696,220

Owner of Record

Owner	FARRICIELLI JOSEPH J	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	108 CHERRY HILL RD BRANFORD, CT 06405	**Book & Page**	4077/ 44
		Sale Date	08/28/2013

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
FARRICIELLI JOSEPH J	$0		4077/ 44	08/28/2013
STATE FIVE INDUSTRIAL PARK INC	$0		2411/ 128	03/10/2003
LOOK INVESTMENT AGENCY INC	$0		1558/ 18	03/14/1996
FARRICIELLI JOSEPH J	$0		669/ 436	07/08/1981

Building Information

Building 1 : Section 1

Year Built: 1935
Living Area: 956
Building Percent Good: 43

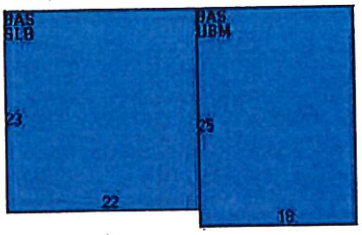
Building Attributes	
Field	**Description**
STYLE	Office Bldg
MODEL	Comm/Ind

Building Photo

Grade	D
Stories:	1
Occupancy	1
Exterior Wall 1	Brick Veneer
Exterior Wall 2	
Roof Structure	Gable/Hip
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	SAND&GRAVL M94
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	410C
Heat/AC	HEAT/AC PKGS
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	CEIL & WALLS
Rooms/Prtns	AVERAGE
Wall Height	10
% Comn Wall	0

(http://images.vgsl.com/photos2/HamdenCTPhotos//\00\02\75/32.jpg)

Building Layout



(http://images.vgsl.com/photos2/HamdenCTPhotos//Sketches/

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	956	956
SLB	Slab	0	0
UBM	Basement, Unfinished	450	0
		1,406	956

Building 2 : Section 1

Year Built: 1935
Living Area: 5,576
Building Percent Good: 33

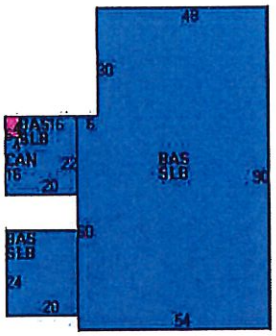
Building Photo

Building Attributes : Bldg 2 of 4	
Field	Description
STYLE	Service Shop
MODEL	Ind/Comm
Grade	C
Stories:	1
Occupancy	2
Exterior Wall 1	Brick Masonry

Exterior Wall 2	
Roof Structure	Irregular
Roof Cover	Asphalt
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Oil
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	SAND&GRAVL M96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	4100
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	15
% Comn Wall	0

(http://Images.vgsi.com/photos2/HamdenCTPhotos//\00\02\75/33.jpg)

Building Layout



(http://Images.vgsi.com/photos2/HamdenCTPhotos//Sketches/

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	5,576	5,576
CAN	Canopy	24	0
SLB	Slab	0	0
		5,600	5,576

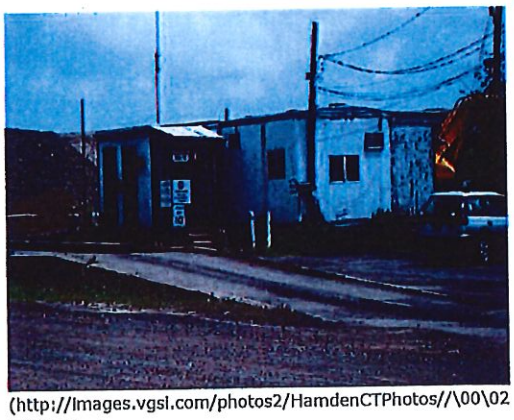
Building 3 : Section 1

Year Built: 1990
Living Area: 1,256
Building Percent Good: 47

Building Photo

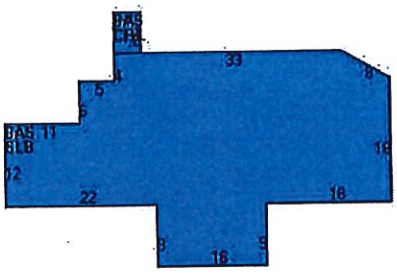
Building Attributes : Bldg 3 of 4	
Field	Description
STYLE	Office Bldg
MODEL	Comm/Ind
Grade	D
Stories:	1
Occupancy	1
Exterior Wall 1	Pre-Fab Wood

Exterior Wall 2	Pre-finsh Metl
Roof Structure	Gable/Hip
Roof Cover	Metal/Tin
Interior Wall 1	Plywood Panel
Interior Wall 2	Drywall
Interior Floor 1	Vinyl/Asphalt
Interior Floor 2	
Heating Fuel	Electric
Heating Type	Electr Basebrd
AC Type	None
Bldg Use	SAND&GRAVL M94
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	410C
Heat/AC	NONE
Frame Type	WOOD FRAME
Baths/Plumbing	AVERAGE
Ceiling/Wall	CEIL & WALLS
Rooms/Prtns	AVERAGE
Wall Height	8
% Comn Wall	0



(http://Images.vgsi.com/photos2/HamdenCTPhotos//\00\02\75/34.jpg)

Building Layout



(http://Images.vgsi.com/photos2/HamdenCTPhotos//Sketches,

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	1,256	1,256
CRL	Crawl Space	24	0
SLB	Slab	0	0
		1,280	1,256

Building 4 : Section 1

Year Built: 2002
Living Area: 210
Building Percent Good: 91

Building Photo

Building Attributes : Bldg 4 of 4	
Field	Description
STYLE	Pre-Eng Warehs
MODEL	Ind/Comm
Grade	C
Stories:	1
Occupancy	1
Exterior Wall 1	Precast Panel

Exterior Wall 2	
Roof Structure	Steel Frm/Trus
Roof Cover	Metal/Tin
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	None
Heating Type	None
AC Type	None
Bldg Use	TEL REL TW M96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	4310
Heat/AC	NONE
Frame Type	STEEL
Baths/Plumbing	NONE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	8
% Comn Wall	

(http://images.vgsi.com/photos2/HamdenCTPhotos//\00\02\01/48.jpg)

Building Layout

(http://images.vgsi.com/photos2/HamdenCTPhotos//Sketches/1C

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	210	210
SLB	Slab	210	0
		420	210

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
A/C	AIR CONDITIONING	1256 S.F.	$1,200	3

Land

Land Use

Use Code	410C
Description	SAND&GRAVL M94
Zone	T4
Neighborhood	W3
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	24.67
Frontage	
Depth	
Assessed Value	$542,920
Appraised Value	$775,600

Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
FN8	W/O TOP RL-6'			220 L.F.	$1,100	4
SCL2	SCALES-ELECT			65 TONS	$25,000	1
LT2	W/DOUBLE LIGHT			5 UNITS	$2,800	1
LT1	LIGHTS-IN W/PL			2 UNITS	$700	1
PAV1	PAVING-ASPHALT			4000 S.F.	$2,700	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2017	$219,000	$775,600	$994,600
2016	$219,000	$775,600	$994,600
2015	$219,000	$775,600	$994,600

Assessment			
Valuation Year	Improvements	Land	Total
2017	$153,300	$542,920	$696,220
2016	$153,300	$542,920	$696,220
2015	$153,300	$542,920	$696,220

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11611B

Nextel Monopole Hamden
2895 State Road
Hamden, CT 06517

August 31, 2018

EBI Project Number: 6218005998

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	6.80 %

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

EBI Consulting
environmental | engineering | due diligence

August 31, 2018

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

Emissions Analysis for Site: **CT11611B – Nextel Monopole Hamden**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **2895 State Road, Hamden, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

General population/uncontrolled exposure limits apply to situations in which the general population 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 population 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 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) frequency 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 T-Mobile Wireless antenna facility located at **2895 State Road, Hamden, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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) 1 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.

2) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

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

8) For the following calculations the sample point was the top of a 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 for directional panel antennas, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antennas used in this modeling are the **Ericsson AIR32 KRD901146-1 B66A/B2A** & **Ericsson AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **RFS APXVAARR24_43-U-NA20** for 600 MHz and 700 MHz channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antenna mounting height centerline of the proposed antennas is **128 feet** above ground level (AGL).

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

12) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A	Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A	Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	128 feet	Height (AGL):	128 feet	Height (AGL):	128 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	7,780.90	ERP (W):	7,780.90	ERP (W):	7,780.90
Antenna A1 MPE%	**1.88**	Antenna B1 MPE%	**1.88**	Antenna C1 MPE%	**1.88**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	128 feet	Height (AGL):	128 feet	Height (AGL):	128 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power(W):	95	Total TX Power(W):	95	Total TX Power(W):	95
ERP (W):	3,695.93	ERP (W):	3,695.93	ERP (W):	3,695.93
Antenna A2 MPE%	**0.89**	Antenna B2 MPE%	**0.89**	Antenna C2 MPE%	**0.89**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd
Height (AGL):	128 feet	Height (AGL):	128 feet	Height (AGL):	128 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,443.03	ERP (W):	2,443.03	ERP (W):	2,443.03
Antenna A3 MPE%	**1.40**	Antenna B3 MPE%	**1.40**	Antenna C3 MPE%	**1.40**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**4.17 %**
Verizon Wireless	**2.63** %
Site Total MPE %:	**6.80 %**

T-Mobile Sector A Total:	4.17 %
T-Mobile Sector B Total:	4.17 %
T-Mobile Sector C Total:	4.17 %
Site Total:	6.80 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _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
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	128	7.52	PCS - 1900 MHz	1000.00	0.75%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	128	11.28	AWS - 2100 MHz	1000.00	1.13%
T-Mobile PCS - 1900 MHz UMTS	1	1,556.18	128	3.76	PCS - 1900 MHz	1000.00	0.37%
T-Mobile PCS - 1900 MHz GSM	1	583.57	128	1.41	PCS - 1900 MHz	1000.00	0.14%
T-Mobile AWS - 2100 MHz UMTS	1	1,556.18	128	3.76	AWS - 2100 MHz	1000.00	0.38%
T-Mobile 600 MHz LTE	2	788.97	128	3.81	600 MHz	400.00	0.95%
T-Mobile 700 MHz LTE	2	432.54	128	2.09	700 MHz	467.00	0.45%
						Total:	**4.17%**

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	4.17 %
Sector B:	4.17 %
Sector C:	4.17 %
T-Mobile Maximum MPE % (Per Sector):	4.17 %
Site Total:	6.80 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **6.80%** of the allowable FCC established general population 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.

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Structural Analysis Report

Existing 136 ft EEI Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT46137-A

Customer Site Name: Hamden-State St

Carrier Name: T-Mobile

Carrier Site ID / Name: CT11611B / Nextel Monopole Hamden

Site Location: 2895 State Street

Hamden, Connecticut

New Haven County

Latitude: 41.360008

Longitude: -72.885694

8/24/18

Analysis Result:

Max Structural Usage: 75.9% [Pass]

Max Foundation Usage: 74.7% [Pass]

Additional Usage Caused by New Mount: + 5.8%

Report Prepared by: Matthew Baker

Introduction

The purpose of this report is to summarize the analysis results on the 136 ft EEI Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Engineered Endeavors Incorporated (Job No. 5315-P01) Structure & Foundation Design Calculations dated August 16. 1999
Foundation Drawing	N/A
Geotechnical Report	Dr. Clarence Welti, P.E., P.C., Project Name: Nextel Tower Site, dated 5/27/1999
Modification Drawings	N/A

Analysis Criteria

The feasibility analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-G**.** In accordance with this standard, the structure was analyzed using **TESPoles,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed V_{ult} = 125.0 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 97.0 mph (3-Sec. Gust)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 3/4" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2012 IBC / 2016 Connecticut State Building Code
Exposure Category:	C
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft
Seismic Parameters:	S_S = 0.186, S_1 = 0.062

This structural analysis is based upon the tower being classified as a Structure Class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	136.0	6	Andrew HBX-6517DS-VTM - Panel	Low Profile Platform	(2) 1 5/8" Fiber	Verizon
2		6	Andrew LNX-6514DS-VTM - Panel			
3		3	Alcatel Lucent RRH-2X40-700U RRHs			
4		3	Alcatel Lucent RRH-2X40-AWS RRHs			
-	128.0	3	Ericsson Air21 B2A/B4P - Panel	Low Profile Platform	(12) 1 5/8" (1) 1 5/8" Fiber	T-Mobile
-		3	Ericsson Air21 B4A/B2P - Panel			
-		3	Commscope LNX-6515DS-A1M - Panel			
-		3	Ericsson KRY 112 144/1 TMA			
-		3	Ericsson S11B12 RRU			

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
5	128.0	3	Ericsson - AIR 21 B2A/B4P - Panel	Platform w/ Hand Rail (SitePro RMQP-496-HK)	(12) 1 5/8" (3) 1-1/4" Hybrid	T-Mobile
6		3	RFS - APXVAARR24_43-U-NA20 (Octa) - Panel			
7		3	Ericsson - Air 32 KRD901146-1_B66A_B2A (Octo)- Panel			
8		3	Ericsson - KRY 112 144/2 - TMA			
10		3	Ericsson - Radio 4449 B71 + B12 - RRU			

All transmission lines are considered running inside of the pole shafts.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**65.9%**	**54.5%**	**75.9%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Original Design Reactions	2324.8	21.8	26.9
Analysis Reactions	2310.7	21.9	23.3
Factored Reactions*	3138.5	29.4	36.2
% of Design Reactions	73.6%	74.7%	64.4%

* Per section 15.5.1 of the TIA-222-G standard, factored reactions were obtained by multiplying a 1.35 factor to the original design reactions.

A foundation reactions comparison was performed between the original design reactions and the current analysis reactions. Since the reactions calculated from the current analysis are less than those indicated on the original structural design drawing, the foundations are assumed to be adequate to resist the reactions from the current analysis.

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-G for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 1.6476 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-G Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The analysis is based on the presumption that the tower members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.

3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion.

4. An initial tension of 10% of the break strength on all the existing guy wires was assumed in all the structural analyses of guyed towers unless different values were provided by the client. **TES** cannot take responsibility for the deviations in the analysis results because of differences in the initial tension forces of the existing guy wires.

5. Secondary component or connection secondary components, welds and bolts are assumed to be able to carry their intended original design loads. **TES** cannot take responsibility for verification of the adequacy on the connections, bolts and welds present in the structure.

6. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

7. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

8. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

9. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Ratio 65.91% at 92.0ft

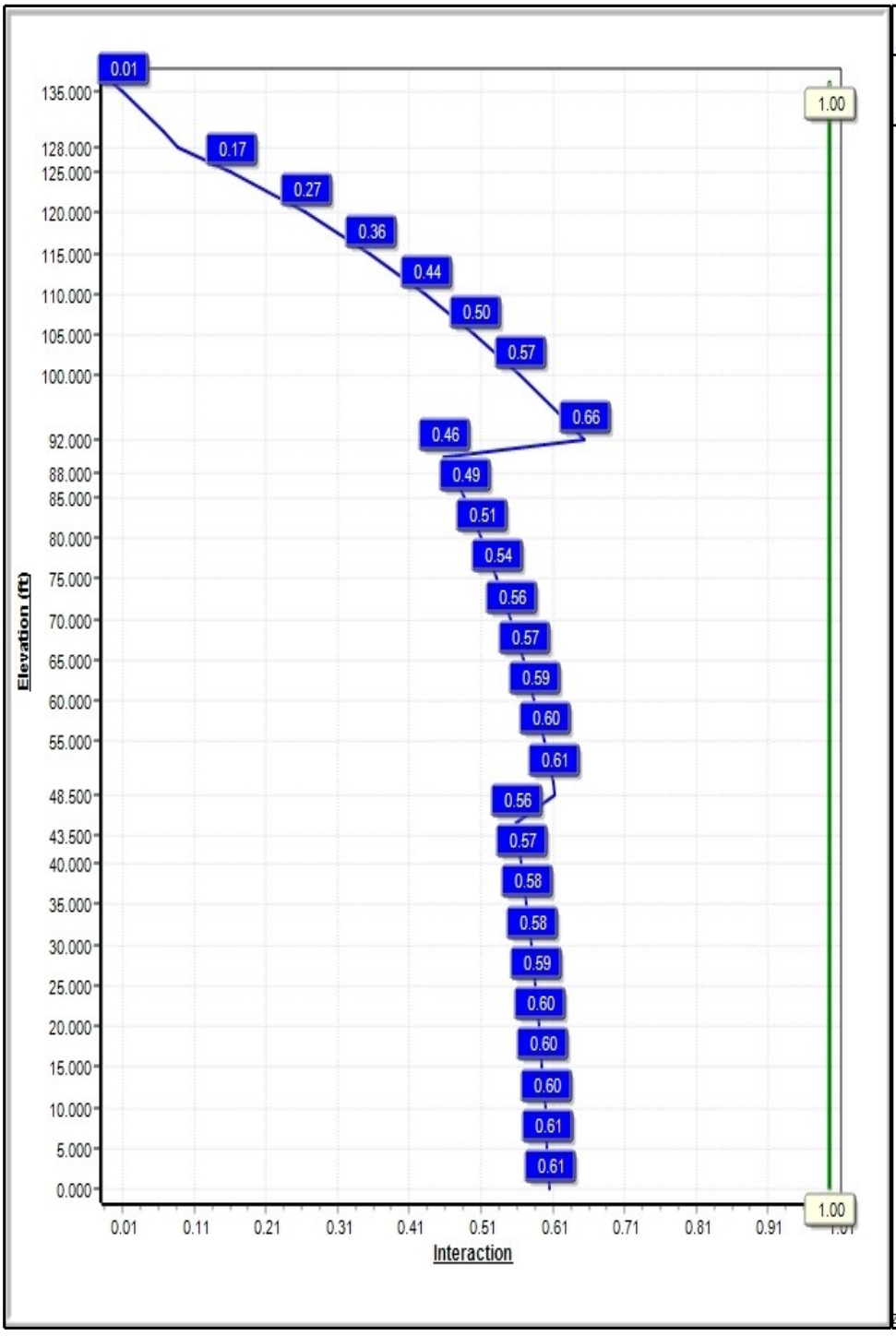
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018
Site Name:	Hamden-State St	**Exposure:**	C	
Height:	136.00 (ft)	**Gh:**	1.1	
Base Elev:	0.000 (ft)			Page: 1

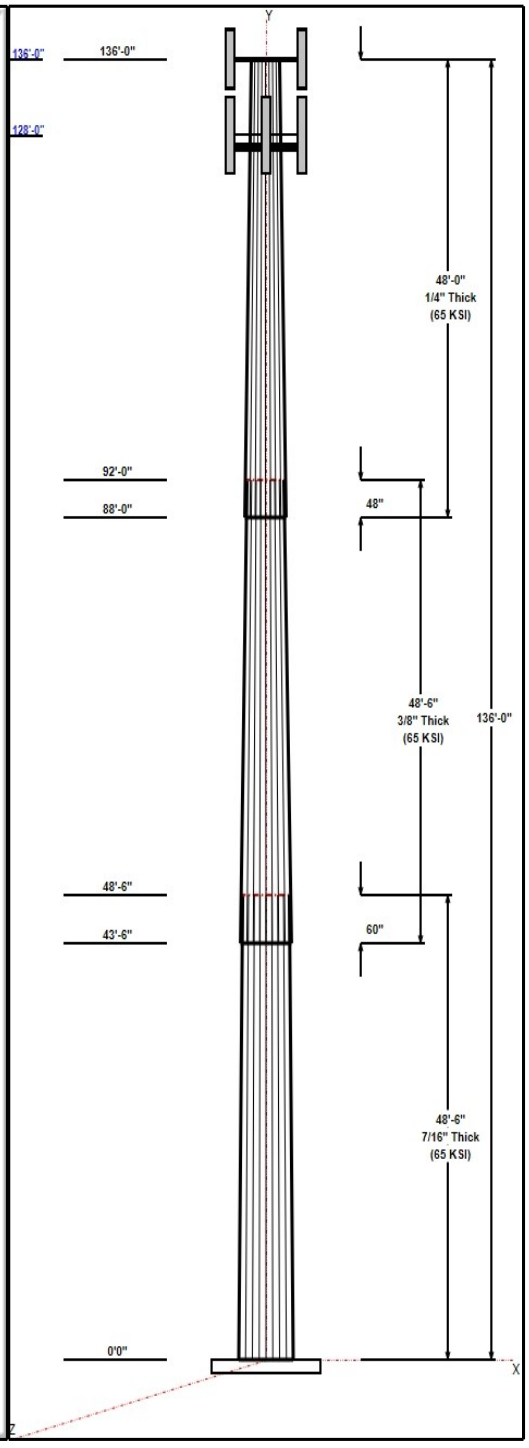
Tower Engineering Solutions

Dead Load Factor:	1.20
Wind Load Factor:	1.60

Load Case : 1.2D + 1.6W 97 mph Wind

Iterations: 25





Structure: CT46137-A-SBA

Type: Tapered
Site Name: Hamden-State St
Height: 136.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.18566

8/24/2018

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	48.50	34.00	43.00	0.438		0.18566	65
2	48.50	26.67	35.67	0.375	Slip	0.18566	65
3	48.00	19.00	27.91	0.250	Slip	0.18566	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
136.00	136.00	6	LNX-6514DS-VTM	Verizon
136.00	136.00	6	HBX-6517DS-VTM	Verizon
136.00	136.00	3	RRH-2X40-700U	Verizon
136.00	136.00	3	RRH-2X40-AWS	Verizon
136.00	136.00	1	Low Profile Platform	Verizon
128.00	128.00	1	RMQP-496-HK	T-Mobile
128.00	128.00	3	RFS -	T-Mobile
128.00	128.00	3	Ericsson - Air 32	T-Mobile
128.00	128.00	3	Ericsson - KRY 112 144/2	T-Mobile
128.00	128.00	3	Ericsson - Radio 4449 B71	T-Mobile
128.00	128.00	3	Ericsson - Air21 B2A/B4P	T-Mobile

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	136.00	Inside	1 5/8" Fiber	Verizon
0.00	128.00	Inside	1 5/8" Coax	T-Mobile
0.00	128.00	Inside	1-1/4" Hybrid	T-Mobile

Anchor Bolts

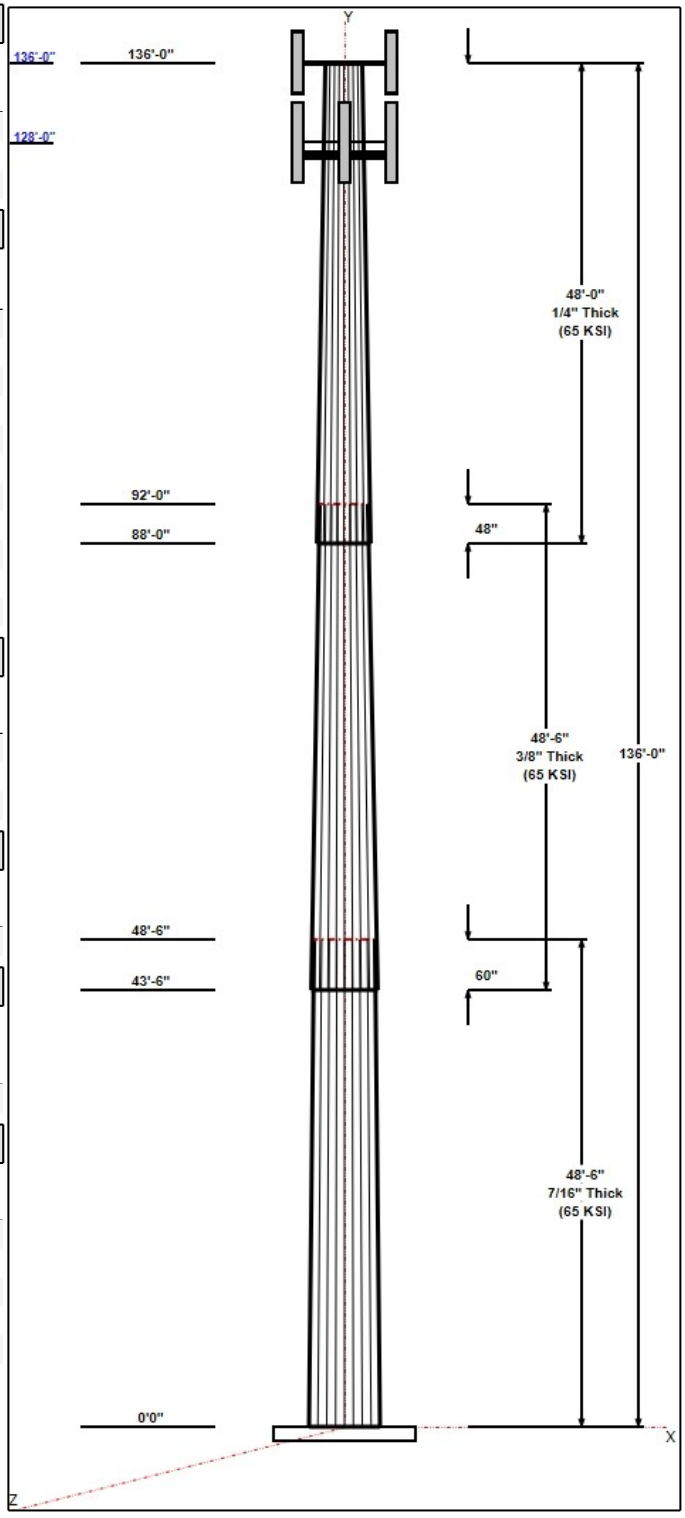
Qty	Specifications	Grade (ksi)	Arrangement
16	2.25" 18J	75.0	Radial

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.0000	57.0	60.0	Round

Reactions

Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 97 mph Wind	2310.7	21.9	31.1
0.9D + 1.6W 97 mph Wind	2283.1	21.9	23.3
1.2D + 1.0Di + 1.0Wi 50 mph Wind	641.2	6.2	46.7
1.2D + 1.0E	197.9	1.7	31.2
0.9D + 1.0E	195.3	1.7	23.4
1.0D + 1.0W 60 mph Wind	549.2	5.2	26.0



Structure: CT46137-A-SBA - Coax Line Placement

Type: Monopole
Site Name: Hamden-State St
Height: 136.00 (ft)

8/24/2018

Tower Engineering Solutions

Shaft Properties

Structure:	CT46137-A-SBA		**Code:**	EIA/TIA-222-G	8/24/2018
Site Name:	Hamden-State St		**Exposure:**	C	
Height:	136.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 4

Tower Engineering Solutions

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	48.500	0.4375	65		0.00	8,722
2	18	48.500	0.3750	65	Slip	60.00	6,049
3	18	48.000	0.2500	65	Slip	48.00	3,007
					Total Shaft Weight:		**17,779**

	Bottom						Top						
Sec. No.	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Taper**
1	43.00	0.00	59.10	13527.07	15.92	98.29	34.00	48.50	46.60	6629.90	12.29	77.70	0.185662
2	35.67	43.50	42.01	6613.82	15.36	95.13	26.67	92.00	31.30	2733.70	11.13	71.12	0.185662
3	27.91	88.00	21.95	2121.90	18.28	111.65	19.00	136.00	14.88	660.83	11.99	76.00	0.185662

Load Summary

Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 5	

Tower Engineering Solutions

Discrete Appurtenances

				No Ice			Ice				
No.	Elev (ft)	Description	Qty	Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
1	136.00	LNX-6514DS-VTM	6	33.10	8.09	0.80	206.11	10.858	0.80	0.00	0.00
2	136.00	HBX-6517DS-VTM	6	18.70	5.29	0.75	138.37	6.564	0.75	0.00	0.00
3	136.00	RRH-2X40-700U	3	50.00	2.48	0.93	122.86	3.627	0.93	0.00	0.00
4	136.00	RRH-2X40-AWS	3	44.00	2.52	0.82	104.13	3.731	0.82	0.00	0.00
5	136.00	Low Profile Platform	1	1500.00	22.00	1.00	2796.15	39.489	1.00	0.00	0.00
6	128.00	RMQP-496-HK	1	2449.00	48.00	1.00	4973.07	80.981	1.00	0.00	0.00
7	128.00	RFS - APXVAARR24_43-U-NA20	3	128.00	20.24	0.70	580.06	22.104	0.72	0.00	0.00
8	128.00	Ericsson - Air 32	3	132.20	6.51	0.86	304.42	7.610	0.88	0.00	0.00
9	128.00	Ericsson - KRY 112 144/2 - TMA	3	11.00	0.41	0.50	21.61	0.878	0.50	0.00	0.00
10	128.00	Ericsson - Radio 4449 B71 + B12 -	3	70.00	1.65	0.67	136.90	2.178	0.67	0.00	0.00
11	128.00	Ericsson - Air21 B2A/B4P	3	123.00	11.54	0.89	403.03	13.172	0.89	0.00	0.00
		Totals:	**35**	**5,934.40**			**14,855.10**				

Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
0.00	136.00	(2) 1 5/8" Fiber	0.00	Inside
0.00	128.00	(12) 1 5/8" Coax	0.00	Inside
0.00	128.00	(3) 1-1/4" Hybrid	0.00	Inside

Shaft Section Properties

Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 6	

Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.4375	43.000	59.101	13527.1	15.92	98.29	82.5	619.6	0.0
5.00		0.4375	42.072	57.812	12661.1	15.55	96.16	82.5	592.7	994.6
10.00		0.4375	41.143	56.523	11833.0	15.17	94.04	82.5	566.5	972.6
15.00		0.4375	40.215	55.234	11041.7	14.80	91.92	82.5	540.8	950.7
20.00		0.4375	39.287	53.945	10286.6	14.42	89.80	82.5	515.7	928.8
25.00		0.4375	38.358	52.656	9566.7	14.05	87.68	82.5	491.2	906.9
30.00		0.4375	37.430	51.367	8881.1	13.67	85.55	82.5	467.3	884.9
35.00		0.4375	36.502	50.078	8229.2	13.30	83.43	82.5	444.0	863.0
40.00		0.4375	35.574	48.789	7609.9	12.93	81.31	82.5	421.3	841.1
43.50	Bot - Section 2	0.4375	34.924	47.887	7195.5	12.66	79.83	82.5	405.8	575.7
45.00		0.4375	34.645	47.500	7022.6	12.55	79.19	82.5	399.2	457.0
48.50	Top - Section 1	0.3750	34.745	40.908	6105.6	14.93	92.65	0.0	0.0	1052.1
50.00		0.3750	34.467	40.576	5958.4	14.80	91.91	82.5	340.5	208.0
55.00		0.3750	33.539	39.472	5484.8	14.36	89.44	82.5	322.1	681.0
60.00		0.3750	32.610	38.367	5037.0	13.92	86.96	82.5	304.2	662.2
65.00		0.3750	31.682	37.262	4614.2	13.49	84.49	82.5	286.9	643.4
70.00		0.3750	30.754	36.157	4215.8	13.05	82.01	82.5	270.0	624.6
75.00		0.3750	29.825	35.052	3841.0	12.61	79.53	82.5	253.7	605.8
80.00		0.3750	28.897	33.947	3489.1	12.18	77.06	82.5	237.8	587.0
85.00		0.3750	27.969	32.842	3159.4	11.74	74.58	82.5	222.5	568.2
88.00	Bot - Section 3	0.3750	27.412	32.179	2971.9	11.48	73.10	82.5	213.5	331.9
90.00		0.3750	27.040	31.737	2851.2	11.30	72.11	82.5	207.7	365.9
92.00	Top - Section 2	0.2500	27.169	21.360	1955.5	17.75	108.68	0.0	0.0	360.9
95.00		0.2500	26.612	20.918	1836.6	17.36	106.45	81.0	135.9	215.8
100.00		0.2500	25.684	20.181	1649.4	16.70	102.74	81.8	126.5	349.6
105.00		0.2500	24.756	19.444	1475.3	16.05	99.02	82.5	117.4	337.1
110.00		0.2500	23.827	18.708	1313.9	15.39	95.31	82.5	108.6	324.6
115.00		0.2500	22.899	17.971	1164.7	14.74	91.60	82.5	100.2	312.0
120.00		0.2500	21.971	17.235	1027.3	14.09	87.88	82.5	92.1	299.5
125.00		0.2500	21.042	16.498	901.1	13.43	84.17	82.5	84.3	287.0
128.00		0.2500	20.485	16.056	830.6	13.04	81.94	82.5	79.9	166.2
130.00		0.2500	20.114	15.761	785.7	12.78	80.46	82.5	76.9	108.3
135.00		0.2500	19.186	15.025	680.7	12.12	76.74	82.5	69.9	261.9
136.00		0.2500	19.000	14.878	660.8	11.99	76.00	82.5	68.5	50.9
										17778.7

Wind Loading - Shaft

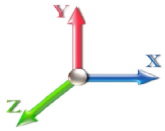
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 7	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	19.450	21.40	325.40	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.450	21.40	318.37	0.650	0.000	5.00	17.997	11.70	400.4	0.0	1193.5
10.00		1.00	0.85	19.450	21.40	311.35	0.650	0.000	5.00	17.604	11.44	391.7	0.0	1167.2
15.00		1.00	0.85	19.450	21.40	304.32	0.650	0.000	5.00	17.211	11.19	383.0	0.0	1140.9
20.00		1.00	0.90	20.638	22.70	306.24	0.650	0.000	5.00	16.818	10.93	397.1	0.0	1114.5
25.00		1.00	0.95	21.630	23.79	306.11	0.650	0.000	5.00	16.426	10.68	406.5	0.0	1088.2
30.00		1.00	0.98	22.477	24.72	304.49	0.650	0.000	5.00	16.033	10.42	412.3	0.0	1061.9
35.00		1.00	1.01	23.218	25.54	301.80	0.650	0.000	5.00	15.640	10.17	415.4	0.0	1035.6
40.00		1.00	1.04	23.880	26.27	298.28	0.650	0.000	5.00	15.247	9.91	416.5	0.0	1009.3
43.50	Bot - Section 2	1.00	1.06	24.305	26.74	295.43	0.650	0.000	3.50	10.439	6.79	290.3	0.0	690.8
45.00		1.00	1.07	24.479	26.93	294.12	0.650	0.000	1.50	4.510	2.93	126.3	0.0	548.4
48.50	Top - Section 1	1.00	1.09	24.869	27.36	290.89	0.650	0.000	3.50	10.387	6.75	295.5	0.0	1262.6
50.00		1.00	1.09	25.029	27.53	295.87	0.650	0.000	1.50	4.393	2.86	125.8	0.0	249.5
55.00		1.00	1.12	25.536	28.09	290.81	0.650	0.000	5.00	14.386	9.35	420.3	0.0	817.2
60.00		1.00	1.14	26.008	28.61	285.36	0.650	0.000	5.00	13.994	9.10	416.4	0.0	794.6
65.00		1.00	1.16	26.450	29.09	279.58	0.650	0.000	5.00	13.601	8.84	411.5	0.0	772.0
70.00		1.00	1.17	26.866	29.55	273.52	0.650	0.000	5.00	13.208	8.59	405.9	0.0	749.5
75.00		1.00	1.19	27.259	29.98	267.19	0.650	0.000	5.00	12.815	8.33	399.6	0.0	726.9
80.00		1.00	1.21	27.632	30.39	260.64	0.650	0.000	5.00	12.423	8.07	392.7	0.0	704.4
85.00		1.00	1.22	27.987	30.79	253.88	0.650	0.000	5.00	12.030	7.82	385.2	0.0	681.8
88.00	Bot - Section 3	1.00	1.23	28.192	31.01	249.74	0.650	0.000	3.00	7.029	4.57	226.7	0.0	398.3
90.00		1.00	1.24	28.325	31.16	246.94	0.650	0.000	2.00	4.692	3.05	152.1	0.0	439.0
92.00	Top - Section 2	1.00	1.24	28.457	31.30	244.11	0.650	0.000	2.00	4.629	3.01	150.7	0.0	433.0
95.00		1.00	1.25	28.650	31.51	244.41	0.650	0.000	3.00	6.826	4.44	223.7	0.0	258.9
100.00		1.00	1.27	28.961	31.86	237.16	0.650	0.000	5.00	11.063	7.19	366.5	0.0	419.5
105.00		1.00	1.28	29.260	32.19	229.77	0.650	0.000	5.00	10.670	6.94	357.2	0.0	404.5
110.00		1.00	1.29	29.548	32.50	222.24	0.650	0.000	5.00	10.278	6.68	347.4	0.0	389.5
115.00		1.00	1.30	29.826	32.81	214.58	0.650	0.000	5.00	9.885	6.43	337.3	0.0	374.4
120.00		1.00	1.32	30.094	33.10	206.81	0.650	0.000	5.00	9.492	6.17	326.8	0.0	359.4
125.00		1.00	1.33	30.354	33.39	198.92	0.650	0.000	5.00	9.099	5.91	316.0	0.0	344.4
128.00	Appurtenance(s)	1.00	1.33	30.506	33.56	194.14	0.650	0.000	3.00	5.271	3.43	184.0	0.0	199.4
130.00		1.00	1.34	30.605	33.67	190.93	0.650	0.000	2.00	3.435	2.23	120.3	0.0	129.9
135.00		1.00	1.35	30.850	33.93	182.85	0.650	0.000	5.00	8.314	5.40	293.4	0.0	314.3
136.00	Appurtenance(s)	1.00	1.35	30.898	33.99	181.22	0.650	0.000	1.00	1.616	1.05	57.1	0.0	61.1
								Totals:	**136.00**			**10,351.4**		**21,334.4**

Discrete Appurtenance Forces

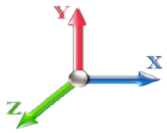
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	136.00	LNX-6514DS-VTM	6	30.898	33.987	0.72	0.90	34.95	238.32	0.000	0.000	1900.50	0.00	0.00
2	136.00	RRH-2X40-AWS	3	30.898	33.987	0.74	0.90	5.58	158.40	0.000	0.000	303.40	0.00	0.00
3	136.00	RRH-2X40-700U	3	30.898	33.987	0.84	0.90	6.23	180.00	0.000	0.000	338.64	0.00	0.00
4	136.00	HBX-6517DS-VTM	6	30.898	33.987	0.68	0.90	21.42	134.64	0.000	0.000	1165.06	0.00	0.00
5	136.00	Low Profile Platform	1	30.898	33.987	1.00	1.00	22.00	1800.00	0.000	0.000	1196.35	0.00	0.00
6	128.00	RMQP-496-HK	1	30.506	33.556	1.00	1.00	48.00	2938.80	0.000	0.000	2577.12	0.00	0.00
7	128.00	Ericsson - Air21 B2A/B4P	3	30.506	33.556	0.71	0.80	24.65	442.80	0.000	0.000	1323.43	0.00	0.00
8	128.00	Ericsson - Radio 4449 B71	3	30.506	33.556	0.54	0.80	2.65	252.00	0.000	0.000	142.45	0.00	0.00
9	128.00	Ericsson - KRY 112 144/2	3	30.506	33.556	0.40	0.80	0.49	39.60	0.000	0.000	26.42	0.00	0.00
10	128.00	Ericsson - Air 32	3	30.506	33.556	0.69	0.80	13.47	475.92	0.000	0.000	723.09	0.00	0.00
11	128.00	RFS -	3	30.506	33.556	0.56	0.80	34.10	460.80	0.000	0.000	1830.85	0.00	0.00
							Totals:		**7,121.28**			**11,527.29**		

Total Applied Force Summary

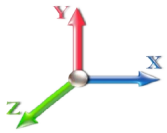
Structure:	CT46137-A-SBA		**Code:**	EIA/TIA-222-G	8/24/2018
Site Name:	Hamden-State St		**Exposure:**	C	
Height:	136.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 9

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		400.45	1298.74	0.00	0.00
10.00		391.71	1272.43	0.00	0.00
15.00		382.97	1246.11	0.00	0.00
20.00		397.07	1219.79	0.00	0.00
25.00		406.45	1193.47	0.00	0.00
30.00		412.26	1167.16	0.00	0.00
35.00		415.42	1140.84	0.00	0.00
40.00		416.54	1114.52	0.00	0.00
43.50		290.27	764.50	0.00	0.00
45.00		126.31	580.01	0.00	0.00
48.50		295.50	1336.25	0.00	0.00
50.00		125.77	281.12	0.00	0.00
55.00		420.27	922.41	0.00	0.00
60.00		416.35	899.85	0.00	0.00
65.00		411.54	877.29	0.00	0.00
70.00		405.94	854.73	0.00	0.00
75.00		399.63	832.18	0.00	0.00
80.00		392.69	809.62	0.00	0.00
85.00		385.15	787.06	0.00	0.00
88.00		226.71	461.41	0.00	0.00
90.00		152.05	481.14	0.00	0.00
92.00		150.71	475.12	0.00	0.00
95.00		223.74	322.10	0.00	0.00
100.00		366.53	524.80	0.00	0.00
105.00		357.17	509.76	0.00	0.00
110.00		347.41	494.72	0.00	0.00
115.00		337.27	479.68	0.00	0.00
120.00		326.79	464.65	0.00	0.00
125.00		315.97	449.61	0.00	0.00
128.00	(16) attachments	6807.30	4872.47	0.00	0.00
130.00		120.28	135.20	0.00	0.00
135.00		293.41	327.48	0.00	0.00
136.00	(19) attachments	4961.05	2575.05	0.00	0.00
	Totals:	**21,878.67**	**31,171.27**	**0.00**	**0.00**

Calculated Forces

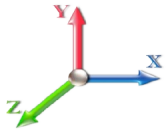
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 25

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-31.12	-21.94	0.00	-2310.7	0.00	2310.70	4390.93	2195.46	7660.90	3836.15	0.00	0.000	0.000	0.610
5.00	-29.74	-21.67	0.00	-2200.9	0.00	2200.98	4295.16	2147.58	7328.71	3669.80	0.13	-0.237	0.000	0.607
10.00	-28.38	-21.39	0.00	-2092.6	0.00	2092.66	4199.39	2099.69	7003.88	3507.15	0.50	-0.478	0.000	0.604
15.00	-27.04	-21.11	0.00	-1985.7	0.00	1985.73	4103.62	2051.81	6686.41	3348.18	1.14	-0.724	0.000	0.600
20.00	-25.74	-20.80	0.00	-1880.2	0.00	1880.20	4007.85	2003.93	6376.31	3192.89	2.03	-0.973	0.000	0.595
25.00	-24.46	-20.48	0.00	-1776.1	0.00	1776.17	3912.08	1956.04	6073.57	3041.30	3.18	-1.225	0.000	0.590
30.00	-23.21	-20.15	0.00	-1673.7	0.00	1673.75	3816.32	1908.16	5778.19	2893.39	4.60	-1.482	0.000	0.585
35.00	-22.00	-19.80	0.00	-1573.0	0.00	1573.01	3720.55	1860.27	5490.18	2749.17	6.29	-1.742	0.000	0.578
40.00	-20.82	-19.43	0.00	-1473.9	0.00	1473.99	3624.78	1812.39	5209.53	2608.64	8.26	-2.005	0.000	0.571
43.50	-20.02	-19.16	0.00	-1405.9	0.00	1405.98	3557.74	1778.87	5017.45	2512.46	9.80	-2.194	0.000	0.565
45.00	-19.40	-19.06	0.00	-1377.2	0.00	1377.24	3529.01	1764.51	4936.24	2471.79	10.50	-2.276	0.000	0.563
48.50	-18.03	-18.75	0.00	-1310.5	0.00	1310.54	3039.25	1519.63	4279.34	2142.85	12.24	-2.467	0.000	0.618
50.00	-17.70	-18.67	0.00	-1282.4	0.00	1282.41	3014.63	1507.31	4209.90	2108.08	13.03	-2.550	0.000	0.614
55.00	-16.70	-18.30	0.00	-1189.0	0.00	1189.05	2932.54	1466.27	3982.54	1994.23	15.86	-2.845	0.000	0.602
60.00	-15.73	-17.91	0.00	-1097.5	0.00	1097.57	2850.45	1425.23	3761.50	1883.54	18.99	-3.142	0.000	0.588
65.00	-14.79	-17.53	0.00	-1008.0	0.00	1008.00	2768.37	1384.18	3546.76	1776.02	22.44	-3.439	0.000	0.573
70.00	-13.87	-17.14	0.00	-920.35	0.00	920.35	2686.28	1343.14	3338.33	1671.65	26.20	-3.736	0.000	0.556
75.00	-12.98	-16.76	0.00	-834.63	0.00	834.63	2604.19	1302.10	3136.22	1570.44	30.27	-4.032	0.000	0.537
80.00	-12.12	-16.37	0.00	-750.85	0.00	750.85	2522.10	1261.05	2940.42	1472.40	34.65	-4.326	0.000	0.515
85.00	-11.30	-15.97	0.00	-669.02	0.00	669.02	2440.02	1220.01	2750.93	1377.51	39.33	-4.615	0.000	0.490
88.00	-10.82	-15.73	0.00	-621.12	0.00	621.12	2390.76	1195.38	2640.27	1322.09	42.28	-4.790	0.000	0.474
90.00	-10.32	-15.56	0.00	-589.66	0.00	589.66	2357.93	1178.96	2567.75	1285.78	44.31	-4.906	0.000	0.463
92.00	-9.82	-15.39	0.00	-558.54	0.00	558.54	1547.90	773.95	1709.73	856.14	46.39	-5.020	0.000	0.659
95.00	-9.45	-15.19	0.00	-512.37	0.00	512.37	1524.57	762.29	1648.80	825.63	49.59	-5.187	0.000	0.627
100.00	-8.87	-14.83	0.00	-436.44	0.00	436.44	1484.88	742.44	1548.79	775.55	55.22	-5.555	0.000	0.569
105.00	-8.32	-14.47	0.00	-362.30	0.00	362.30	1444.16	722.08	1450.80	726.48	61.21	-5.899	0.000	0.505
110.00	-7.79	-14.11	0.00	-289.96	0.00	289.96	1389.90	694.95	1342.87	672.43	67.55	-6.214	0.000	0.437
115.00	-7.29	-13.76	0.00	-219.40	0.00	219.40	1335.17	667.59	1238.67	620.26	74.20	-6.489	0.000	0.360
120.00	-6.82	-13.40	0.00	-150.62	0.00	150.62	1280.45	640.22	1138.68	570.19	81.11	-6.715	0.000	0.270
125.00	-6.39	-13.05	0.00	-83.62	0.00	83.62	1225.72	612.86	1042.90	522.23	88.22	-6.878	0.000	0.166
128.00	-2.36	-5.70	0.00	-44.49	0.00	44.49	1192.89	596.44	987.45	494.46	92.55	-6.938	0.000	0.092
130.00	-2.24	-5.57	0.00	-33.08	0.00	33.08	1171.00	585.50	951.33	476.37	95.46	-6.965	0.000	0.071
135.00	-1.95	-5.24	0.00	-5.24	0.00	5.24	1116.28	558.14	863.96	432.62	102.76	-7.000	0.000	0.014
136.00	0.00	-4.96	0.00	0.00	0.00	0.00	1105.33	552.67	846.99	424.13	104.22	-7.001	0.000	0.000

Wind Loading - Shaft

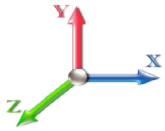
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	19.450	21.40	325.40	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.450	21.40	318.37	0.650	0.000	5.00	17.997	11.70	400.4	0.0	895.1
10.00		1.00	0.85	19.450	21.40	311.35	0.650	0.000	5.00	17.604	11.44	391.7	0.0	875.4
15.00		1.00	0.85	19.450	21.40	304.32	0.650	0.000	5.00	17.211	11.19	383.0	0.0	855.6
20.00		1.00	0.90	20.638	22.70	306.24	0.650	0.000	5.00	16.818	10.93	397.1	0.0	835.9
25.00		1.00	0.95	21.630	23.79	306.11	0.650	0.000	5.00	16.426	10.68	406.5	0.0	816.2
30.00		1.00	0.98	22.477	24.72	304.49	0.650	0.000	5.00	16.033	10.42	412.3	0.0	796.4
35.00		1.00	1.01	23.218	25.54	301.80	0.650	0.000	5.00	15.640	10.17	415.4	0.0	776.7
40.00		1.00	1.04	23.880	26.27	298.28	0.650	0.000	5.00	15.247	9.91	416.5	0.0	757.0
43.50	Bot - Section 2	1.00	1.06	24.305	26.74	295.43	0.650	0.000	3.50	10.439	6.79	290.3	0.0	518.1
45.00		1.00	1.07	24.479	26.93	294.12	0.650	0.000	1.50	4.510	2.93	126.3	0.0	411.3
48.50	Top - Section 1	1.00	1.09	24.869	27.36	290.89	0.650	0.000	3.50	10.387	6.75	295.5	0.0	946.9
50.00		1.00	1.09	25.029	27.53	295.87	0.650	0.000	1.50	4.393	2.86	125.8	0.0	187.2
55.00		1.00	1.12	25.536	28.09	290.81	0.650	0.000	5.00	14.386	9.35	420.3	0.0	612.9
60.00		1.00	1.14	26.008	28.61	285.36	0.650	0.000	5.00	13.994	9.10	416.4	0.0	595.9
65.00		1.00	1.16	26.450	29.09	279.58	0.650	0.000	5.00	13.601	8.84	411.5	0.0	579.0
70.00		1.00	1.17	26.866	29.55	273.52	0.650	0.000	5.00	13.208	8.59	405.9	0.0	562.1
75.00		1.00	1.19	27.259	29.98	267.19	0.650	0.000	5.00	12.815	8.33	399.6	0.0	545.2
80.00		1.00	1.21	27.632	30.39	260.64	0.650	0.000	5.00	12.423	8.07	392.7	0.0	528.3
85.00		1.00	1.22	27.987	30.79	253.88	0.650	0.000	5.00	12.030	7.82	385.2	0.0	511.4
88.00	Bot - Section 3	1.00	1.23	28.192	31.01	249.74	0.650	0.000	3.00	7.029	4.57	226.7	0.0	298.7
90.00		1.00	1.24	28.325	31.16	246.94	0.650	0.000	2.00	4.692	3.05	152.1	0.0	329.3
92.00	Top - Section 2	1.00	1.24	28.457	31.30	244.11	0.650	0.000	2.00	4.629	3.01	150.7	0.0	324.8
95.00		1.00	1.25	28.650	31.51	244.41	0.650	0.000	3.00	6.826	4.44	223.7	0.0	194.2
100.00		1.00	1.27	28.961	31.86	237.16	0.650	0.000	5.00	11.063	7.19	366.5	0.0	314.7
105.00		1.00	1.28	29.260	32.19	229.77	0.650	0.000	5.00	10.670	6.94	357.2	0.0	303.4
110.00		1.00	1.29	29.548	32.50	222.24	0.650	0.000	5.00	10.278	6.68	347.4	0.0	292.1
115.00		1.00	1.30	29.826	32.81	214.58	0.650	0.000	5.00	9.885	6.43	337.3	0.0	280.8
120.00		1.00	1.32	30.094	33.10	206.81	0.650	0.000	5.00	9.492	6.17	326.8	0.0	269.5
125.00		1.00	1.33	30.354	33.39	198.92	0.650	0.000	5.00	9.099	5.91	316.0	0.0	258.3
128.00	Appurtenance(s)	1.00	1.33	30.506	33.56	194.14	0.650	0.000	3.00	5.271	3.43	184.0	0.0	149.5
130.00		1.00	1.34	30.605	33.67	190.93	0.650	0.000	2.00	3.435	2.23	120.3	0.0	97.4
135.00		1.00	1.35	30.850	33.93	182.85	0.650	0.000	5.00	8.314	5.40	293.4	0.0	235.7
136.00	Appurtenance(s)	1.00	1.35	30.898	33.99	181.22	0.650	0.000	1.00	1.616	1.05	57.1	0.0	45.8
								Totals:	**136.00**			**10,351.4**		**16,000.8**

Discrete Appurtenance Forces

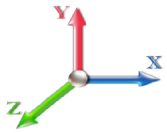
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	136.00	LNX-6514DS-VTM	6	30.898	33.987	0.72	0.90	34.95	178.74	0.000	0.000	1900.50	0.00	0.00
2	136.00	RRH-2X40-AWS	3	30.898	33.987	0.74	0.90	5.58	118.80	0.000	0.000	303.40	0.00	0.00
3	136.00	RRH-2X40-700U	3	30.898	33.987	0.84	0.90	6.23	135.00	0.000	0.000	338.64	0.00	0.00
4	136.00	HBX-6517DS-VTM	6	30.898	33.987	0.68	0.90	21.42	100.98	0.000	0.000	1165.06	0.00	0.00
5	136.00	Low Profile Platform	1	30.898	33.987	1.00	1.00	22.00	1350.00	0.000	0.000	1196.35	0.00	0.00
6	128.00	RMQP-496-HK	1	30.506	33.556	1.00	1.00	48.00	2204.10	0.000	0.000	2577.12	0.00	0.00
7	128.00	Ericsson - Air21 B2A/B4P	3	30.506	33.556	0.71	0.80	24.65	332.10	0.000	0.000	1323.43	0.00	0.00
8	128.00	Ericsson - Radio 4449 B71	3	30.506	33.556	0.54	0.80	2.65	189.00	0.000	0.000	142.45	0.00	0.00
9	128.00	Ericsson - KRY 112 144/2	3	30.506	33.556	0.40	0.80	0.49	29.70	0.000	0.000	26.42	0.00	0.00
10	128.00	Ericsson - Air 32	3	30.506	33.556	0.69	0.80	13.47	356.94	0.000	0.000	723.09	0.00	0.00
11	128.00	RFS -	3	30.506	33.556	0.56	0.80	34.10	345.60	0.000	0.000	1830.85	0.00	0.00
							Totals:		**5,340.96**			**11,527.29**		

Total Applied Force Summary

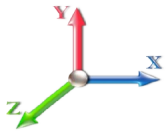
Structure:	CT46137-A-SBA		**Code:**	EIA/TIA-222-G	8/24/2018
Site Name:	Hamden-State St		**Exposure:**	C	
Height:	136.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 13

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		400.45	974.06	0.00	0.00
10.00		391.71	954.32	0.00	0.00
15.00		382.97	934.58	0.00	0.00
20.00		397.07	914.84	0.00	0.00
25.00		406.45	895.10	0.00	0.00
30.00		412.26	875.37	0.00	0.00
35.00		415.42	855.63	0.00	0.00
40.00		416.54	835.89	0.00	0.00
43.50		290.27	573.38	0.00	0.00
45.00		126.31	435.01	0.00	0.00
48.50		295.50	1002.19	0.00	0.00
50.00		125.77	210.84	0.00	0.00
55.00		420.27	691.81	0.00	0.00
60.00		416.35	674.89	0.00	0.00
65.00		411.54	657.97	0.00	0.00
70.00		405.94	641.05	0.00	0.00
75.00		399.63	624.13	0.00	0.00
80.00		392.69	607.21	0.00	0.00
85.00		385.15	590.30	0.00	0.00
88.00		226.71	346.06	0.00	0.00
90.00		152.05	360.85	0.00	0.00
92.00		150.71	356.34	0.00	0.00
95.00		223.74	241.57	0.00	0.00
100.00		366.53	393.60	0.00	0.00
105.00		357.17	382.32	0.00	0.00
110.00		347.41	371.04	0.00	0.00
115.00		337.27	359.76	0.00	0.00
120.00		326.79	348.48	0.00	0.00
125.00		315.97	337.21	0.00	0.00
128.00	(16) attachments	6807.30	3654.35	0.00	0.00
130.00		120.28	101.40	0.00	0.00
135.00		293.41	245.61	0.00	0.00
136.00	(19) attachments	4961.05	1931.29	0.00	0.00
	Totals:	**21,878.67**	**23,378.45**	**0.00**	**0.00**

Calculated Forces

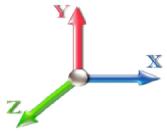
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 14	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 25

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-23.33	-21.93	0.00	-2283.1	0.00	2283.14	4390.93	2195.46	7660.90	3836.15	0.00	0.000	0.000	0.601
5.00	-22.27	-21.62	0.00	-2173.5	0.00	2173.50	4295.16	2147.58	7328.71	3669.80	0.13	-0.234	0.000	0.598
10.00	-21.23	-21.31	0.00	-2065.4	0.00	2065.42	4199.39	2099.69	7003.88	3507.15	0.50	-0.472	0.000	0.594
15.00	-20.21	-21.00	0.00	-1958.8	0.00	1958.88	4103.62	2051.81	6686.41	3348.18	1.12	-0.714	0.000	0.590
20.00	-19.21	-20.67	0.00	-1853.8	0.00	1853.87	4007.85	2003.93	6376.31	3192.89	2.00	-0.960	0.000	0.586
25.00	-18.24	-20.33	0.00	-1750.5	0.00	1750.50	3912.08	1956.04	6073.57	3041.30	3.14	-1.209	0.000	0.580
30.00	-17.28	-19.98	0.00	-1648.8	0.00	1648.85	3816.32	1908.16	5778.19	2893.39	4.54	-1.462	0.000	0.575
35.00	-16.35	-19.61	0.00	-1548.9	0.00	1548.97	3720.55	1860.27	5490.18	2749.17	6.21	-1.718	0.000	0.568
40.00	-15.45	-19.23	0.00	-1450.9	0.00	1450.92	3624.78	1812.39	5209.53	2608.64	8.15	-1.977	0.000	0.561
43.50	-14.85	-18.95	0.00	-1383.6	0.00	1383.63	3557.74	1778.87	5017.45	2512.46	9.67	-2.163	0.000	0.555
45.00	-14.37	-18.84	0.00	-1355.2	0.00	1355.20	3529.01	1764.51	4936.24	2471.79	10.36	-2.244	0.000	0.552
48.50	-13.34	-18.54	0.00	-1289.2	0.00	1289.26	3039.25	1519.63	4279.34	2142.85	12.07	-2.431	0.000	0.606
50.00	-13.07	-18.44	0.00	-1261.4	0.00	1261.45	3014.63	1507.31	4209.90	2108.08	12.85	-2.514	0.000	0.603
55.00	-12.31	-18.06	0.00	-1169.2	0.00	1169.23	2932.54	1466.27	3982.54	1994.23	15.64	-2.804	0.000	0.591
60.00	-11.57	-17.66	0.00	-1078.9	0.00	1078.95	2850.45	1425.23	3761.50	1883.54	18.73	-3.095	0.000	0.577
65.00	-10.85	-17.27	0.00	-990.63	0.00	990.63	2768.37	1384.18	3546.76	1776.02	22.12	-3.387	0.000	0.562
70.00	-10.15	-16.88	0.00	-904.27	0.00	904.27	2686.28	1343.14	3338.33	1671.65	25.83	-3.680	0.000	0.545
75.00	-9.47	-16.49	0.00	-819.88	0.00	819.88	2604.19	1302.10	3136.22	1570.44	29.83	-3.970	0.000	0.526
80.00	-8.81	-16.10	0.00	-737.45	0.00	737.45	2522.10	1261.05	2940.42	1472.40	34.14	-4.259	0.000	0.505
85.00	-8.19	-15.70	0.00	-656.97	0.00	656.97	2440.02	1220.01	2750.93	1377.51	38.75	-4.543	0.000	0.480
88.00	-7.82	-15.46	0.00	-609.88	0.00	609.88	2390.76	1195.38	2640.27	1322.09	41.66	-4.714	0.000	0.465
90.00	-7.45	-15.30	0.00	-578.95	0.00	578.95	2357.93	1178.96	2567.75	1285.78	43.66	-4.828	0.000	0.454
92.00	-7.07	-15.13	0.00	-548.35	0.00	548.35	1547.90	773.95	1709.73	856.14	45.70	-4.940	0.000	0.645
95.00	-6.78	-14.92	0.00	-502.95	0.00	502.95	1524.57	762.29	1648.80	825.63	48.85	-5.105	0.000	0.614
100.00	-6.33	-14.56	0.00	-428.34	0.00	428.34	1484.88	742.44	1548.79	775.55	54.39	-5.465	0.000	0.557
105.00	-5.91	-14.20	0.00	-355.55	0.00	355.55	1444.16	722.08	1450.80	726.48	60.29	-5.803	0.000	0.494
110.00	-5.50	-13.84	0.00	-284.55	0.00	284.55	1389.90	694.95	1342.87	672.43	66.52	-6.112	0.000	0.428
115.00	-5.12	-13.49	0.00	-215.33	0.00	215.33	1335.17	667.59	1238.67	620.26	73.06	-6.382	0.000	0.351
120.00	-4.77	-13.14	0.00	-147.87	0.00	147.87	1280.45	640.22	1138.68	570.19	79.86	-6.604	0.000	0.263
125.00	-4.45	-12.80	0.00	-82.15	0.00	82.15	1225.72	612.86	1042.90	522.23	86.85	-6.764	0.000	0.161
128.00	-1.62	-5.61	0.00	-43.76	0.00	43.76	1192.89	596.44	987.45	494.46	91.11	-6.823	0.000	0.090
130.00	-1.53	-5.48	0.00	-32.54	0.00	32.54	1171.00	585.50	951.33	476.37	93.97	-6.849	0.000	0.070
135.00	-1.32	-5.16	0.00	-5.16	0.00	5.16	1116.28	558.14	863.96	432.62	101.15	-6.883	0.000	0.013
136.00	0.00	-4.96	0.00	0.00	0.00	0.00	1105.33	552.67	846.99	424.13	102.59	-6.885	0.000	0.000

Wind Loading - Shaft

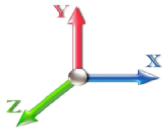
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	5.168	5.68	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	5.168	5.68	0.00	1.200	1.242	5.00	19.032	22.84	129.8	337.0	1530.5
10.00		1.00	0.85	5.168	5.68	0.00	1.200	1.331	5.00	18.713	22.46	127.7	354.2	1521.3
15.00		1.00	0.85	5.168	5.68	0.00	1.200	1.386	5.00	18.366	22.04	125.3	361.2	1502.1
20.00		1.00	0.90	5.483	6.03	0.00	1.200	1.427	5.00	18.007	21.61	130.3	363.8	1478.4
25.00		1.00	0.95	5.747	6.32	0.00	1.200	1.459	5.00	17.641	21.17	133.8	363.8	1452.1
30.00		1.00	0.98	5.972	6.57	0.00	1.200	1.486	5.00	17.271	20.73	136.2	362.1	1424.0
35.00		1.00	1.01	6.169	6.79	0.00	1.200	1.509	5.00	16.897	20.28	137.6	359.2	1394.8
40.00		1.00	1.04	6.345	6.98	0.00	1.200	1.529	5.00	16.522	19.83	138.4	355.3	1364.6
43.50	Bot - Section 2	1.00	1.06	6.458	7.10	0.00	1.200	1.542	3.50	11.339	13.61	96.7	246.5	937.3
45.00		1.00	1.07	6.504	7.15	0.00	1.200	1.547	1.50	4.897	5.88	42.0	107.4	655.8
48.50	Top - Section 1	1.00	1.09	6.608	7.27	0.00	1.200	1.559	3.50	11.296	13.56	98.5	248.1	1510.7
50.00		1.00	1.09	6.650	7.32	0.00	1.200	1.564	1.50	4.783	5.74	42.0	105.8	355.4
55.00		1.00	1.12	6.785	7.46	0.00	1.200	1.579	5.00	15.702	18.84	140.6	347.2	1164.3
60.00		1.00	1.14	6.910	7.60	0.00	1.200	1.592	5.00	15.321	18.38	139.8	341.1	1135.7
65.00		1.00	1.16	7.028	7.73	0.00	1.200	1.605	5.00	14.939	17.93	138.6	334.6	1106.6
70.00		1.00	1.17	7.138	7.85	0.00	1.200	1.617	5.00	14.556	17.47	137.2	327.8	1077.3
75.00		1.00	1.19	7.243	7.97	0.00	1.200	1.628	5.00	14.172	17.01	135.5	320.7	1047.6
80.00		1.00	1.21	7.342	8.08	0.00	1.200	1.639	5.00	13.788	16.55	133.6	313.4	1017.7
85.00		1.00	1.22	7.436	8.18	0.00	1.200	1.649	5.00	13.404	16.08	131.6	305.8	987.6
88.00	Bot - Section 3	1.00	1.23	7.491	8.24	0.00	1.200	1.655	3.00	7.857	9.43	77.7	180.7	578.9
90.00		1.00	1.24	7.526	8.28	0.00	1.200	1.658	2.00	5.245	6.29	52.1	121.3	560.3
92.00	Top - Section 2	1.00	1.24	7.561	8.32	0.00	1.200	1.662	2.00	5.183	6.22	51.7	120.0	553.0
95.00		1.00	1.25	7.612	8.37	0.00	1.200	1.667	3.00	7.660	9.19	77.0	177.1	436.1
100.00		1.00	1.27	7.695	8.46	0.00	1.200	1.676	5.00	12.460	14.95	126.6	287.1	706.6
105.00		1.00	1.28	7.774	8.55	0.00	1.200	1.684	5.00	12.074	14.49	123.9	278.8	683.3
110.00		1.00	1.29	7.851	8.64	0.00	1.200	1.692	5.00	11.687	14.02	121.1	270.3	659.8
115.00		1.00	1.30	7.925	8.72	0.00	1.200	1.699	5.00	11.301	13.56	118.2	261.7	636.1
120.00		1.00	1.32	7.996	8.80	0.00	1.200	1.707	5.00	10.914	13.10	115.2	253.0	612.4
125.00		1.00	1.33	8.065	8.87	0.00	1.200	1.714	5.00	10.527	12.63	112.1	244.1	588.5
128.00	Appurtenance(s)	1.00	1.33	8.105	8.92	0.00	1.200	1.718	3.00	6.130	7.36	65.6	143.2	342.6
130.00		1.00	1.34	8.132	8.95	0.00	1.200	1.720	2.00	4.009	4.81	43.0	94.0	224.0
135.00		1.00	1.35	8.197	9.02	0.00	1.200	1.727	5.00	9.753	11.70	105.5	226.0	540.3
136.00	Appurtenance(s)	1.00	1.35	8.210	9.03	0.00	1.200	1.728	1.00	1.904	2.28	20.6	44.8	105.9
								Totals:	**136.00**			**3,505.4**		**29,891.5**

Discrete Appurtenance Forces

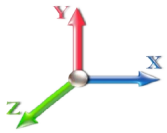
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	136.00	LNX-6514DS-VTM	6	8.210	9.031	0.72	0.90	46.91	976.36	0.000	0.000	423.60	0.00	0.00
2	136.00	RRH-2X40-AWS	3	8.210	9.031	0.74	0.90	8.26	286.60	0.000	0.000	74.59	0.00	0.00
3	136.00	RRH-2X40-700U	3	8.210	9.031	0.84	0.90	9.11	335.28	0.000	0.000	82.24	0.00	0.00
4	136.00	HBX-6517DS-VTM	6	8.210	9.031	0.68	0.90	26.58	852.65	0.000	0.000	240.07	0.00	0.00
5	136.00	Low Profile Platform	1	8.210	9.031	1.00	1.00	39.49	2796.15	0.000	0.000	356.61	0.00	0.00
6	128.00	RMQP-496-HK	1	8.105	8.916	1.00	1.00	80.98	4672.87	0.000	0.000	722.02	0.00	0.00
7	128.00	Ericsson - Air21 B2A/B4P	3	8.105	8.916	0.71	0.80	28.13	1282.88	0.000	0.000	250.85	0.00	0.00
8	128.00	Ericsson - Radio 4449 B71	3	8.105	8.916	0.54	0.80	3.50	452.70	0.000	0.000	31.23	0.00	0.00
9	128.00	Ericsson - KRY 112 144/2	3	8.105	8.916	0.40	0.80	1.05	62.13	0.000	0.000	9.39	0.00	0.00
10	128.00	Ericsson - Air 32	3	8.105	8.916	0.70	0.80	15.98	869.29	0.000	0.000	142.49	0.00	0.00
11	128.00	RFS -	3	8.105	8.916	0.58	0.80	38.19	1513.07	0.000	0.000	340.55	0.00	0.00
							Totals:		**14,099.98**			**2,673.64**		

Total Applied Force Summary

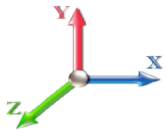
Structure:	CT46137-A-SBA		**Code:**	EIA/TIA-222-G	8/24/2018
Site Name:	Hamden-State St		**Exposure:**	C	
Height:	136.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 17

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		129.83	1635.73	0.00	0.00
10.00		127.66	1626.58	0.00	0.00
15.00		125.29	1607.33	0.00	0.00
20.00		130.34	1583.61	0.00	0.00
25.00		133.83	1557.30	0.00	0.00
30.00		136.15	1529.28	0.00	0.00
35.00		137.60	1500.03	0.00	0.00
40.00		138.37	1469.84	0.00	0.00
43.50		96.66	1011.01	0.00	0.00
45.00		42.05	687.40	0.00	0.00
48.50		98.52	1584.35	0.00	0.00
50.00		41.99	386.97	0.00	0.00
55.00		140.63	1269.57	0.00	0.00
60.00		139.75	1240.92	0.00	0.00
65.00		138.58	1211.89	0.00	0.00
70.00		137.15	1182.53	0.00	0.00
75.00		135.49	1152.89	0.00	0.00
80.00		133.63	1122.98	0.00	0.00
85.00		131.57	1092.83	0.00	0.00
88.00		77.68	642.08	0.00	0.00
90.00		52.11	602.41	0.00	0.00
92.00		51.73	595.13	0.00	0.00
95.00		76.97	499.22	0.00	0.00
100.00		126.56	811.87	0.00	0.00
105.00		123.90	788.52	0.00	0.00
110.00		121.12	765.02	0.00	0.00
115.00		118.22	741.38	0.00	0.00
120.00		115.20	717.60	0.00	0.00
125.00		112.07	693.71	0.00	0.00
128.00	(16) attachments	1562.12	9258.72	0.00	0.00
130.00		43.03	229.25	0.00	0.00
135.00		105.52	553.51	0.00	0.00
136.00	(19) attachments	1197.74	5355.56	0.00	0.00
	Totals:	**6,179.07**	**46,707.03**	**0.00**	**0.00**

Calculated Forces

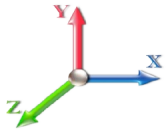
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 18	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-46.70	-6.21	0.00	-641.21	0.00	641.21	4390.93	2195.46	7660.90	3836.15	0.00	0.000	0.000	0.178
5.00	-45.06	-6.13	0.00	-610.18	0.00	610.18	4295.16	2147.58	7328.71	3669.80	0.04	-0.066	0.000	0.177
10.00	-43.43	-6.05	0.00	-579.55	0.00	579.55	4199.39	2099.69	7003.88	3507.15	0.14	-0.133	0.000	0.176
15.00	-41.81	-5.97	0.00	-549.31	0.00	549.31	4103.62	2051.81	6686.41	3348.18	0.31	-0.200	0.000	0.174
20.00	-40.22	-5.88	0.00	-519.47	0.00	519.47	4007.85	2003.93	6376.31	3192.89	0.56	-0.269	0.000	0.173
25.00	-38.66	-5.79	0.00	-490.07	0.00	490.07	3912.08	1956.04	6073.57	3041.30	0.88	-0.339	0.000	0.171
30.00	-37.12	-5.68	0.00	-461.15	0.00	461.15	3816.32	1908.16	5778.19	2893.39	1.27	-0.410	0.000	0.169
35.00	-35.62	-5.58	0.00	-432.72	0.00	432.72	3720.55	1860.27	5490.18	2749.17	1.74	-0.481	0.000	0.167
40.00	-34.14	-5.47	0.00	-404.82	0.00	404.82	3624.78	1812.39	5209.53	2608.64	2.28	-0.554	0.000	0.165
43.50	-33.13	-5.38	0.00	-385.69	0.00	385.69	3557.74	1778.87	5017.45	2512.46	2.71	-0.606	0.000	0.163
45.00	-32.44	-5.35	0.00	-377.62	0.00	377.62	3529.01	1764.51	4936.24	2471.79	2.90	-0.628	0.000	0.162
48.50	-30.85	-5.26	0.00	-358.89	0.00	358.89	3039.25	1519.63	4279.34	2142.85	3.38	-0.680	0.000	0.178
50.00	-30.46	-5.24	0.00	-351.01	0.00	351.01	3014.63	1507.31	4209.90	2108.08	3.60	-0.703	0.000	0.177
55.00	-29.19	-5.12	0.00	-324.83	0.00	324.83	2932.54	1466.27	3982.54	1994.23	4.38	-0.784	0.000	0.173
60.00	-27.94	-5.00	0.00	-299.22	0.00	299.22	2850.45	1425.23	3761.50	1883.54	5.25	-0.865	0.000	0.169
65.00	-26.73	-4.88	0.00	-274.21	0.00	274.21	2768.37	1384.18	3546.76	1776.02	6.19	-0.946	0.000	0.164
70.00	-25.54	-4.76	0.00	-249.80	0.00	249.80	2686.28	1343.14	3338.33	1671.65	7.23	-1.027	0.000	0.159
75.00	-24.38	-4.64	0.00	-225.99	0.00	225.99	2604.19	1302.10	3136.22	1570.44	8.35	-1.107	0.000	0.153
80.00	-23.26	-4.51	0.00	-202.80	0.00	202.80	2522.10	1261.05	2940.42	1472.40	9.55	-1.186	0.000	0.147
85.00	-22.16	-4.38	0.00	-180.23	0.00	180.23	2440.02	1220.01	2750.93	1377.51	10.83	-1.264	0.000	0.140
88.00	-21.52	-4.31	0.00	-167.08	0.00	167.08	2390.76	1195.38	2640.27	1322.09	11.64	-1.311	0.000	0.135
90.00	-20.91	-4.25	0.00	-158.47	0.00	158.47	2357.93	1178.96	2567.75	1285.78	12.20	-1.342	0.000	0.132
92.00	-20.32	-4.20	0.00	-149.97	0.00	149.97	1547.90	773.95	1709.73	856.14	12.77	-1.373	0.000	0.188
95.00	-19.82	-4.13	0.00	-137.38	0.00	137.38	1524.57	762.29	1648.80	825.63	13.65	-1.418	0.000	0.179
100.00	-19.00	-4.02	0.00	-116.70	0.00	116.70	1484.88	742.44	1548.79	775.55	15.18	-1.516	0.000	0.163
105.00	-18.21	-3.90	0.00	-96.61	0.00	96.61	1444.16	722.08	1450.80	726.48	16.82	-1.608	0.000	0.146
110.00	-17.44	-3.78	0.00	-77.10	0.00	77.10	1389.90	694.95	1342.87	672.43	18.55	-1.692	0.000	0.127
115.00	-16.70	-3.66	0.00	-58.19	0.00	58.19	1335.17	667.59	1238.67	620.26	20.36	-1.765	0.000	0.106
120.00	-15.98	-3.54	0.00	-39.88	0.00	39.88	1280.45	640.22	1138.68	570.19	22.25	-1.825	0.000	0.082
125.00	-15.29	-3.41	0.00	-22.19	0.00	22.19	1225.72	612.86	1042.90	522.23	24.18	-1.868	0.000	0.055
128.00	-6.09	-1.55	0.00	-11.96	0.00	11.96	1192.89	596.44	987.45	494.46	25.36	-1.884	0.000	0.029
130.00	-5.86	-1.50	0.00	-8.87	0.00	8.87	1171.00	585.50	951.33	476.37	26.15	-1.892	0.000	0.024
135.00	-5.31	-1.37	0.00	-1.37	0.00	1.37	1116.28	558.14	863.96	432.62	28.14	-1.901	0.000	0.008
136.00	0.00	-1.20	0.00	0.00	0.00	0.00	1105.33	552.67	846.99	424.13	28.54	-1.901	0.000	0.000

Seismic Segment Forces (Factored)

Structure:	CT46137-A-SBA		**Code:**	EIA/TIA-222-G	8/24/2018
Site Name:	Hamden-State St		**Exposure:**	C	
Height:	136.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 19

Tower Engineering Solutions

Load Case:	1.2D + 1.0E							**Iterations**	23
Gust Response Factor	1.10				**Sds**	0.20		**Ss**	0.19
Dead Load Factor	1.20	**Seismic Load Factor**	1.00		**Sd1**	0.10		**S1**	0.06
Wind Load Factor	0.00	**Structure Frequency**	0.37		**SA**	0.04	**Seismic Importance Factor**		1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		994.58	0.00	0.04	0.02	20.01	
10.00		972.64	0.01	0.06	0.03	27.80	
15.00		950.71	0.02	0.07	0.04	30.90	
20.00		928.78	0.04	0.07	0.04	31.99	
25.00		906.85	0.06	0.07	0.04	32.30	
30.00		884.92	0.09	0.07	0.04	32.39	
35.00		862.99	0.13	0.07	0.03	32.42	
40.00		841.06	0.16	0.07	0.03	32.23	
43.50	Bot - Section 2	575.69	0.19	0.06	0.02	22.16	
45.00		457.03	0.21	0.06	0.02	17.55	
48.50	Top - Section 1	1052.1	0.24	0.06	0.02	39.64	
50.00		207.95	0.26	0.05	0.02	7.71	
55.00		680.96	0.31	0.04	0.01	22.67	
60.00		662.17	0.37	0.03	0.01	17.27	
65.00		643.37	0.43	0.01	0.01	9.58	
70.00		624.57	0.50	-0.02	0.01	0.28	
75.00		605.77	0.57	-0.04	0.01	-9.01	
80.00		586.97	0.65	-0.07	0.02	-16.33	
85.00		568.17	0.74	-0.10	0.04	-20.35	
88.00	Bot - Section 3	331.88	0.79	-0.11	0.05	-12.51	
90.00		365.87	0.83	-0.12	0.06	-13.77	
92.00	Top - Section 2	360.85	0.86	-0.12	0.07	-13.18	
95.00		215.79	0.92	-0.12	0.10	-7.10	
100.00		349.62	1.02	-0.10	0.14	-7.59	
105.00		337.09	1.13	-0.05	0.20	-1.40	
110.00		324.56	1.24	0.04	0.28	6.40	
115.00		312.03	1.35	0.20	0.38	15.60	
120.00		299.49	1.47	0.43	0.51	25.97	
125.00		286.96	1.60	0.77	0.67	37.33	
128.00	Appurtenance(s)	4007.7	1.67	1.03	0.78	638.54	
130.00		108.27	1.73	1.23	0.86	19.51	
135.00		261.90	1.86	1.84	1.09	62.15	
136.00	Appurtenance(s)	2143.6	1.89	1.98	1.14	534.97	
	Totals:	**23,713.1**				**1,616.1**	**Total Wind:** **21,878.7**

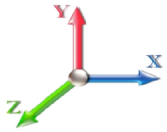
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 20	

Tower Engineering Solutions

Load Case: 1.2D + 1.0E



Gust Response Factor	1.10			**Sds**	0.20			**Iterations**	23
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.10			**Ss**	0.19
Wind Load Factor	0.00	**Structure Frequency**	0.37	**SA**	0.04			**S1**	0.06
								Seismic Importance Factor	1.00

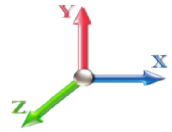
Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-31.17	-1.72	0.00	-197.93	0.00	197.93	4390.93	2195.46	7660.90	3836.15		0.00	0.00	0.059
5.00	-29.87	-1.71	0.00	-189.32	0.00	189.32	4295.16	2147.58	7328.71	3669.80		0.01	-0.02	0.059
10.00	-28.60	-1.70	0.00	-180.75	0.00	180.75	4199.39	2099.69	7003.88	3507.15		0.04	-0.04	0.058
15.00	-27.35	-1.67	0.00	-172.28	0.00	172.28	4103.62	2051.81	6686.41	3348.18		0.10	-0.06	0.058
20.00	-26.13	-1.65	0.00	-163.91	0.00	163.91	4007.85	2003.93	6376.31	3192.89		0.17	-0.08	0.058
25.00	-24.94	-1.63	0.00	-155.66	0.00	155.66	3912.08	1956.04	6073.57	3041.30		0.27	-0.11	0.058
30.00	-23.77	-1.60	0.00	-147.54	0.00	147.54	3816.32	1908.16	5778.19	2893.39		0.40	-0.13	0.057
35.00	-22.63	-1.57	0.00	-139.54	0.00	139.54	3720.55	1860.27	5490.18	2749.17		0.54	-0.15	0.057
40.00	-21.51	-1.55	0.00	-131.67	0.00	131.67	3624.78	1812.39	5209.53	2608.64		0.72	-0.18	0.056
43.50	-20.75	-1.53	0.00	-126.26	0.00	126.26	3557.74	1778.87	5017.45	2512.46		0.85	-0.19	0.056
45.00	-20.17	-1.51	0.00	-123.97	0.00	123.97	3529.01	1764.51	4936.24	2471.79		0.91	-0.20	0.056
48.50	-18.83	-1.47	0.00	-118.68	0.00	118.68	3039.25	1519.63	4279.34	2142.85		1.06	-0.22	0.062
50.00	-18.55	-1.47	0.00	-116.48	0.00	116.48	3014.63	1507.31	4209.90	2108.08		1.13	-0.22	0.061
55.00	-17.63	-1.45	0.00	-109.14	0.00	109.14	2932.54	1466.27	3982.54	1994.23		1.38	-0.25	0.061
60.00	-16.73	-1.44	0.00	-101.90	0.00	101.90	2850.45	1425.23	3761.50	1883.54		1.66	-0.28	0.060
65.00	-15.85	-1.43	0.00	-94.72	0.00	94.72	2768.37	1384.18	3546.76	1776.02		1.97	-0.31	0.059
70.00	-14.99	-1.43	0.00	-87.58	0.00	87.58	2686.28	1343.14	3338.33	1671.65		2.30	-0.33	0.058
75.00	-14.16	-1.43	0.00	-80.42	0.00	80.42	2604.19	1302.10	3136.22	1570.44		2.67	-0.36	0.057
80.00	-13.35	-1.43	0.00	-73.25	0.00	73.25	2522.10	1261.05	2940.42	1472.40		3.06	-0.39	0.055
85.00	-12.56	-1.43	0.00	-66.08	0.00	66.08	2440.02	1220.01	2750.93	1377.51		3.49	-0.42	0.053
88.00	-12.10	-1.43	0.00	-61.78	0.00	61.78	2390.76	1195.38	2640.27	1322.09		3.76	-0.44	0.052
90.00	-11.62	-1.43	0.00	-58.91	0.00	58.91	2357.93	1178.96	2567.75	1285.78		3.94	-0.45	0.051
92.00	-11.14	-1.43	0.00	-56.04	0.00	56.04	1547.90	773.95	1709.73	856.14		4.13	-0.46	0.073
95.00	-10.82	-1.43	0.00	-51.75	0.00	51.75	1524.57	762.29	1648.80	825.63		4.43	-0.48	0.070
100.00	-10.30	-1.44	0.00	-44.58	0.00	44.58	1484.88	742.44	1548.79	775.55		4.95	-0.51	0.064
105.00	-9.79	-1.44	0.00	-37.40	0.00	37.40	1444.16	722.08	1450.80	726.48		5.50	-0.55	0.058
110.00	-9.29	-1.43	0.00	-30.21	0.00	30.21	1389.90	694.95	1342.87	672.43		6.10	-0.58	0.052
115.00	-8.81	-1.41	0.00	-23.06	0.00	23.06	1335.17	667.59	1238.67	620.26		6.72	-0.61	0.044
120.00	-8.34	-1.39	0.00	-15.99	0.00	15.99	1280.45	640.22	1138.68	570.19		7.38	-0.63	0.035
125.00	-7.90	-1.35	0.00	-9.06	0.00	9.06	1225.72	612.86	1042.90	522.23		8.05	-0.65	0.024
128.00	-3.03	-0.65	0.00	-5.02	0.00	5.02	1192.89	596.44	987.45	494.46		8.46	-0.66	0.013
130.00	-2.90	-0.63	0.00	-3.72	0.00	3.72	1171.00	585.50	951.33	476.37		8.74	-0.66	0.010
135.00	-2.57	-0.56	0.00	-0.56	0.00	0.56	1116.28	558.14	863.96	432.62		9.44	-0.67	0.004
136.00	0.00	-0.53	0.00	0.00	0.00	0.00	1105.33	552.67	846.99	424.13		9.57	-0.67	0.000

Seismic Segment Forces (Factored)

Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 0.9D + 1.0E



Gust Response Factor	1.10			**Sds**	0.20	**Iterations**	22
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.10	**Ss**	0.19
Wind Load Factor	0.00	**Structure Frequency**	0.37	**SA**	0.04	**S1**	0.06
						Seismic Importance Factor	1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		994.58	0.00	0.04	0.02	20.01	
10.00		972.64	0.01	0.06	0.03	27.80	
15.00		950.71	0.02	0.07	0.04	30.90	
20.00		928.78	0.04	0.07	0.04	31.99	
25.00		906.85	0.06	0.07	0.04	32.30	
30.00		884.92	0.09	0.07	0.04	32.39	
35.00		862.99	0.13	0.07	0.03	32.42	
40.00		841.06	0.16	0.07	0.03	32.23	
43.50	Bot - Section 2	575.69	0.19	0.06	0.02	22.16	
45.00		457.03	0.21	0.06	0.02	17.55	
48.50	Top - Section 1	1052.1	0.24	0.06	0.02	39.64	
50.00		207.95	0.26	0.05	0.02	7.71	
55.00		680.96	0.31	0.04	0.01	22.67	
60.00		662.17	0.37	0.03	0.01	17.27	
65.00		643.37	0.43	0.01	0.01	9.58	
70.00		624.57	0.50	-0.02	0.01	0.28	
75.00		605.77	0.57	-0.04	0.01	-9.01	
80.00		586.97	0.65	-0.07	0.02	-16.33	
85.00		568.17	0.74	-0.10	0.04	-20.35	
88.00	Bot - Section 3	331.88	0.79	-0.11	0.05	-12.51	
90.00		365.87	0.83	-0.12	0.06	-13.77	
92.00	Top - Section 2	360.85	0.86	-0.12	0.07	-13.18	
95.00		215.79	0.92	-0.12	0.10	-7.10	
100.00		349.62	1.02	-0.10	0.14	-7.59	
105.00		337.09	1.13	-0.05	0.20	-1.40	
110.00		324.56	1.24	0.04	0.28	6.40	
115.00		312.03	1.35	0.20	0.38	15.60	
120.00		299.49	1.47	0.43	0.51	25.97	
125.00		286.96	1.60	0.77	0.67	37.33	
128.00	Appurtenance(s)	4007.7	1.67	1.03	0.78	638.54	
130.00		108.27	1.73	1.23	0.86	19.51	
135.00		261.90	1.86	1.84	1.09	62.15	
136.00	Appurtenance(s)	2143.6	1.89	1.98	1.14	534.97	
	Totals:	**23,713.1**				**1,616.1**	**Total Wind:** **21,878.7**

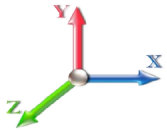
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Load Case: 0.9D + 1.0E



Gust Response Factor	1.10			**Sds**	0.20	**Iterations**	22		
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.10	**Ss**	0.19		
Wind Load Factor	0.00	**Structure Frequency**	0.37	**SA**	0.04	**S1**	0.06		
						Seismic Importance Factor	1.00		

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-23.38	-1.72	0.00	-195.34	0.00	195.34	4390.93	2195.46	7660.90	3836.15		0.00	0.00	0.056
5.00	-22.40	-1.71	0.00	-186.74	0.00	186.74	4295.16	2147.58	7328.71	3669.80		0.01	-0.02	0.056
10.00	-21.45	-1.69	0.00	-178.20	0.00	178.20	4199.39	2099.69	7003.88	3507.15		0.04	-0.04	0.056
15.00	-20.51	-1.66	0.00	-169.76	0.00	169.76	4103.62	2051.81	6686.41	3348.18		0.10	-0.06	0.056
20.00	-19.60	-1.64	0.00	-161.44	0.00	161.44	4007.85	2003.93	6376.31	3192.89		0.17	-0.08	0.055
25.00	-18.70	-1.61	0.00	-153.25	0.00	153.25	3912.08	1956.04	6073.57	3041.30		0.27	-0.10	0.055
30.00	-17.83	-1.58	0.00	-145.20	0.00	145.20	3816.32	1908.16	5778.19	2893.39		0.39	-0.13	0.055
35.00	-16.97	-1.56	0.00	-137.28	0.00	137.28	3720.55	1860.27	5490.18	2749.17		0.54	-0.15	0.054
40.00	-16.13	-1.53	0.00	-129.50	0.00	129.50	3624.78	1812.39	5209.53	2608.64		0.71	-0.17	0.054
43.50	-15.56	-1.51	0.00	-124.15	0.00	124.15	3557.74	1778.87	5017.45	2512.46		0.84	-0.19	0.054
45.00	-15.13	-1.49	0.00	-121.89	0.00	121.89	3529.01	1764.51	4936.24	2471.79		0.90	-0.20	0.054
48.50	-14.12	-1.45	0.00	-116.67	0.00	116.67	3039.25	1519.63	4279.34	2142.85		1.05	-0.21	0.059
50.00	-13.91	-1.45	0.00	-114.50	0.00	114.50	3014.63	1507.31	4209.90	2108.08		1.12	-0.22	0.059
55.00	-13.22	-1.43	0.00	-107.27	0.00	107.27	2932.54	1466.27	3982.54	1994.23		1.36	-0.25	0.058
60.00	-12.54	-1.41	0.00	-100.13	0.00	100.13	2850.45	1425.23	3761.50	1883.54		1.64	-0.27	0.058
65.00	-11.88	-1.41	0.00	-93.07	0.00	93.07	2768.37	1384.18	3546.76	1776.02		1.94	-0.30	0.057
70.00	-11.24	-1.41	0.00	-86.05	0.00	86.05	2686.28	1343.14	3338.33	1671.65		2.27	-0.33	0.056
75.00	-10.62	-1.41	0.00	-79.01	0.00	79.01	2604.19	1302.10	3136.22	1570.44		2.63	-0.36	0.054
80.00	-10.01	-1.41	0.00	-71.97	0.00	71.97	2522.10	1261.05	2940.42	1472.40		3.02	-0.38	0.053
85.00	-9.42	-1.41	0.00	-64.92	0.00	64.92	2440.02	1220.01	2750.93	1377.51		3.43	-0.41	0.051
88.00	-9.07	-1.41	0.00	-60.70	0.00	60.70	2390.76	1195.38	2640.27	1322.09		3.70	-0.43	0.050
90.00	-8.71	-1.41	0.00	-57.88	0.00	57.88	2357.93	1178.96	2567.75	1285.78		3.88	-0.44	0.049
92.00	-8.36	-1.41	0.00	-55.06	0.00	55.06	1547.90	773.95	1709.73	856.14		4.07	-0.45	0.070
95.00	-8.11	-1.41	0.00	-50.84	0.00	50.84	1524.57	762.29	1648.80	825.63		4.36	-0.47	0.067
100.00	-7.72	-1.41	0.00	-43.80	0.00	43.80	1484.88	742.44	1548.79	775.55		4.87	-0.51	0.062
105.00	-7.34	-1.41	0.00	-36.75	0.00	36.75	1444.16	722.08	1450.80	726.48		5.42	-0.54	0.056
110.00	-6.96	-1.41	0.00	-29.69	0.00	29.69	1389.90	694.95	1342.87	672.43		6.00	-0.57	0.049
115.00	-6.60	-1.39	0.00	-22.66	0.00	22.66	1335.17	667.59	1238.67	620.26		6.62	-0.60	0.041
120.00	-6.26	-1.36	0.00	-15.72	0.00	15.72	1280.45	640.22	1138.68	570.19		7.26	-0.62	0.032
125.00	-5.92	-1.32	0.00	-8.91	0.00	8.91	1225.72	612.86	1042.90	522.23		7.92	-0.64	0.022
128.00	-2.27	-0.64	0.00	-4.95	0.00	4.95	1192.89	596.44	987.45	494.46		8.33	-0.65	0.012
130.00	-2.17	-0.62	0.00	-3.67	0.00	3.67	1171.00	585.50	951.33	476.37		8.60	-0.65	0.010
135.00	-1.93	-0.56	0.00	-0.56	0.00	0.56	1116.28	558.14	863.96	432.62		9.28	-0.65	0.003
136.00	0.00	-0.53	0.00	0.00	0.00	0.00	1105.33	552.67	846.99	424.13		9.42	-0.65	0.000

Wind Loading - Shaft

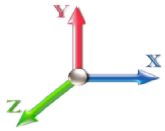
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 23	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 23

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	7.442	8.19	201.28	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	7.442	8.19	196.93	0.650	0.000	5.00	17.997	11.70	95.8	0.0	994.6
10.00		1.00	0.85	7.442	8.19	192.59	0.650	0.000	5.00	17.604	11.44	93.7	0.0	972.6
15.00		1.00	0.85	7.442	8.19	188.24	0.650	0.000	5.00	17.211	11.19	91.6	0.0	950.7
20.00		1.00	0.90	7.896	8.69	189.43	0.650	0.000	5.00	16.818	10.93	95.0	0.0	928.8
25.00		1.00	0.95	8.276	9.10	189.35	0.650	0.000	5.00	16.426	10.68	97.2	0.0	906.9
30.00		1.00	0.98	8.600	9.46	188.34	0.650	0.000	5.00	16.033	10.42	98.6	0.0	884.9
35.00		1.00	1.01	8.883	9.77	186.68	0.650	0.000	5.00	15.640	10.17	99.3	0.0	863.0
40.00		1.00	1.04	9.137	10.05	184.51	0.650	0.000	5.00	15.247	9.91	99.6	0.0	841.1
43.50	Bot - Section 2	1.00	1.06	9.300	10.23	182.74	0.650	0.000	3.50	10.439	6.79	69.4	0.0	575.7
45.00		1.00	1.07	9.366	10.30	181.93	0.650	0.000	1.50	4.510	2.93	30.2	0.0	457.0
48.50	Top - Section 1	1.00	1.09	9.515	10.47	179.93	0.650	0.000	3.50	10.387	6.75	70.7	0.0	1052.1
50.00		1.00	1.09	9.576	10.53	183.01	0.650	0.000	1.50	4.393	2.86	30.1	0.0	208.0
55.00		1.00	1.12	9.770	10.75	179.88	0.650	0.000	5.00	14.386	9.35	100.5	0.0	681.0
60.00		1.00	1.14	9.951	10.95	176.51	0.650	0.000	5.00	13.994	9.10	99.6	0.0	662.2
65.00		1.00	1.16	10.120	11.13	172.94	0.650	0.000	5.00	13.601	8.84	98.4	0.0	643.4
70.00		1.00	1.17	10.279	11.31	169.18	0.650	0.000	5.00	13.208	8.59	97.1	0.0	624.6
75.00		1.00	1.19	10.430	11.47	165.27	0.650	0.000	5.00	12.815	8.33	95.6	0.0	605.8
80.00		1.00	1.21	10.572	11.63	161.22	0.650	0.000	5.00	12.423	8.07	93.9	0.0	587.0
85.00		1.00	1.22	10.708	11.78	157.04	0.650	0.000	5.00	12.030	7.82	92.1	0.0	568.2
88.00	Bot - Section 3	1.00	1.23	10.787	11.87	154.48	0.650	0.000	3.00	7.029	4.57	54.2	0.0	331.9
90.00		1.00	1.24	10.838	11.92	152.75	0.650	0.000	2.00	4.692	3.05	36.4	0.0	365.9
92.00	Top - Section 2	1.00	1.24	10.888	11.98	151.00	0.650	0.000	2.00	4.629	3.01	36.0	0.0	360.9
95.00		1.00	1.25	10.962	12.06	151.18	0.650	0.000	3.00	6.826	4.44	53.5	0.0	215.8
100.00		1.00	1.27	11.081	12.19	146.70	0.650	0.000	5.00	11.063	7.19	87.6	0.0	349.6
105.00		1.00	1.28	11.195	12.31	142.13	0.650	0.000	5.00	10.670	6.94	85.4	0.0	337.1
110.00		1.00	1.29	11.305	12.44	137.47	0.650	0.000	5.00	10.278	6.68	83.1	0.0	324.6
115.00		1.00	1.30	11.412	12.55	132.73	0.650	0.000	5.00	9.885	6.43	80.7	0.0	312.0
120.00		1.00	1.32	11.514	12.67	127.92	0.650	0.000	5.00	9.492	6.17	78.1	0.0	299.5
125.00		1.00	1.33	11.614	12.78	123.04	0.650	0.000	5.00	9.099	5.91	75.6	0.0	287.0
128.00	Appurtenance(s)	1.00	1.33	11.672	12.84	120.09	0.650	0.000	3.00	5.271	3.43	44.0	0.0	166.2
130.00		1.00	1.34	11.710	12.88	118.10	0.650	0.000	2.00	3.435	2.23	28.8	0.0	108.3
135.00		1.00	1.35	11.803	12.98	113.10	0.650	0.000	5.00	8.314	5.40	70.2	0.0	261.9
136.00	Appurtenance(s)	1.00	1.35	11.822	13.00	112.09	0.650	0.000	1.00	1.616	1.05	13.7	0.0	50.9
								Totals:	**136.00**			**2,475.4**		**17,778.7**

Discrete Appurtenance Forces

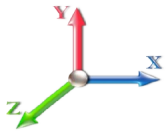
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 24	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 23

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	136.00	LNX-6514DS-VTM	6	11.822	13.004	0.72	0.90	34.95	198.60	0.000	0.000	454.47	0.00	0.00
2	136.00	RRH-2X40-AWS	3	11.822	13.004	0.74	0.90	5.58	132.00	0.000	0.000	72.55	0.00	0.00
3	136.00	RRH-2X40-700U	3	11.822	13.004	0.84	0.90	6.23	150.00	0.000	0.000	80.98	0.00	0.00
4	136.00	HBX-6517DS-VTM	6	11.822	13.004	0.68	0.90	21.42	112.20	0.000	0.000	278.60	0.00	0.00
5	136.00	Low Profile Platform	1	11.822	13.004	1.00	1.00	22.00	1500.00	0.000	0.000	286.09	0.00	0.00
6	128.00	RMQP-496-HK	1	11.672	12.839	1.00	1.00	48.00	2449.00	0.000	0.000	616.27	0.00	0.00
7	128.00	Ericsson - Air21 B2A/B4P	3	11.672	12.839	0.71	0.80	24.65	369.00	0.000	0.000	316.47	0.00	0.00
8	128.00	Ericsson - Radio 4449 B71	3	11.672	12.839	0.54	0.80	2.65	210.00	0.000	0.000	34.06	0.00	0.00
9	128.00	Ericsson - KRY 112 144/2	3	11.672	12.839	0.40	0.80	0.49	33.00	0.000	0.000	6.32	0.00	0.00
10	128.00	Ericsson - Air 32	3	11.672	12.839	0.69	0.80	13.47	396.60	0.000	0.000	172.91	0.00	0.00
11	128.00	RFS -	3	11.672	12.839	0.56	0.80	34.10	384.00	0.000	0.000	437.82	0.00	0.00
							Totals:		**5,934.40**			**2,756.55**		

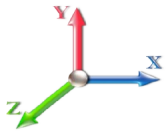
Total Applied Force Summary

Structure:	CT46137-A-SBA		**Code:**	EIA/TIA-222-G	8/24/2018
Site Name:	Hamden-State St		**Exposure:**	C	
Height:	136.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 25

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 23

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		95.76	1082.29	0.00	0.00
10.00		93.67	1060.35	0.00	0.00
15.00		91.58	1038.42	0.00	0.00
20.00		94.95	1016.49	0.00	0.00
25.00		97.20	994.56	0.00	0.00
30.00		98.58	972.63	0.00	0.00
35.00		99.34	950.70	0.00	0.00
40.00		99.61	928.77	0.00	0.00
43.50		69.41	637.09	0.00	0.00
45.00		30.20	483.34	0.00	0.00
48.50		70.66	1113.54	0.00	0.00
50.00		30.08	234.27	0.00	0.00
55.00		100.50	768.67	0.00	0.00
60.00		99.56	749.88	0.00	0.00
65.00		98.41	731.08	0.00	0.00
70.00		97.07	712.28	0.00	0.00
75.00		95.57	693.48	0.00	0.00
80.00		93.90	674.68	0.00	0.00
85.00		92.10	655.88	0.00	0.00
88.00		54.21	384.51	0.00	0.00
90.00		36.36	400.95	0.00	0.00
92.00		36.04	395.94	0.00	0.00
95.00		53.50	268.42	0.00	0.00
100.00		87.65	437.33	0.00	0.00
105.00		85.41	424.80	0.00	0.00
110.00		83.08	412.27	0.00	0.00
115.00		80.65	399.74	0.00	0.00
120.00		78.15	387.20	0.00	0.00
125.00		75.56	374.67	0.00	0.00
128.00	(16) attachments	1627.85	4060.39	0.00	0.00
130.00		28.76	112.67	0.00	0.00
135.00		70.16	272.90	0.00	0.00
136.00	(19) attachments	1186.35	2145.88	0.00	0.00
	Totals:	**5,231.91**	**25,976.06**	**0.00**	**0.00**

Calculated Forces

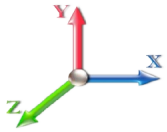
Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 26	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 23

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-25.97	-5.24	0.00	-549.22	0.00	549.22	4390.93	2195.46	7660.90	3836.15	0.00	0.000	0.000	0.149
5.00	-24.89	-5.17	0.00	-523.00	0.00	523.00	4295.16	2147.58	7328.71	3669.80	0.03	-0.056	0.000	0.148
10.00	-23.82	-5.10	0.00	-497.14	0.00	497.14	4199.39	2099.69	7003.88	3507.15	0.12	-0.114	0.000	0.147
15.00	-22.78	-5.03	0.00	-471.63	0.00	471.63	4103.62	2051.81	6686.41	3348.18	0.27	-0.172	0.000	0.146
20.00	-21.76	-4.95	0.00	-446.48	0.00	446.48	4007.85	2003.93	6376.31	3192.89	0.48	-0.231	0.000	0.145
25.00	-20.76	-4.87	0.00	-421.71	0.00	421.71	3912.08	1956.04	6073.57	3041.30	0.76	-0.291	0.000	0.144
30.00	-19.78	-4.79	0.00	-397.34	0.00	397.34	3816.32	1908.16	5778.19	2893.39	1.09	-0.352	0.000	0.143
35.00	-18.82	-4.71	0.00	-373.38	0.00	373.38	3720.55	1860.27	5490.18	2749.17	1.49	-0.414	0.000	0.141
40.00	-17.89	-4.62	0.00	-349.85	0.00	349.85	3624.78	1812.39	5209.53	2608.64	1.96	-0.476	0.000	0.139
43.50	-17.25	-4.55	0.00	-333.69	0.00	333.69	3557.74	1778.87	5017.45	2512.46	2.33	-0.521	0.000	0.138
45.00	-16.77	-4.53	0.00	-326.86	0.00	326.86	3529.01	1764.51	4936.24	2471.79	2.49	-0.541	0.000	0.137
48.50	-15.65	-4.45	0.00	-311.02	0.00	311.02	3039.25	1519.63	4279.34	2142.85	2.91	-0.586	0.000	0.150
50.00	-15.41	-4.43	0.00	-304.34	0.00	304.34	3014.63	1507.31	4209.90	2108.08	3.09	-0.606	0.000	0.149
55.00	-14.64	-4.34	0.00	-282.18	0.00	282.18	2932.54	1466.27	3982.54	1994.23	3.77	-0.676	0.000	0.146
60.00	-13.89	-4.25	0.00	-260.47	0.00	260.47	2850.45	1425.23	3761.50	1883.54	4.51	-0.746	0.000	0.143
65.00	-13.15	-4.16	0.00	-239.22	0.00	239.22	2768.37	1384.18	3546.76	1776.02	5.33	-0.816	0.000	0.139
70.00	-12.44	-4.07	0.00	-218.43	0.00	218.43	2686.28	1343.14	3338.33	1671.65	6.22	-0.887	0.000	0.135
75.00	-11.74	-3.97	0.00	-198.11	0.00	198.11	2604.19	1302.10	3136.22	1570.44	7.19	-0.957	0.000	0.131
80.00	-11.06	-3.88	0.00	-178.24	0.00	178.24	2522.10	1261.05	2940.42	1472.40	8.23	-1.027	0.000	0.125
85.00	-10.41	-3.79	0.00	-158.84	0.00	158.84	2440.02	1220.01	2750.93	1377.51	9.34	-1.096	0.000	0.120
88.00	-10.02	-3.73	0.00	-147.48	0.00	147.48	2390.76	1195.38	2640.27	1322.09	10.04	-1.137	0.000	0.116
90.00	-9.62	-3.69	0.00	-140.02	0.00	140.02	2357.93	1178.96	2567.75	1285.78	10.53	-1.165	0.000	0.113
92.00	-9.22	-3.65	0.00	-132.63	0.00	132.63	1547.90	773.95	1709.73	856.14	11.02	-1.192	0.000	0.161
95.00	-8.95	-3.60	0.00	-121.68	0.00	121.68	1524.57	762.29	1648.80	825.63	11.78	-1.232	0.000	0.153
100.00	-8.51	-3.52	0.00	-103.66	0.00	103.66	1484.88	742.44	1548.79	775.55	13.12	-1.319	0.000	0.139
105.00	-8.08	-3.43	0.00	-86.07	0.00	86.07	1444.16	722.08	1450.80	726.48	14.55	-1.401	0.000	0.124
110.00	-7.67	-3.35	0.00	-68.90	0.00	68.90	1389.90	694.95	1342.87	672.43	16.05	-1.475	0.000	0.108
115.00	-7.27	-3.27	0.00	-52.15	0.00	52.15	1335.17	667.59	1238.67	620.26	17.63	-1.541	0.000	0.090
120.00	-6.88	-3.18	0.00	-35.81	0.00	35.81	1280.45	640.22	1138.68	570.19	19.28	-1.595	0.000	0.068
125.00	-6.51	-3.10	0.00	-19.89	0.00	19.89	1225.72	612.86	1042.90	522.23	20.97	-1.633	0.000	0.043
128.00	-2.49	-1.36	0.00	-10.59	0.00	10.59	1192.89	596.44	987.45	494.46	22.00	-1.648	0.000	0.024
130.00	-2.38	-1.33	0.00	-7.88	0.00	7.88	1171.00	585.50	951.33	476.37	22.69	-1.654	0.000	0.019
135.00	-2.11	-1.25	0.00	-1.25	0.00	1.25	1116.28	558.14	863.96	432.62	24.43	-1.662	0.000	0.005
136.00	0.00	-1.19	0.00	0.00	0.00	0.00	1105.33	552.67	846.99	424.13	24.78	-1.662	0.000	0.000

Final Analysis Summary

Structure:	CT46137-A-SBA	**Code:**	EIA/TIA-222-G	8/24/2018	
Site Name:	Hamden-State St	**Exposure:**	C		
Height:	136.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 27	

Tower Engineering Solutions

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 97 mph Wind	21.9	0.00	31.12	0.00	0.00	2310.70
0.9D + 1.6W 97 mph Wind	21.9	0.00	23.33	0.00	0.00	2283.14
1.2D + 1.0Di + 1.0Wi 50 mph Wind	6.2	0.00	46.70	0.00	0.00	641.21
1.2D + 1.0E	1.7	0.00	31.17	0.00	0.00	197.93
0.9D + 1.0E	1.7	0.00	23.38	0.00	0.00	195.34
1.0D + 1.0W 60 mph Wind	5.2	0.00	25.97	0.00	0.00	549.22

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 97 mph Wind	-9.82	-15.39	0.00	-558.54	0.00	-558.54	1547.90	773.95	1709.73	856.14	92.00	0.659
0.9D + 1.6W 97 mph Wind	-7.07	-15.13	0.00	-548.35	0.00	-548.35	1547.90	773.95	1709.73	856.14	92.00	0.645
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-20.32	-4.20	0.00	-149.97	0.00	-149.97	1547.90	773.95	1709.73	856.14	92.00	0.188
1.2D + 1.0E	-11.14	-1.43	0.00	-56.04	0.00	-56.04	1547.90	773.95	1709.73	856.14	92.00	0.073
0.9D + 1.0E	-8.36	-1.41	0.00	-55.06	0.00	-55.06	1547.90	773.95	1709.73	856.14	92.00	0.070
1.0D + 1.0W 60 mph Wind	-9.22	-3.65	0.00	-132.63	0.00	-132.63	1547.90	773.95	1709.73	856.14	92.00	0.161

Base Plate Summary

Structure:	CT46137-A-SB		**Code:**	EIA/TIA-222-G	8/24/2018
Site Name:	Hamden-State St		**Exposure:**	C	
Height:	136.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 28

Tower Engineering Solutions

Reactions		Base Plate		Anchor Bolts	
Original Design		**Yield (ksi):**	60.00	**Bolt Circle:**	51.00
Moment (kip-ft):	2324.83	**Width (in):**	57.00	**Number Bolts:**	16.00
Axial (kip):	26.85	**Style:**	Round	**Bolt Type:**	2.25" 18J
Shear (kip):	21.75	**Polygon Sides:**	0.00	**Bolt Diameter (in):**	2.25
Analysis		**Clip Length (in):**	0.00	**Yield (ksi):**	75.00
Moment (kip-ft):	2310.70	**Effective Len (in):**	12.20	**Ultimate (ksi):**	100.00
Axial (kip):	46.70	**Moment (kip-in):**	499.83	**Arrangement:**	Radial
Shear (kip):	21.94	**Allow Stress (ksi):**	81.00	**Cluster Dist (in):**	0.00
		Applied Stress (ksi):	0.00	**Start Angle (deg):**	0.00
Moment Design %:	99.39	**Stress Ratio:**	0.76	Compression	
				Force (kip):	138.84
				Allowable (kip):	260.00
				Ratio:	0.54
				Tension	
				Force (kip):	133.00
				Allowable (kip):	260.00
				Ratio:	0.52

CENTEK engineering

Centered on Solutions℠

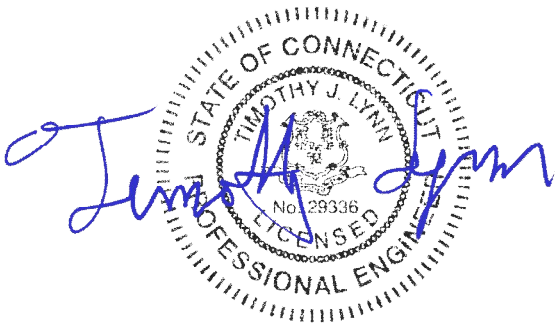
Structural Analysis Report

Antenna Mount Analysis

T-Mobile Site #: CT11611B

2895 State Road
Hamden, CT

Centek Project No. 18058.81



Date: July 18, 2018

Max Stress Ratio = 41.4%

Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

July 18, 2018

Mr. Dan Reid
Transcend Wireless
10 Industrial Ave
Mahwah, NJ 07430

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CT11611B
2895 state Road
Hamden, CT 06517

Centek Project No. 18058.81

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting of one (1) low profile platform to support the equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2012 International Building Code as modified by the 2016 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  Platform: Three (3) Ericsson AIR21 panel antennas, three (3) Ericsson AIR32 panel antennas, three (3) RFS APXVAARR24-43-NA20 panel antennas, three (3) KRY112 TMAs and three (3) Ericsson 4449 B71_B12 remote radio units mounted on one (1) proposed platform with a RAD center elevation of 128-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2012 International Building Code as modified by the 2016 Connecticut State Building Code considering a nominal design wind speed of 97 mph for Hamden as required in Appendix N of the 2016 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the existing antenna platform is structurally inadequate to support the proposed antenna configuration. Replacement of the existing platform with a SItePro platform (p/n RMQP-4096-HK) is required. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Section 2 - Calculations

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: TIA-222-G Loads

Location: Hamden, CT

Rev. 0: 7/18/18

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 18058.81

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed: $V := 97$ mph (User Input - 2016 CSBC Appendix N)

Basic Wind Speed with Ice: $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = Structure_Type := Pole (User Input)

Structure Category = SC := II (User Input)

Exposure Category = Exp := C (User Input)

Structure Height = $h := 140$ ft (User Input)

Height to Center of Antennas = $z_{AT\&T} := 128$ ft (User Input)

Radial Ice Thickness = $t_i := 0.75$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H = 1.1$ (User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if Structure\_Type = Pole} \\ 0.85 & \text{if Structure\_Type = Lattice} \end{cases} = 0.95$$

(Per Table 2-2 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if SC = 1} \\ 1.00 & \text{if SC = 2} \\ 1.15 & \text{if SC = 3} \end{cases} = 1$$

(Per Table 2-3 of TIA-222-G)

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if SC = 1} \\ 1.00 & \text{if SC = 2} \\ 1.00 & \text{if SC = 3} \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if SC = 1} \\ 1.00 & \text{if SC = 2} \\ 1.25 & \text{if SC = 3} \end{cases} = 1$$

$$K_{iz} := \left(\frac{z_{AT\&T}}{33}\right)^{0.1} = 1.145$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.718$$

Velocity Pressure Coefficient Antennas =

$$Kz_{AT\&T} := 2.01\left(\left(\frac{z_{AT\&T}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.333$$

Velocity Pressure w/o Ice Antennas =

$$qz_{AT\&T} := 0.00256 \cdot K_d \cdot Kz_{AT\&T} \cdot V^2 \cdot I_{Wind} = 30.506$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.AT\&T} := 0.00256 \cdot K_d \cdot Kz_{AT\&T} \cdot V_i^2 \cdot I_{Wind} = 8.105$$

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	TIA-222-G Loads
Location:	Hamden, CT
Rev. 0: 7/18/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 18058.81

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR32		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56.6$	in	(User Input)
Antenna Width =	$W_{ant} := 12.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 133$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.4$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.1$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 218$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.4$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 147$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.8$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 78$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5.1$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 58$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 133$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6352$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5549$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 180$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 180$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR21		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56$	in	(User Input)
Antenna Width =	$W_{ant} := 12.1$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.9$	in	(User Input)
Antenna Weight =	$WT_{ant} := 90$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.6$		
Antenna Force Coefficient =	$Ca_{ant} = 1.29$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 204$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.1$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 133$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 74$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 4.7$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 54$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 90$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5353$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5114$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 166$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 166$	lbs

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	TIA-222-G Loads
Location:	Hamden, CT
Rev. 0: 7/18/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 18058.81

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFSAPXVAARR24-43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 153$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 679$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 246$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 18.9$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 214$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 95$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 153$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 423$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 423$	lbs

Development of Wind & Ice Load on TMA's

TMA Data:

TMA Model =	Ericsson KRY112 TMA		
TMA Shape =	Flat		(User Input)
TMA Height =	$L_{TMA} := 7.7$	in	(User Input)
TMA Width =	$W_{TMA} := 7.5$	in	(User Input)
TMA Thickness =	$T_{TMA} := 3.4$	in	(User Input)
TMA Weight =	$WT_{TMA} := 11$	lbs	(User Input)
Number of TMA's =	$N_{TMA} := 1$		(User Input)
TMA Aspect Ratio =	$Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1$		
TMA Force Coefficient =	$Ca_{TMA} = 1.2$		

Wind Load (without ice)

Surface Area for One TMA =	$SA_{TMAF} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.4$	sf
Total TMA Wind Force =	$F_{TMA} := qz_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAF} = 16$	lbs
Surface Area for One TMA =	$SA_{TMAS} := \frac{L_{TMA} \cdot T_{TMA}}{144} = 0.2$	sf
Total TMA Wind Force =	$F_{TMA} := qz_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAS} = 7$	lbs

Wind Load (with ice)

Surface Area for One TMA w/ Ice =	$SA_{ICETMAF} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz})}{144} = 0.8$	sf
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAF} = 9$	lbs
Surface Area for One TMA w/ Ice =	$SA_{ICETMAS} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz})}{144} = 0.5$	sf
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAS} = 6$	lbs

Gravity Load (without ice)

Weight of All TMAs =	$WT_{TMA} \cdot N_{TMA} = 11$	lbs

Gravity Loads (ice only)

Volume of Each TMA =	$V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 196$	cu in
Volume of Ice on Each TMA =	$V_{ice} := (L_{TMA} + 2 \cdot t_{iz})(W_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz}) - V_{TMA} = 636$	cu in
Weight of Ice on Each TMA =	$W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 21$	lbs
Weight of Ice on All TMAs =	$W_{ICETMA} \cdot N_{TMA} = 21$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model = Ericsson 4449 B71B12

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 10.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 74$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 55$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 43$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 23$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.8$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 19$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 74$ lbs

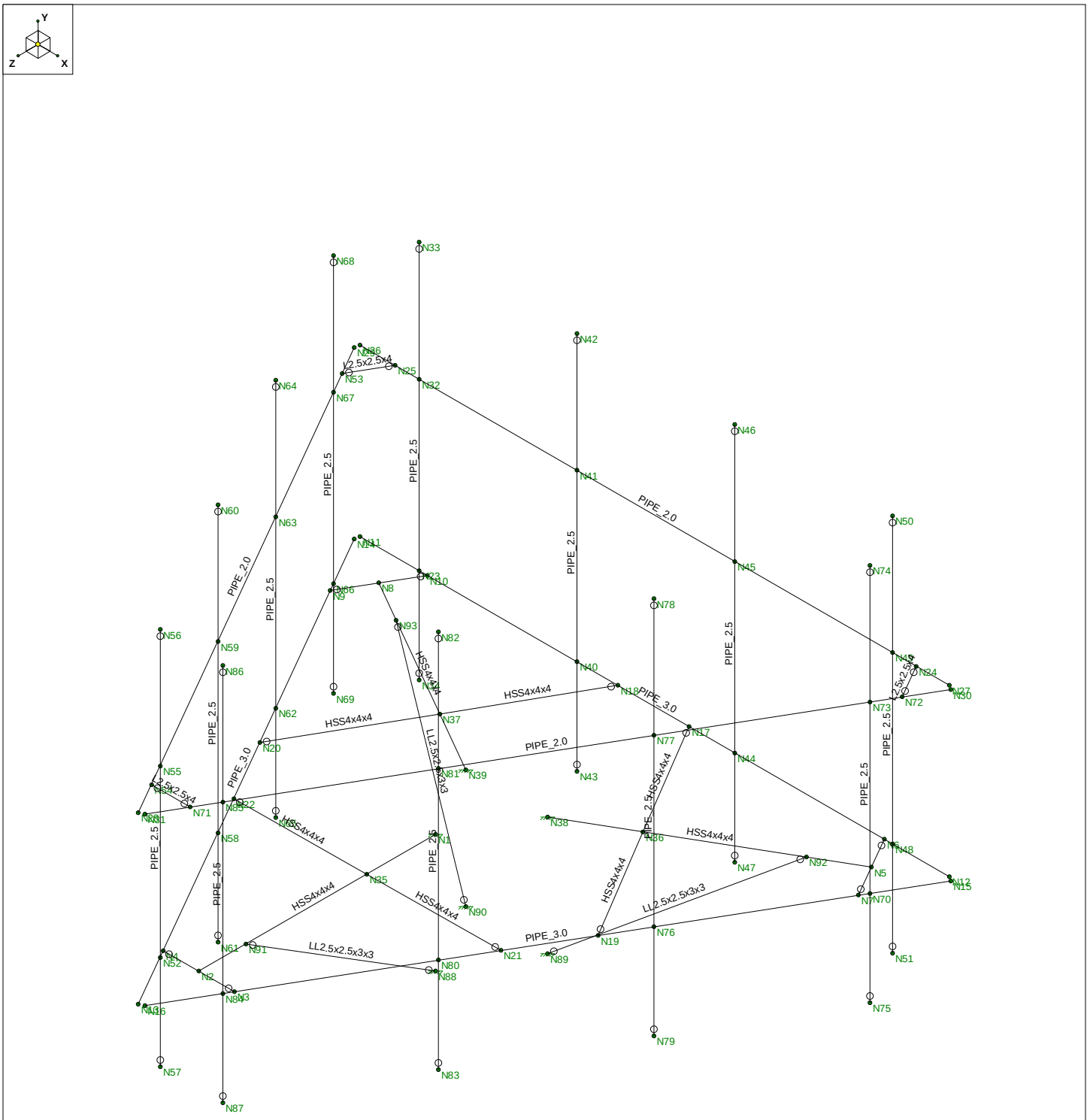
Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2176$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 70$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 70$ lbs



Envelope Only Solution

Centek		
TJL	CT11611B	July 18, 2018 at 4:39 PM
18058.81	Member Framing	Mount - Proposed.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	No
RISAConnection Code	AISC 13th(360-05): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building AISC 14th(360-10): ASD

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	150.001
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Outrigger	HSS4x4x4	Beam	Pipe	A500 Gr.46	Typical	3.37	7.8	7.8	12.8
2	Horz Pipe	PIPE_3.0	Beam	Pipe	A53 Gr B	Typical	2.07	2.85	2.85	5.69
3	Antenna Pipe	PIPE_2.5	Beam	Pipe	A53 Gr B	Typical	1.61	1.45	1.45	2.89
4	Handrail	PIPE_2.0	Beam	Pipe	A53 Gr B	Typical	1.02	.627	.627	1.25
5	Support	HSS4x4x4	Beam	Pipe	A500 Gr.46	Typical	3.37	7.8	7.8	12.8
6	Kicker	LL2.5x2.5x3x3	Beam	Pipe	A36 Gr.36	Typical	1.8	2.46	1.07	.023
7	Handrail Corner	L2.5x2.5x4	Beam	Pipe	A36 Gr.36	Typical	1.19	.692	.692	.026

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Outrigger	5	Segment	Segment	Segment	Segment	Segme...				Lateral
2	M2	Outrigger	5	Segment	Segment	Segment	Segment	Segme...				Lateral
3	M3	Outrigger	5	Segment	Segment	Segment	Segment	Segme...				Lateral
4	M4	Horz Pipe	12.45	5	5	5	5					Lateral
5	M5	Horz Pipe	12.45	5	5	5	5					Lateral
6	M6	Horz Pipe	12.45	5	5	5	5					Lateral
7	M10	Support	2.786			Lbyy						Lateral
8	M11	Support	2.811			Lbyy						Lateral
9	M12	Support	2.786			Lbyy						Lateral
10	M13	Handrail	12.45			Lbyy						Lateral
11	M14	Handrail	12.45			Lbyy						Lateral
12	M15	Handrail	12.45			Lbyy						Lateral
13	M16	Antenna Pipe	8			Lbyy						Lateral
14	M17	Support	2.811			Lbyy						Lateral
15	M18	Support	2.761			Lbyy						Lateral
16	M19	Support	2.761			Lbyy						Lateral
17	M20	Antenna Pipe	8			Lbyy						Lateral
18	M21	Antenna Pipe	8			Lbyy						Lateral
19	M22	Antenna Pipe	8			Lbyy						Lateral
20	M23	Antenna Pipe	8			Lbyy						Lateral
21	M24	Antenna Pipe	8			Lbyy						Lateral
22	M25	Antenna Pipe	8			Lbyy						Lateral
23	M26	Antenna Pipe	8			Lbyy						Lateral
24	M27	Antenna Pipe	8			Lbyy						Lateral
25	M28	Antenna Pipe	8			Lbyy						Lateral
26	M29	Antenna Pipe	8			Lbyy						Lateral
27	M30	Antenna Pipe	8			Lbyy						Lateral
28	M31	Handrail Co...	.821			Lbyy						Lateral
29	M32	Handrail Co...	.821			Lbyy						Lateral
30	M33	Handrail Co...	.821			Lbyy						Lateral
31	M34	Kicker	4.717			Lbyy						Lateral
32	M35	Kicker	4.717			Lbyy						Lateral
33	M36	Kicker	4.717			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N2			Outrigger	Beam	Pipe	A500 Gr....	Typical
2	M2	N38	N5			Outrigger	Beam	Pipe	A500 Gr....	Typical
3	M3	N39	N8			Outrigger	Beam	Pipe	A500 Gr....	Typical
4	M4	N16	N15			Horz Pipe	Beam	Pipe	A53 Gr B	Typical
5	M5	N13	N14			Horz Pipe	Beam	Pipe	A53 Gr B	Typical
6	M6	N12	N11			Horz Pipe	Beam	Pipe	A53 Gr B	Typical
7	M7	N9	N10			RIGID	None	None	RIGID	Typical
8	M8	N7	N6			RIGID	None	None	RIGID	Typical
9	M9	N3	N4			RIGID	None	None	RIGID	Typical
10	M10	N22	N35			Support	Beam	Pipe	A500 Gr....	Typical
11	M11	N36	N17			Support	Beam	Pipe	A500 Gr....	Typical
12	M12	N37	N20			Support	Beam	Pipe	A500 Gr....	Typical
13	M13	N31	N30			Handrail	Beam	Pipe	A53 Gr B	Typical
14	M14	N28	N29			Handrail	Beam	Pipe	A53 Gr B	Typical
15	M15	N27	N26			Handrail	Beam	Pipe	A53 Gr B	Typical
16	M16	N34	N33			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
17	M17	N35	N21			Support	Beam	Pipe	A500 Gr....	Typical
18	M18	N36	N19			Support	Beam	Pipe	A500 Gr....	Typical
19	M19	N18	N37			Support	Beam	Pipe	A500 Gr....	Typical
20	M20	N43	N42			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
21	M21	N47	N46			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
22	M22	N51	N50			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
23	M23	N57	N56			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
24	M24	N61	N60			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
25	M25	N65	N64			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
26	M26	N69	N68			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
27	M27	N75	N74			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
28	M28	N79	N78			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
29	M29	N83	N82			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
30	M30	N87	N86			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
31	M31	N53	N25			Handrail Corner	Beam	Pipe	A36 Gr.36	Typical
32	M32	N72	N24			Handrail Corner	Beam	Pipe	A36 Gr.36	Typical
33	M33	N54	N71			Handrail Corner	Beam	Pipe	A36 Gr.36	Typical
34	M34	N91	N88			Kicker	Beam	Pipe	A36 Gr.36	Typical
35	M35	N93	N90			Kicker	Beam	Pipe	A36 Gr.36	Typical
36	M36	N92	N89			Kicker	Beam	Pipe	A36 Gr.36	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	0	1	0	
2	N2	0	0	6	0	
3	N3	0.75	0	6	0	
4	N4	-0.75	0	6	0	
5	N5	5.196152	0	-3	0	
6	N6	4.821152	0	-3.649519	0	
7	N7	5.571152	0	-2.350481	0	
8	N8	-5.196152	0	-3	0	
9	N9	-5.571152	0	-2.350481	0	
10	N10	-4.821152	0	-3.649519	0	
11	N11	-6.25	0	-3.649519	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
12	N12	6.2	0	-3.649519	0	
13	N13	-0.035576	0	7.237418	0	
14	N14	-6.260576	0	-3.544598	0	
15	N15	6.285576	0	-3.587899	0	
16	N16	0.060576	0	7.194117	0	
17	N17	.7	0	-3.649519	0	
18	N18	-.8	0	-3.649519	0	
19	N19	3.560576	0	1.131939	0	
20	N20	-3.535576	0	1.17524	0	
21	N21	2.810576	0	2.430977	0	
22	N22	-2.785576	0	2.474279	0	
23	N23	-5	0	-3.649519	0	
24	N24	5.5	3.5	-3.649519	0	
25	N25	-5.5	3.5	-3.649519	0	
26	N26	-6.25	3.5	-3.649519	0	
27	N27	6.2	3.5	-3.649519	0	
28	N28	-0.035576	3.5	7.237418	0	
29	N29	-6.260576	3.5	-3.544598	0	
30	N30	6.285576	3.5	-3.587899	0	
31	N31	0.060576	3.5	7.194117	0	
32	N32	-5	3.5	-3.649519	0	
33	N33	-5	6	-3.649519	0	
34	N34	-5	-2	-3.649519	0	
35	N35	0	0	2.452725	0	
36	N36	2.143125	0	-1.237334	0	
37	N37	-2.161623	0	-1.248013	0	
38	N38	0.866025	0	-.5	0	
39	N39	-0.866025	0	-.5	0	
40	N40	-1.667	0	-3.649519	0	
41	N41	-1.667	3.5	-3.649519	0	
42	N42	-1.667	6	-3.649519	0	
43	N43	-1.667	-2	-3.649519	0	
44	N44	1.666	0	-3.649519	0	
45	N45	1.666	3.5	-3.649519	0	
46	N46	1.666	6	-3.649519	0	
47	N47	1.666	-2	-3.649519	0	
48	N48	4.999	0	-3.649519	0	
49	N49	4.999	3.5	-3.649519	0	
50	N50	4.999	6	-3.649519	0	
51	N51	4.999	-2	-3.649519	0	
52	N52	-0.660576	0	6.154887	0	
53	N53	-5.910576	3.5	-2.93838	0	
54	N54	-0.410576	3.5	6.587899	0	
55	N55	-0.660576	3.5	6.154887	0	
56	N56	-0.660576	6	6.154887	0	
57	N57	-0.660576	-2	6.154887	0	
58	N58	-2.327076	0	3.268424	0	
59	N59	-2.327076	3.5	3.268424	0	
60	N60	-2.327076	6	3.268424	0	
61	N61	-2.327076	-2	3.268424	0	
62	N62	-3.993576	0	0.381961	0	
63	N63	-3.993576	3.5	0.381961	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
64	N64	-3.993576	6	0.381961	0	
65	N65	-3.993576	-2	0.381961	0	
66	N66	-5.660076	0	-2.504501	0	
67	N67	-5.660076	3.5	-2.504501	0	
68	N68	-5.660076	6	-2.504501	0	
69	N69	-5.660076	-2	-2.504501	0	
70	N70	5.660576	0	-2.505368	0	
71	N71	0.410576	3.5	6.587899	0	
72	N72	5.910576	3.5	-2.93838	0	
73	N73	5.660576	3.5	-2.505368	0	
74	N74	5.660576	6	-2.505368	0	
75	N75	5.660576	-2	-2.505368	0	
76	N76	3.994076	0	0.381095	0	
77	N77	3.994076	3.5	0.381095	0	
78	N78	3.994076	6	0.381095	0	
79	N79	3.994076	-2	0.381095	0	
80	N80	2.327576	0	3.267558	0	
81	N81	2.327576	3.5	3.267558	0	
82	N82	2.327576	6	3.267558	0	
83	N83	2.327576	-2	3.267558	0	
84	N84	0.661076	0	6.15402	0	
85	N85	0.661076	3.5	6.15402	0	
86	N86	0.661076	6	6.15402	0	
87	N87	0.661076	-2	6.15402	0	
88	N88	0	-2.5	1	0	
89	N89	0.866025	-2.5	-.5	0	
90	N90	-0.866025	-2.5	-.5	0	
91	N91	0	0	5	0	
92	N92	4.330127	0	-2.5	0	
93	N93	-4.330127	0	-2.5	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N38	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N39	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N88	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N89	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
6	N90	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
7	N91						
8	N92						
9	N93						

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Y	-.045	7
2	M23	Y	-.045	7
3	M27	Y	-.045	7
4	M16	Y	-.045	3

Member Point Loads (BLC 2 : Equipment Weight) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
5	M23	Y	-.045	3
6	M27	Y	-.045	3
7	M22	Y	-.067	7
8	M26	Y	-.067	7
9	M30	Y	-.067	7
10	M22	Y	-.067	3
11	M26	Y	-.067	3
12	M30	Y	-.067	3
13	M21	Y	-.077	1
14	M25	Y	-.077	1
15	M29	Y	-.077	1
16	M21	Y	-.077	7
17	M25	Y	-.077	7
18	M29	Y	-.077	7
19	M21	Y	-.074	%50
20	M25	Y	-.074	%50
21	M29	Y	-.074	%50

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Y	-.083	7
2	M23	Y	-.083	7
3	M27	Y	-.083	7
4	M16	Y	-.083	3
5	M23	Y	-.083	3
6	M27	Y	-.083	3
7	M22	Y	-.09	7
8	M26	Y	-.09	7
9	M30	Y	-.09	7
10	M22	Y	-.09	3
11	M26	Y	-.09	3
12	M30	Y	-.09	3
13	M21	Y	-.212	1
14	M25	Y	-.212	1
15	M29	Y	-.212	1
16	M21	Y	-.212	7
17	M25	Y	-.212	7
18	M29	Y	-.212	7
19	M21	Y	-.07	%50
20	M25	Y	-.07	%50
21	M29	Y	-.07	%50

Member Point Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	X	.027	7
2	M16	X	.027	3
3	M23	X	.037	7
4	M27	X	.037	7
5	M23	X	.037	3
6	M27	X	.037	3
7	M22	X	.029	7

Member Point Loads (BLC 4 : Wind w/ Ice X) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
8	M22	X	.029	3
9	M26	X	.039	7
10	M30	X	.039	7
11	M26	X	.039	3
12	M30	X	.039	3
13	M21	X	.048	1
14	M21	X	.048	7
15	M25	X	.107	1
16	M29	X	.107	1
17	M25	X	.107	7
18	M29	X	.107	7
19	M21	X	.023	%50
20	M25	X	.023	%50
21	M29	X	.023	%50

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	X	.067	7
2	M16	X	.067	3
3	M23	X	.102	7
4	M27	X	.102	7
5	M23	X	.102	3
6	M27	X	.102	3
7	M22	X	.074	7
8	M22	X	.074	3
9	M26	X	.109	7
10	M30	X	.109	7
11	M26	X	.109	3
12	M30	X	.109	3
13	M21	X	.123	1
14	M21	X	.123	7
15	M25	X	.34	1
16	M29	X	.34	1
17	M25	X	.34	7
18	M29	X	.34	7
19	M21	X	.055	%50
20	M25	X	.055	%50
21	M29	X	.055	%50

Member Point Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Z	.037	7
2	M16	Z	.037	3
3	M23	Z	.027	7
4	M27	Z	.027	7
5	M23	Z	.027	3
6	M27	Z	.027	3
7	M22	Z	.039	7
8	M22	Z	.039	3
9	M26	Z	.029	7
10	M30	Z	.029	7

Member Point Loads (BLC 6 : Wind w/ Ice Z) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
11	M26	Z	.029	3
12	M30	Z	.029	3
13	M21	Z	.107	1
14	M21	Z	.107	7
15	M25	Z	.048	1
16	M29	Z	.048	1
17	M25	Z	.048	7
18	M29	Z	.048	7
19	M21	Z	.023	%50
20	M25	Z	.023	%50
21	M29	Z	.023	%50

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Z	.102	7
2	M16	Z	.102	3
3	M23	Z	.067	7
4	M27	Z	.067	7
5	M23	Z	.067	3
6	M27	Z	.067	3
7	M22	Z	.109	7
8	M22	Z	.109	3
9	M26	Z	.074	7
10	M30	Z	.074	7
11	M26	Z	.074	3
12	M30	Z	.074	3
13	M21	Z	.34	1
14	M21	Z	.34	7
15	M25	Z	.123	1
16	M29	Z	.123	1
17	M25	Z	.123	7
18	M29	Z	.123	7
19	M21	Z	.055	%50
20	M25	Z	.055	%50
21	M29	Z	.055	%50

Member Distributed Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M14	X	.003	.003	0	0
2	M5	X	.003	.003	0	0
3	M5	X	.003	.003	0	0
4	M24	X	.003	.003	0	0
5	M28	X	.003	.003	0	0
6	M16	X	.003	.003	0	0
7	M20	X	.003	.003	0	0
8	M21	X	.003	.003	0	0
9	M22	X	.003	.003	0	0
10	M13	X	.003	.003	0	0
11	M4	X	.003	.003	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M14	X	.008	.008	0	0
2	M5	X	.008	.008	0	0
3	M5	X	.008	.008	0	0
4	M24	X	.008	.008	0	0
5	M28	X	.008	.008	0	0
6	M16	X	.008	.008	0	0
7	M20	X	.008	.008	0	0
8	M21	X	.008	.008	0	0
9	M22	X	.008	.008	0	0
10	M13	X	.008	.008	0	0
11	M4	X	.008	.008	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M15	Z	.003	.003	0	0
2	M6	Z	.003	.003	0	0
3	M20	Z	.003	.003	0	0
4	M26	Z	.003	.003	0	0
5	M25	Z	.003	.003	0	0
6	M24	Z	.003	.003	0	0
7	M23	Z	.003	.003	0	0
8	M27	Z	.003	.003	0	0
9	M28	Z	.003	.003	0	0
10	M29	Z	.003	.003	0	0
11	M30	Z	.003	.003	0	0
12	M14	Z	.003	.003	0	0
13	M5	Z	.003	.003	0	0
14	M13	Z	.003	.003	0	0
15	M4	Z	.003	.003	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M15	Z	.008	.008	0	0
2	M6	Z	.008	.008	0	0
3	M20	Z	.008	.008	0	0
4	M26	Z	.008	.008	0	0
5	M25	Z	.008	.008	0	0
6	M24	Z	.008	.008	0	0
7	M23	Z	.008	.008	0	0
8	M27	Z	.008	.008	0	0
9	M28	Z	.008	.008	0	0
10	M29	Z	.008	.008	0	0
11	M30	Z	.008	.008	0	0
12	M14	Z	.008	.008	0	0
13	M5	Z	.008	.008	0	0
14	M13	Z	.008	.008	0	0
15	M4	Z	.008	.008	0	0

Member Distributed Loads (BLC 8 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 8 : BLC 2 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.033	-.019	2	3.5
2	M1	Y	-.019	-.005	3.5	5
3	M4	Y	-.003	-.006	0	2.49
4	M4	Y	-.006	-.01	2.49	4.98
5	M5	Y	.0003227	-.006	0	2.49
6	M5	Y	-.006	-.013	2.49	4.98
7	M9	Y	-.006	-.006	.317	1.183
8	M10	Y	-.012	-.012	.242	2.779
9	M17	Y	-.013	-.013	.0003843	2.559
10	M2	Y	-.032	-.019	2	3.5
11	M2	Y	-.019	-.005	3.5	5
12	M4	Y	-.013	-.006	7.47	9.96
13	M4	Y	-.006	.0003127	9.96	12.45
14	M6	Y	-.003	-.006	0	2.49
15	M6	Y	-.006	-.01	2.49	4.98
16	M8	Y	-.006	-.006	.318	1.183
17	M11	Y	-.012	-.012	0	2.556
18	M18	Y	-.012	-.012	.009	2.525
19	M3	Y	-.032	-.019	2	3.5
20	M3	Y	-.019	-.005	3.5	5
21	M5	Y	-.009	-.006	7.47	9.96
22	M5	Y	-.006	-.003	9.96	12.45
23	M6	Y	-.013	-.006	7.47	9.96
24	M6	Y	-.006	.0003098	9.96	12.45
25	M7	Y	-.006	-.006	.318	1.182
26	M12	Y	-.012	-.012	.0001388	2.537
27	M19	Y	-.012	-.012	.239	2.754

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Self Weight	DL		-1						
2	Equipment Weight	None					21		3	
3	Ice Weight	None					21			
4	Wind w/ Ice X	None					21	11		
5	Wind X	None					21	11		
6	Wind w/ Ice Z	None					21	15		
7	Wind Z	None					21	15		
8	BLC 2 Transient Area Loads	None						27		

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.2D + 1.6W (X-d..	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-d..	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1....	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2D + 1.6W (X-d..	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6W (X-d..	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0Di + 1....	Yes	Y		1	1.2	2	1.2	3	1	6	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	-.052	6	.487	3	-1.209	2	-.199	2	-.037	6	.381	1
2		min	-1.819	1	-.088	5	-6.257	4	-.516	3	-1.93	2	.088	5
3	N38	max	1.378	5	.581	4	3.022	1	.347	3	1.249	5	.469	4
4		min	-4.652	1	-.068	2	-2.304	5	-.065	5	-.437	2	.256	2
5	N39	max	.954	6	.69	1	.381	6	.38	1	.258	2	-.175	2
6		min	-4.131	2	.415	5	-1.785	2	-.126	5	-.611	5	-.554	6
7	N88	max	0	1	2.658	4	4.227	4	0	1	0	6	0	6
8		min	0	4	.788	2	1.24	2	0	1	0	2	0	2
9	N89	max	3.511	1	2.55	1	.136	5	0	4	0	4	0	2
10		min	-.237	5	-.158	5	-2.028	1	0	2	0	2	0	4
11	N90	max	1.18	2	1.459	6	.681	2	0	5	0	3	0	5
12		min	-1.998	6	-.839	2	-1.154	6	0	3	0	5	0	3
13	Totals:	max	0	6	6.475	6	0	2						
14		min	-6.046	1	2.966	2	-5.595	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	0	1	0	5	0	4	0	3	0	2	0	5
2		min	0	6	0	3	0	2	0	2	0	6	0	1
3	N2	max	.029	2	-.007	2	.003	4	2.033e-03	4	-2.223e-05	6	2.97e-03	2
4		min	0	4	-.037	4	0	2	2.218e-04	2	-1.817e-04	1	-1.021e-03	6
5	N3	max	.029	2	.019	2	.004	4	2.033e-03	4	-4.037e-05	2	-8.922e-04	6
6		min	0	4	-.042	4	.001	3	2.218e-04	2	-4.627e-04	4	-9.514e-03	1
7	N4	max	.029	2	-.012	3	.002	4	2.033e-03	4	6.723e-04	1	1.279e-03	4
8		min	0	4	-.035	1	-.001	2	2.218e-04	2	9.223e-05	6	-8.986e-03	2
9	N5	max	.005	4	.01	5	.012	5	-1.456e-03	6	4.603e-04	5	2.148e-03	4
10		min	-.003	2	-.035	1	-.011	1	-2.315e-03	1	8.451e-05	3	-8.954e-04	2
11	N6	max	.002	4	-.015	5	.014	5	7.608e-03	5	7.409e-04	5	-6.903e-04	3
12		min	-.007	2	-.049	1	-.009	1	-3.779e-04	3	-4.37e-05	3	-3.418e-03	4
13	N7	max	.009	4	.035	5	.01	5	6.276e-03	4	6.775e-04	1	-1.062e-03	6
14		min	0	2	-.021	1	-.013	1	9.249e-04	3	-4.763e-04	5	-4.372e-03	1
15	N8	max	0	3	.022	2	.009	2	2.129e-03	1	6.949e-04	2	6.439e-04	3
16		min	-.003	4	-.011	6	0	3	-1.303e-03	5	-3.295e-04	4	-1.645e-03	5
17	N9	max	.003	2	.026	5	.012	2	5.547e-03	4	1.248e-03	2	2.376e-03	4
18		min	-.006	4	-.019	3	.001	6	-4.355e-03	2	-9.547e-07	6	-4.368e-03	2
19	N10	max	0	5	.035	2	.009	5	6.798e-03	5	2.276e-05	6	3.057e-03	4
20		min	-.008	1	-.01	4	0	3	-2.279e-03	1	-7.228e-05	5	-3.121e-03	2
21	N11	max	0	5	.089	2	.007	4	7.143e-03	5	2.483e-05	6	2.809e-03	4
22		min	-.008	1	-.059	4	0	3	-2.577e-03	1	-9.939e-05	5	-3.145e-03	2
23	N12	max	.002	4	-.038	6	0	6	8.061e-03	5	7.993e-04	5	-7.4e-04	3
24		min	-.007	2	-.095	1	-.009	2	-2.738e-04	3	-6.246e-05	3	-3.141e-03	4
25	N13	max	.039	1	-.02	6	0	6	2.151e-03	4	7.046e-04	1	1.125e-03	4
26		min	.001	6	-.113	1	-.007	2	-1.831e-04	2	1.104e-04	6	-9.329e-03	2
27	N14	max	-.002	6	.085	5	.023	2	5.668e-03	4	1.316e-03	2	2.711e-03	4
28		min	-.015	2	-.026	3	.001	6	-4.215e-03	2	2.145e-06	6	-4.814e-03	2
29	N15	max	.017	4	.104	5	.014	5	6.42e-03	4	7.353e-04	1	-1.108e-03	6
30		min	-.011	1	-.008	3	-.02	1	8.713e-04	3	-5.43e-04	5	-4.642e-03	1
31	N16	max	.028	2	.091	2	.002	1	2.231e-03	4	-5.565e-05	3	-8.079e-04	6
32		min	-.008	4	-.059	4	0	5	5.075e-04	3	-5.174e-04	4	-9.822e-03	1

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
33	N17	max	0	4	.022	5	.007	5	8.265e-03	5	-2.113e-05	3	-1.122e-05	2
34		min	-.007	2	-.028	3	0	3	-3.35e-04	1	-6.464e-04	5	-8.822e-04	4
35	N18	max	0	5	.024	5	.004	5	8.27e-03	5	1.064e-04	5	6.229e-04	5
36		min	-.007	1	-.018	3	-.004	1	-9.169e-04	1	-1.558e-04	1	-4.596e-04	3
37	N19	max	.009	1	-.021	6	.006	5	4.411e-03	1	-3.099e-05	3	-9.277e-04	6
38		min	0	6	-.036	1	-.009	1	1.156e-03	6	-1.57e-04	4	-6.156e-03	1
39	N20	max	.014	2	.022	2	.007	2	1.88e-03	5	2.261e-04	4	3.219e-03	4
40		min	-.001	4	-.031	6	0	6	-4.502e-03	1	-5.453e-04	2	-6.133e-03	2
41	N21	max	.011	2	-.027	5	.006	4	3.628e-03	1	5.521e-04	1	-6.95e-04	6
42		min	0	6	-.042	1	-.008	2	9.852e-04	6	3.339e-05	6	-6.895e-03	1
43	N22	max	.01	2	.025	2	.009	1	1.286e-03	5	1.123e-04	2	3.111e-03	4
44		min	0	6	-.02	4	0	6	-3.424e-03	1	-2.016e-05	4	-7.209e-03	2
45	N23	max	0	5	.042	2	.008	5	7.143e-03	5	2.313e-05	6	2.804e-03	4
46		min	-.008	1	-.017	4	0	3	-2.577e-03	1	-1.067e-04	5	-3.149e-03	2
47	N24	max	.125	1	-.018	5	.526	4	1.633e-02	4	4.923e-03	5	5.475e-04	4
48		min	0	5	-.072	1	.034	3	1.07e-03	3	-3.118e-03	1	-2.771e-03	2
49	N25	max	.125	1	.059	2	.446	4	1.337e-02	4	-1.162e-04	6	-3.016e-04	6
50		min	-.002	5	-.014	4	-.238	1	-6.172e-03	2	-3.645e-03	2	-2.925e-03	1
51	N26	max	.125	1	.085	2	.425	4	1.337e-02	4	-1.146e-04	6	-2.993e-04	6
52		min	-.002	5	-.01	4	-.27	1	-6.172e-03	2	-3.645e-03	2	-2.922e-03	1
53	N27	max	.125	1	-.014	5	.485	4	1.633e-02	4	4.917e-03	5	5.456e-04	4
54		min	0	5	-.095	1	.042	3	1.07e-03	3	-3.118e-03	1	-2.772e-03	2
55	N28	max	.567	1	-.016	3	.109	5	3.229e-03	5	3.299e-03	4	3.319e-04	5
56		min	.012	6	-.075	4	-.206	1	-6.663e-03	1	5.567e-04	3	-1.468e-02	1
57	N29	max	.328	1	.067	5	.298	5	7.174e-03	4	6.155e-03	2	7.768e-03	5
58		min	-.283	4	-.012	3	-.07	1	-4.23e-03	1	4.424e-05	6	-1.21e-02	1
59	N30	max	.352	5	.082	5	.352	4	8.122e-03	4	4.494e-03	1	-1.712e-03	6
60		min	.052	3	-.051	1	.013	3	7.235e-04	3	-3.353e-03	5	-9.041e-03	2
61	N31	max	.543	2	.048	2	.205	1	7.275e-03	2	-7.268e-04	3	-2.756e-04	6
62		min	-.011	4	-.085	4	.037	6	8.81e-04	6	-3.764e-03	4	-1.531e-02	1
63	N32	max	.125	1	.042	2	.461	4	1.344e-02	4	-1.352e-04	6	-3.328e-04	6
64		min	-.002	5	-.017	4	-.216	1	-6.229e-03	2	-3.344e-03	2	-2.858e-03	1
65	N33	max	.224	1	.042	2	.88	4	0	1	-1.352e-04	6	0	1
66		min	.013	5	-.017	4	-.403	1	0	1	-3.344e-03	2	0	1
67	N34	max	.067	4	.042	2	.067	1	0	1	2.313e-05	6	0	1
68		min	-.082	2	-.017	4	-.163	5	0	1	-1.067e-04	5	0	1
69	N35	max	.01	2	-.001	2	.001	4	2.803e-04	4	5.636e-04	2	-1.288e-04	5
70		min	0	6	-.003	6	0	2	6.933e-05	2	-3.036e-06	4	-5.587e-04	1
71	N36	max	.003	4	-.001	5	.006	5	3.546e-04	5	2.095e-04	2	-6.448e-05	6
72		min	0	2	-.003	3	-.003	1	-2.285e-04	3	-2.681e-04	4	-3.233e-04	1
73	N37	max	0	2	0	5	.003	5	4.105e-04	4	1.49e-04	5	2.505e-04	6
74		min	-.001	4	-.003	3	0	3	-2.207e-04	2	1.423e-05	3	-2.658e-04	2
75	N38	max	0	1	0	2	0	5	0	5	0	2	0	2
76		min	0	5	0	4	0	1	0	3	0	5	0	4
77	N39	max	0	2	0	5	0	2	0	5	0	5	0	6
78		min	0	6	0	1	0	6	0	1	0	2	0	2
79	N40	max	0	5	.021	5	.006	5	9.487e-03	5	9.516e-05	5	4.262e-05	5
80		min	-.007	1	-.013	3	-.004	1	-1.389e-03	1	-6.845e-06	3	-7.804e-04	1
81	N41	max	.125	1	.021	5	.582	5	1.609e-02	5	-4.467e-04	3	4.161e-04	5
82		min	-.001	5	-.013	3	-.085	1	-2.261e-03	1	-3.236e-03	5	-2.185e-03	1
83	N42	max	.193	1	.021	5	1.068	5	0	1	-4.467e-04	3	0	1
84		min	-.014	5	-.013	3	-.153	1	0	1	-3.236e-03	5	0	1

Envelope Joint Displacements (Continued)

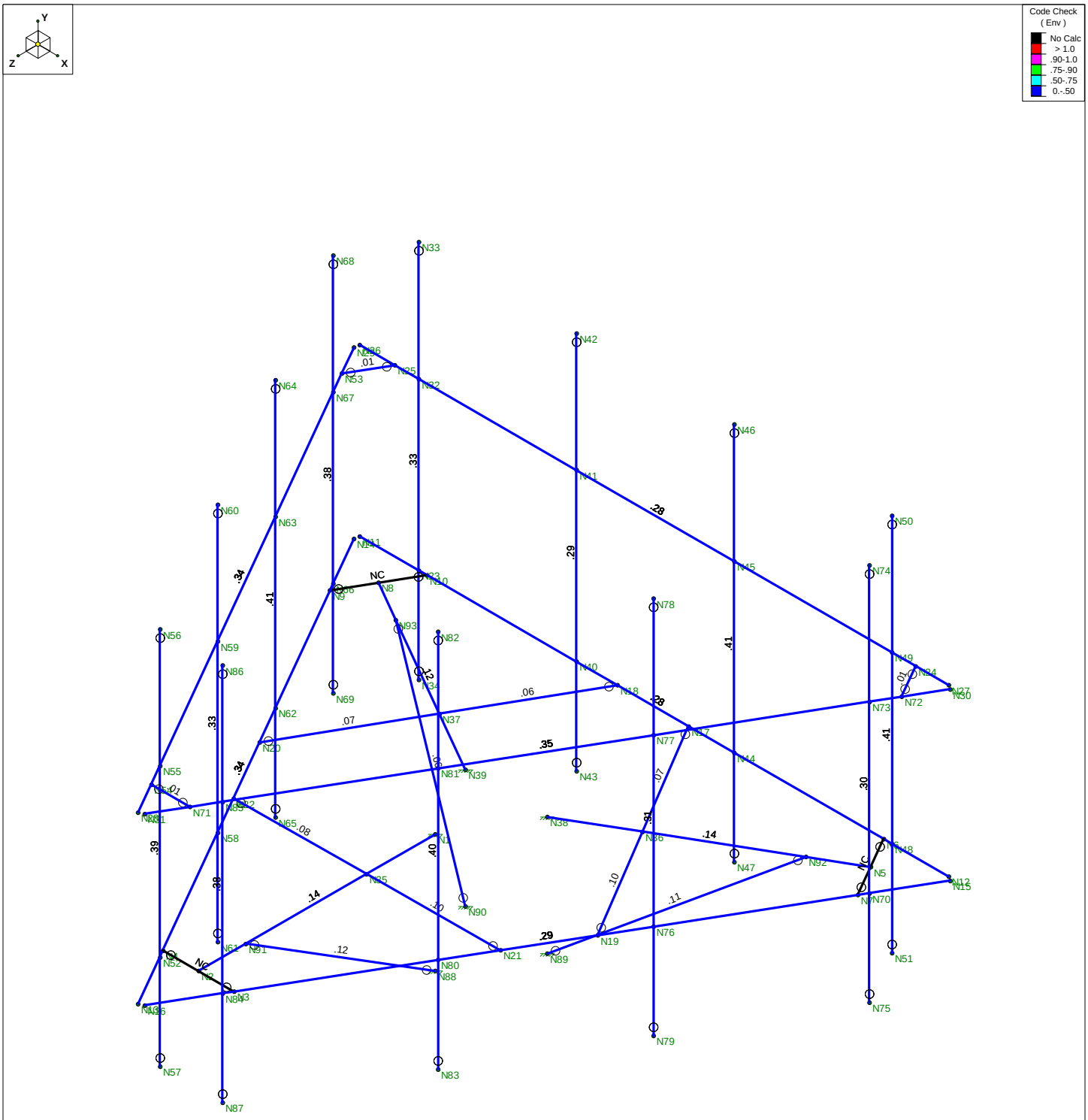
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
85	N43	max	.001	5	.021	5	.029	1	0	1	9.516e-05	5	0	1
86		min	-.024	1	-.013	3	-.221	5	0	1	-6.845e-06	3	0	1
87	N44	max	0	4	.017	5	.017	5	9.646e-03	5	5.59e-05	1	-4.537e-05	5
88		min	-.006	2	-.034	3	0	3	-2.467e-04	3	-6.94e-04	5	-5.214e-04	1
89	N45	max	.125	1	.017	5	.704	5	2.113e-02	5	4.752e-06	5	-2.192e-04	6
90		min	0	5	-.034	3	-.005	3	-3.337e-06	3	-2.285e-03	1	-2.556e-03	1
91	N46	max	.223	1	.017	5	1.389	5	0	1	4.752e-06	5	0	1
92		min	.012	6	-.034	3	-.005	3	0	1	-2.285e-03	1	0	1
93	N47	max	0	5	.017	5	.006	3	0	1	5.59e-05	1	0	1
94		min	-.011	1	-.034	3	-.195	5	0	1	-6.94e-04	5	0	1
95	N48	max	.002	4	-.022	5	.012	5	8.061e-03	5	8.058e-04	5	-7.337e-04	3
96		min	-.007	2	-.055	1	-.009	1	-2.738e-04	3	-6.246e-05	3	-3.134e-03	4
97	N49	max	.125	1	-.022	5	.555	4	1.641e-02	4	4.712e-03	5	6.632e-04	4
98		min	0	5	-.055	1	.028	3	1.077e-03	3	-2.86e-03	1	-2.713e-03	2
99	N50	max	.22	1	-.022	5	1.064	4	0	1	4.712e-03	5	0	1
100		min	-.02	5	-.055	1	.06	3	0	1	-2.86e-03	1	0	1
101	N51	max	-.018	3	-.022	5	.005	3	0	1	8.058e-04	5	0	1
102		min	-.074	4	-.055	1	-.181	5	0	1	-6.246e-05	3	0	1
103	N52	max	.03	2	-.013	6	.002	4	2.146e-03	4	6.92e-04	1	1.127e-03	4
104		min	0	4	-.045	1	-.002	2	-1.864e-04	2	1.112e-04	6	-9.327e-03	2
105	N53	max	.372	1	.047	5	.291	5	7.175e-03	4	6.16e-03	2	7.768e-03	5
106		min	-.271	4	-.017	3	-.095	1	-4.228e-03	1	4.357e-05	6	-1.21e-02	1
107	N54	max	.559	1	-.015	3	.124	5	3.228e-03	5	3.303e-03	4	3.328e-04	5
108		min	.003	6	-.054	1	-.202	1	-6.665e-03	1	5.553e-04	3	-1.468e-02	1
109	N55	max	.555	1	-.013	6	.134	5	3.211e-03	5	3.059e-03	4	3.354e-04	5
110		min	-.003	6	-.045	1	-.2	1	-6.819e-03	1	4.93e-04	3	-1.469e-02	1
111	N56	max	1.011	1	-.013	6	.243	5	0	1	3.059e-03	4	0	1
112		min	-.011	4	-.045	1	-.404	1	0	1	4.93e-04	3	0	1
113	N57	max	.027	4	-.013	6	.003	2	0	1	6.92e-04	1	0	1
114		min	-.193	2	-.045	1	-.048	4	0	1	1.112e-04	6	0	1
115	N58	max	.013	2	.02	2	.008	1	2.101e-03	4	3.251e-04	2	2.78e-03	4
116		min	0	4	-.02	4	0	6	-4.273e-03	1	-3.053e-05	4	-8.449e-03	2
117	N59	max	.553	2	.02	2	.195	4	3.848e-03	5	2.521e-03	4	3.639e-03	4
118		min	-.108	4	-.02	4	-.199	1	-6.451e-03	1	-8.787e-04	2	-1.466e-02	2
119	N60	max	.996	2	.02	2	.313	4	0	1	2.521e-03	4	0	1
120		min	-.217	4	-.02	4	-.392	1	0	1	-8.787e-04	2	0	1
121	N61	max	.067	4	.02	2	.11	1	0	1	3.251e-04	2	0	1
122		min	-.188	2	-.02	4	-.047	4	0	1	-3.053e-05	4	0	1
123	N62	max	.02	2	.018	2	.005	5	2.659e-03	4	2.559e-04	4	3.852e-03	4
124		min	-.004	4	-.035	6	0	3	-4.066e-03	2	-3.699e-04	2	-7.382e-03	2
125	N63	max	.58	2	.018	2	.249	4	6.276e-03	4	1.991e-03	5	6.081e-03	4
126		min	-.201	4	-.036	6	-.215	1	-7.728e-03	1	2.601e-04	3	-1.668e-02	2
127	N64	max	1.132	2	.018	2	.458	4	0	1	1.991e-03	5	0	1
128		min	-.383	4	-.036	6	-.447	1	0	1	2.601e-04	3	0	1
129	N65	max	.089	4	.018	2	.101	2	0	1	2.559e-04	4	0	1
130		min	-.138	2	-.035	6	-.051	4	0	1	-3.699e-04	2	0	1
131	N66	max	0	2	.034	5	.013	2	5.673e-03	4	1.327e-03	2	2.708e-03	4
132		min	-.006	4	-.02	3	.001	6	-4.211e-03	2	1.391e-06	6	-4.816e-03	2
133	N67	max	.404	2	.034	5	.285	5	7.141e-03	4	5.887e-03	2	7.863e-03	5
134		min	-.263	4	-.02	3	-.114	1	-4.182e-03	1	5.389e-05	6	-1.219e-02	1
135	N68	max	.786	1	.034	5	.513	4	0	1	5.887e-03	2	0	1
136		min	-.498	4	-.02	3	-.239	1	0	1	5.389e-05	6	0	1

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
137	N69	max	.059	4	.034	5	.114	2	0	1	1.327e-03	2	0	1
138		min	-.115	2	-.02	3	-.129	4	0	1	1.391e-06	6	0	1
139	N70	max	.01	4	.044	5	.01	5	6.424e-03	4	7.416e-04	1	-1.106e-03	6
140		min	-.001	2	-.019	1	-.014	1	8.757e-04	3	-5.394e-04	5	-4.639e-03	1
141	N71	max	.559	1	.037	2	.214	1	7.274e-03	2	-7.28e-04	3	-2.765e-04	6
142		min	.003	6	-.061	4	.042	6	8.794e-04	6	-3.767e-03	4	-1.532e-02	1
143	N72	max	.326	4	.059	5	.337	4	8.124e-03	4	4.5e-03	1	-1.711e-03	6
144		min	.062	3	-.032	1	.018	3	7.255e-04	3	-3.349e-03	5	-9.04e-03	2
145	N73	max	.312	1	.044	5	.328	4	8.08e-03	4	4.26e-03	1	-1.731e-03	6
146		min	.065	6	-.019	1	.022	3	7.299e-04	3	-3.092e-03	5	-9.095e-03	2
147	N74	max	.6	2	.044	5	.583	4	0	1	4.26e-03	1	0	1
148		min	.117	6	-.019	1	.044	3	0	1	-3.092e-03	5	0	1
149	N75	max	-.024	6	.044	5	-.024	3	0	1	7.416e-04	1	0	1
150		min	-.112	1	-.019	1	-.143	4	0	1	-5.394e-04	5	0	1
151	N76	max	.01	1	-.016	6	.007	5	3.959e-03	1	8.393e-05	2	-1.121e-03	6
152		min	0	6	-.034	1	-.008	1	1.202e-03	6	-1.752e-04	4	-7.331e-03	1
153	N77	max	.474	1	-.016	6	.27	4	6.257e-03	4	4.3e-03	1	-1.453e-03	6
154		min	.053	6	-.034	1	.046	3	1.578e-03	3	-1.847e-03	5	-1.207e-02	1
155	N78	max	.839	1	-.016	6	.461	4	0	1	4.3e-03	1	0	1
156		min	.097	6	-.034	1	.093	3	0	1	-1.847e-03	5	0	1
157	N79	max	-.026	6	-.016	6	-.027	6	0	1	8.393e-05	2	0	1
158		min	-.165	1	-.034	1	-.103	1	0	1	-1.752e-04	4	0	1
159	N80	max	.019	1	-.029	5	.006	4	4.561e-03	1	8.135e-04	1	-8.952e-04	6
160		min	0	6	-.042	1	-.003	2	8.892e-04	6	3.691e-05	6	-8.161e-03	1
161	N81	max	.619	1	-.029	5	.249	1	7.735e-03	1	1.448e-03	2	-1.236e-03	6
162		min	.041	6	-.042	1	.063	3	1.431e-03	6	-2.014e-03	4	-1.817e-02	1
163	N82	max	1.216	1	-.029	5	.481	1	0	1	1.448e-03	2	0	1
164		min	.078	6	-.042	1	.112	6	0	1	-2.014e-03	4	0	1
165	N83	max	-.021	6	-.029	5	-.018	6	0	1	8.135e-04	1	0	1
166		min	-.158	1	-.042	1	-.113	1	0	1	3.691e-05	6	0	1
167	N84	max	.029	2	.029	2	.004	4	2.226e-03	4	-5.695e-05	3	-8.11e-04	6
168		min	-.002	4	-.044	4	.001	3	5.02e-04	3	-5.206e-04	4	-9.825e-03	1
169	N85	max	.571	1	.029	2	.221	1	7.413e-03	2	-6.747e-04	3	-2.816e-04	6
170		min	.009	6	-.044	4	.046	6	8.751e-04	6	-3.52e-03	4	-1.534e-02	1
171	N86	max	1.048	1	.029	2	.443	1	0	1	-6.747e-04	3	0	1
172		min	.017	6	-.044	4	.075	6	0	1	-3.52e-03	4	0	1
173	N87	max	-.02	6	.029	2	-.011	3	0	1	-5.695e-05	3	0	1
174		min	-.207	1	-.044	4	-.049	4	0	1	-5.206e-04	4	0	1
175	N88	max	0	4	0	2	0	2	0	1	0	2	0	2
176		min	0	1	0	4	0	4	0	1	0	6	0	6
177	N89	max	0	5	0	5	0	1	0	2	0	2	0	4
178		min	0	1	0	1	0	5	0	4	0	4	0	2
179	N90	max	0	6	0	2	0	6	0	3	0	5	0	3
180		min	0	2	0	6	0	2	0	5	0	3	0	5
181	N91	max	.028	2	-.004	2	.003	4	1.327e-03	4	3.089e-04	2	1.98e-03	2
182		min	0	4	-.015	4	0	2	2.254e-04	2	-5.127e-05	4	-7.906e-04	6
183	N92	max	.007	4	.002	5	.013	5	-1.144e-03	6	2.413e-04	2	1.322e-03	5
184		min	-.001	2	-.014	1	-.008	1	-1.55e-03	1	-2.41e-05	4	-5.229e-04	1
185	N93	max	0	2	.007	2	.008	5	1.306e-03	1	3.148e-04	2	6.246e-04	3
186		min	-.004	4	-.006	6	0	3	-9.199e-04	5	4.937e-06	6	-9.466e-04	5

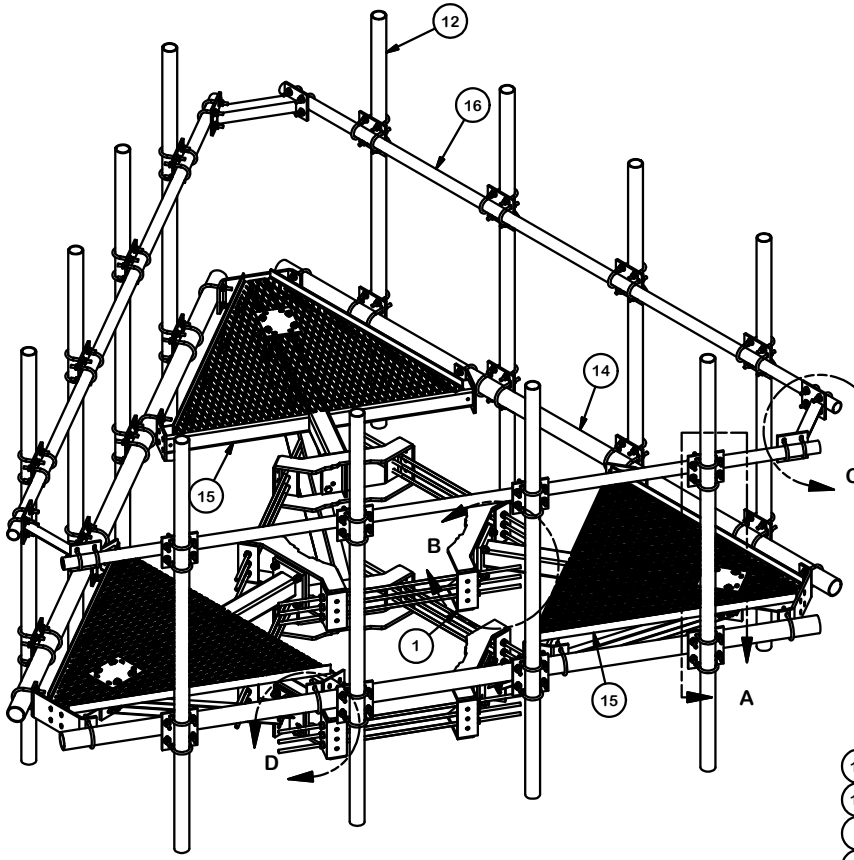
Envelope AISC 14th(360-10): LRFD Steel Code Checks

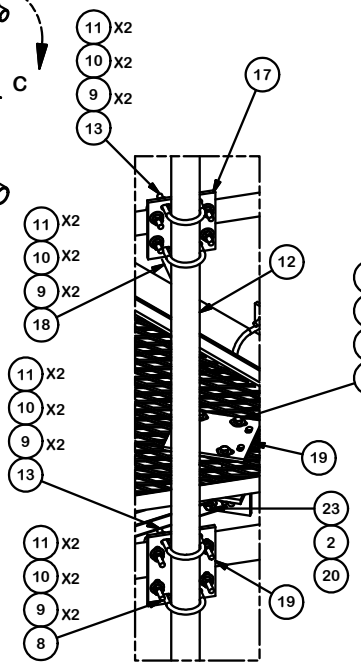
	Member	Shape	Code Check	Loc...	LC	Shea..	Loc.....		L..	phi*Pn..	phi*Pn..	phi*M...	phi*M...	...	Eqn
1	M21	PIPE_2.5	.414	2	4	.080	2		1	30.038	50.715	3.596	3.596	2..	H1-1b
2	M22	PIPE_2.5	.412	2	4	.111	2		5	30.038	50.715	3.596	3.596	1..	H1-1b
3	M25	PIPE_2.5	.410	2	1	.075	5.5		2	30.038	50.715	3.596	3.596	1..	H1-1b
4	M29	PIPE_2.5	.397	2	1	.076	2		4	30.038	50.715	3.596	3.596	1..	H1-1b
5	M23	PIPE_2.5	.390	2	1	.076	2		4	30.038	50.715	3.596	3.596	1..	H1-1b
6	M26	PIPE_2.5	.385	2	1	.128	2		2	30.038	50.715	3.596	3.596	1..	H1-1b
7	M30	PIPE_2.5	.376	2	2	.086	2		4	30.038	50.715	3.596	3.596	1..	H1-1b
8	M13	PIPE_2.0	.350	4.5...	1	.138	7.7...		1	6.346	32.13	1.872	1.872	3..	H1-1b
9	M14	PIPE_2.0	.340	8.0...	2	.137	11....		2	6.346	32.13	1.872	1.872	4..	H1-1b
10	M5	PIPE_3.0	.338	1.5...	1	.268	1.4...		1	57.037	65.205	5.749	5.749	1	H1-1b
11	M16	PIPE_2.5	.334	2	4	.085	2		2	30.038	50.715	3.596	3.596	1..	H1-1b
12	M24	PIPE_2.5	.331	2	1	.084	2		4	30.038	50.715	3.596	3.596	1..	H1-1b
13	M28	PIPE_2.5	.306	2	1	.116	2		1	30.038	50.715	3.596	3.596	1..	H1-1b
14	M27	PIPE_2.5	.304	2	5	.099	2		1	30.038	50.715	3.596	3.596	1..	H1-1b
15	M20	PIPE_2.5	.289	2	4	.086	2		5	30.038	50.715	3.596	3.596	2..	H1-1b
16	M4	PIPE_3.0	.286	1.4...	2	.254	1.2...		2	57.037	65.205	5.749	5.749	1	H1-1b
17	M6	PIPE_3.0	.281	1.4...	4	.242	1.2...		4	57.037	65.205	5.749	5.749	1	H1-1b
18	M15	PIPE_2.0	.275	4.5...	2	.110	7.7...		4	6.346	32.13	1.872	1.872	4..	H1-1b
19	M2	HSS4x4x4	.145	3.9...	1	.076	4.01	z	4	135.844	139.518	16.181	16.181	2..	H1-1b
20	M1	HSS4x4x4	.142	0	1	.090	4.01	y	1	138.291	139.518	16.181	16.181	1..	H1-1b
21	M3	HSS4x4x4	.124	5	1	.059	1.51	y	5	138.935	139.518	16.181	16.181	1..	H1-1b
22	M34	LL2.5x2.5x3x3	.115	4.7...	4	.004	4.7...	y	1	43.374	58.32	3.954	2.55	1	H1-1..
23	M36	LL2.5x2.5x3x3	.110	4.7...	1	.003	0	y	4	43.374	58.32	3.954	2.55	1	H1-1...
24	M18	HSS4x4x4	.104	0	1	.086	0	y	1	135.137	139.518	16.181	16.181	1..	H1-1b
25	M17	HSS4x4x4	.103	0	1	.104	0	y	1	134.981	139.518	16.181	16.181	1..	H1-1b
26	M10	HSS4x4x4	.075	2.7...	4	.095	0	z	1	135.06	139.518	16.181	16.181	1..	H1-1b
27	M12	HSS4x4x4	.069	0	2	.084	2.7...	y	2	135.06	139.518	16.181	16.181	1..	H1-1b
28	M11	HSS4x4x4	.068	0	5	.095	0	z	5	134.98	139.518	16.181	16.181	1..	H1-1b
29	M35	LL2.5x2.5x3x3	.063	4.7...	6	.002	0	y	4	43.374	58.32	3.954	2.55	1	H1-1...
30	M19	HSS4x4x4	.062	2.7...	3	.097	0	y	5	135.138	139.518	16.181	16.181	1..	H1-1b
31	M31	L2.5x2.5x4	.009	.411	2	.124	.821	y	4	37.717	38.556	1.114	2.537	1..	H2-1
32	M32	L2.5x2.5x4	.008	.411	1	.149	0	y	4	37.717	38.556	1.114	2.537	1..	H2-1
33	M33	L2.5x2.5x4	.008	.411	4	.169	0	y	1	37.717	38.556	1.114	2.537	1..	H2-1



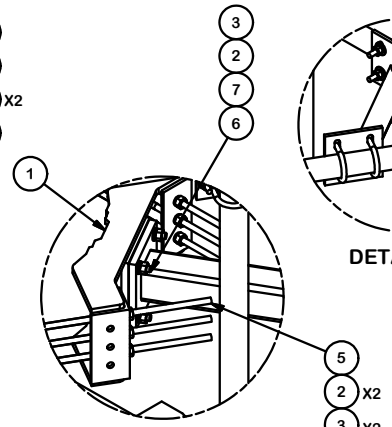
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
TJL	CT11611B	July 18, 2018 at 4:36 PM
18058.81	Unity Check	Mount - Proposed.r3d

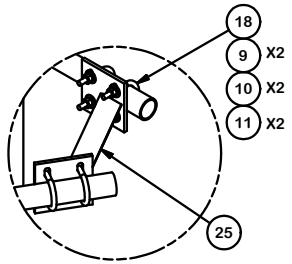




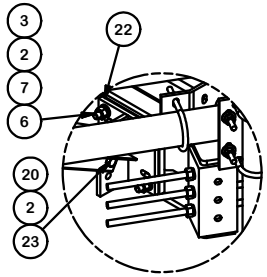
DETAIL A



DETAIL B



DETAIL C



DETAIL D

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.16	408.95
2	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
3	60	A58NUT	5/8" HDG A325 HEX NUT		0.13	7.78
4	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		0.55	9.88
5	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		0.55	9.88
6	24	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	8.53
7	24	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.82
8	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.73	26.34
9	264	G12FW	1/2" HDG USS FLATWASHER		0.03	8.99
10	252	G12LW	1/2" HDG LOCKWASHER		0.01	3.50
11	252	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	18.03
12	12	P3096	2-7/8" OD X 96" Sch 40 Galvanized Pipe		46.45	557.43
13	48	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.73	35.12
14	3	P3150	3-1/2" X 150" SCH 40 GALVANIZED PIPE	150 in	94.80	284.40
15	3	X-SV196	LOW PROFILE PLATFORM CORNER		212.10	636.31
16	3	P2150	2-3/8" OD X 150" SCH 40 GALVANIZED PIPE	150 in	48.06	144.17
17	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
18	36	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.73	26.34
19	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
20	6	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.78
21	6	X-253993	PLATFORM REINFORCEMENT KIT ANGLE	52 25/32 in	14.33	85.99
22	6	X-253992	T-BRACKET FOR REINFORCEMENT KIT		13.55	81.27
23	6	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.62
24	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	4.91
25	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
					TOTAL WT. #	2645.84

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

REVISION HISTORY				
REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	REPLACED HCP WITH X-AHCP	4488	CEK	7/14/2014

DESCRIPTION
12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-7/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

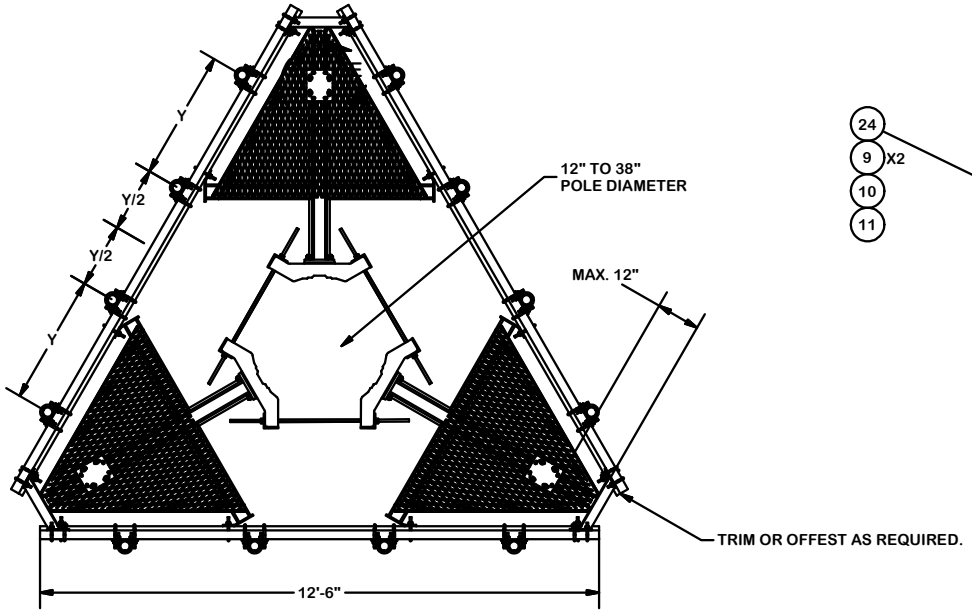
SITE PRO 1 — A valmont COMPANY

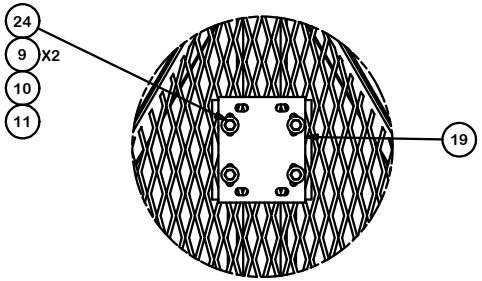
Engineering Support Team: 1-888-753-7446

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

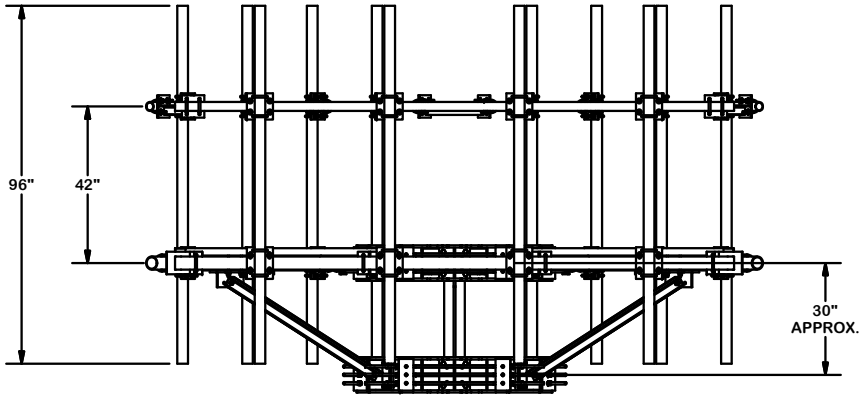
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
4488	CEK 3/24/2014		RMQP-4096-HK	1 OF 3

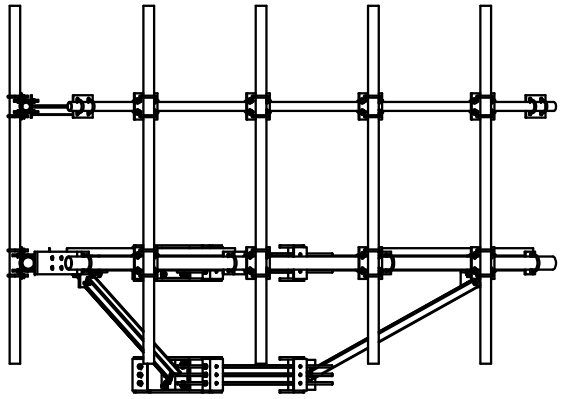
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-4096-HK





DETAIL E





TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	REPLACED HCP WITH X-AHCP	4488	CEK	7/14/2014

REVISION HISTORY

DESCRIPTION
12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-7/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

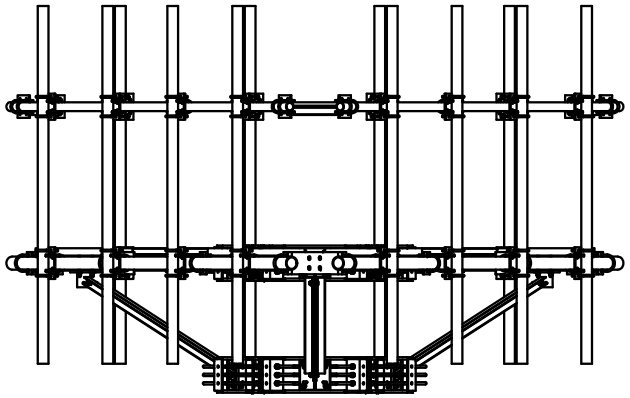
SITE PRO 1
A valmont COMPANY

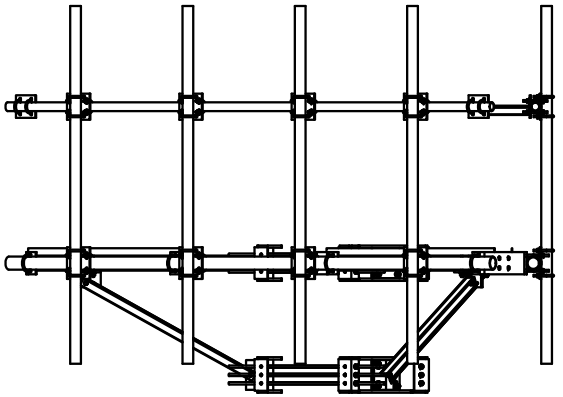
Engineering Support Team:
1-888-753-7446

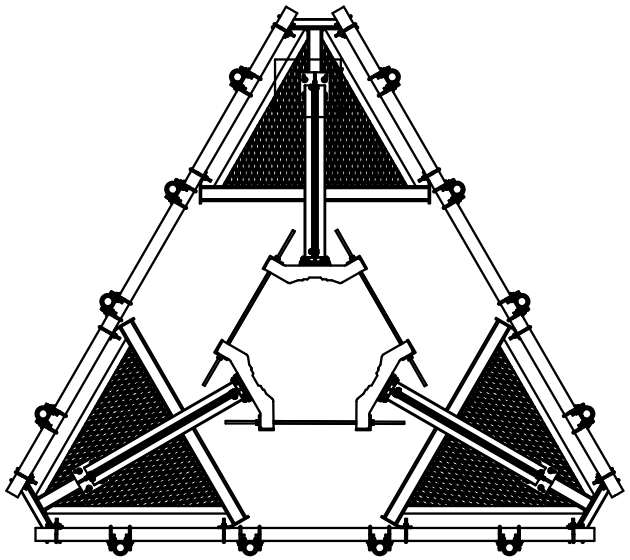
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

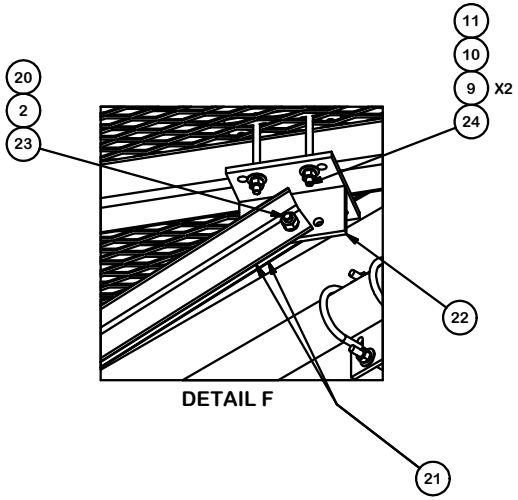
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 3/24/2014		RMQP-4096-HK

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-4096-HK









DETAIL F

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	REPLACED HCP WITH X-AHCP	4488	CEK	7/14/2014

REVISION HISTORY

DESCRIPTION
12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-7/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

SITE PRO 1
A valmont COMPANY

Engineering
Support Team:
1-888-753-7446

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 3/24/2014		RMQP-4096-HK

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-4096-HK

SITE NAME: NEXTEL MONOPOLE HAMDEN

2895 STATE ROAD
HAMDEN, CT 06517

SITE NUMBER: CT11611B

PROJECT: T-MOBILE L600

CONFIGURATION: 67D92DB

T-MOBILE TECHNICIAN SITE SAFETY NOTES

LOCATION	SPECIAL RESTRICTIONS
ANTENNA/TMA	
SECTOR A:	ACCESS NOT PERMITTED
SECTOR B:	ACCESS NOT PERMITTED
SECTOR C:	ACCESS NOT PERMITTED
GPS/LMU:	UNRESTRICTED*
(*CAUTION: OSHA-APPROVED PORTABLE 8' STEP-LADDER REQUIRED)	
RADIO CABINETS:	UNRESTRICTED
PPC DISCONNECT:	UNRESTRICTED
MAIN CIRCUIT D/C:	UNRESTRICTED
NIU/T DEMARC:	UNRESTRICTED
OTHER/SPECIAL:	NONE

GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE NORTHEAST, LLC. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE T-MOBILE NORTHEAST. LLC REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

SPECIAL CONSTRUCTION NOTES

1. TOWER OWNER SHALL PROVIDE GLOBAL STRUCTURAL STABILITY ANALYSIS OF EXISTING ANTENNA SUPPORT STRUCTURE. GENERAL CONTRACTOR SCOPE OF WORK SHALL INCLUDE TO FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS, RE-BUNDLING OF COAXIAL CABLES OR OTHER SPECIAL MODIFICATIONS AS OUTLINED THEREIN.
2. 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.
3. PROTERRA DESIGN GROUP ASSUMES THAT THE MONOPOLE IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES.
4. ANY REQUIRED ANTENNA MOUNT WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE ANTENNA MOUNT STRUCTURAL ANALYSIS, (MSA) PREPARED BY OTHERS.

PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T-MOBILE EQUIPMENT MODERNIZATION
ZONING JURISDICTION:	SPECIAL ZONING NOTE (ELIGIBLE FACILITY REQUEST): BASED ON INFORMATION PROVIDED BY T-MOBILE 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).
SITE ADDRESS:	2895 STATE ROAD HAMDEN, CT 06517
LATITUDE:	41° 21' 36.03" N (41.3600°) (FROM SBA RECORD)
LONGITUDE:	72° 53' 8.50" W (-72.8857°) (FROM SBA RECORD)
JURISDICTION:	TOWN OF HAMDEN
BUILDING CODE:	2016 CONNECTICUT STATE BUILDING CODE WITH AMENDMENTS. (IBC 2012 BASED)
ELECTRICAL CODE:	2014 NATIONAL ELECTRICAL CODE WITH AMENDMENTS
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
TOWER OWNER:	SBA 2012 TC ASSETS, LLC
SBA SITE ID:	CT46137-A
SBA SITE NAME:	HAMDEN-STATE ST
SBA REGIONAL SITE MANAGER:	STEPHEN ROTH (860) 539-4920

APPROVALS

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

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

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

UNDERGROUND SERVICE ALERT

DRAWING INDEX

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
PROFESSIONAL ENGINEER
LICENSED

CHECKED BY: JMM/TEJ 9/6/18

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	09/06/18	ISSUED FOR CONSTRUCTION	PN
0	08/22/18	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT11611B
SITE NAME:
NEXTEL MONOPOLE HAMDEN
SITE ADDRESS:
2895 STATE ROAD
HAMDEN, CT 06517

SHEET TITLE
COMPOUND PLAN

SHEET NUMBER
T-1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTNING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER SURCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

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

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

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CUR\BS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
14. ANY NEW CONCRETE NEEDED FOR CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (FY = 36 KSI) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (FY = 35 KSI). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH UMTS SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF T-MOBILE SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. APPLICABLE BUILDING CODES:
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

    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), STEEL CONSTRUCTION MANUAL, 14TH EDITION;

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

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

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

ABBREVIATIONS

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

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ 9/6/18

APPROVED BY: JMM/TEJ

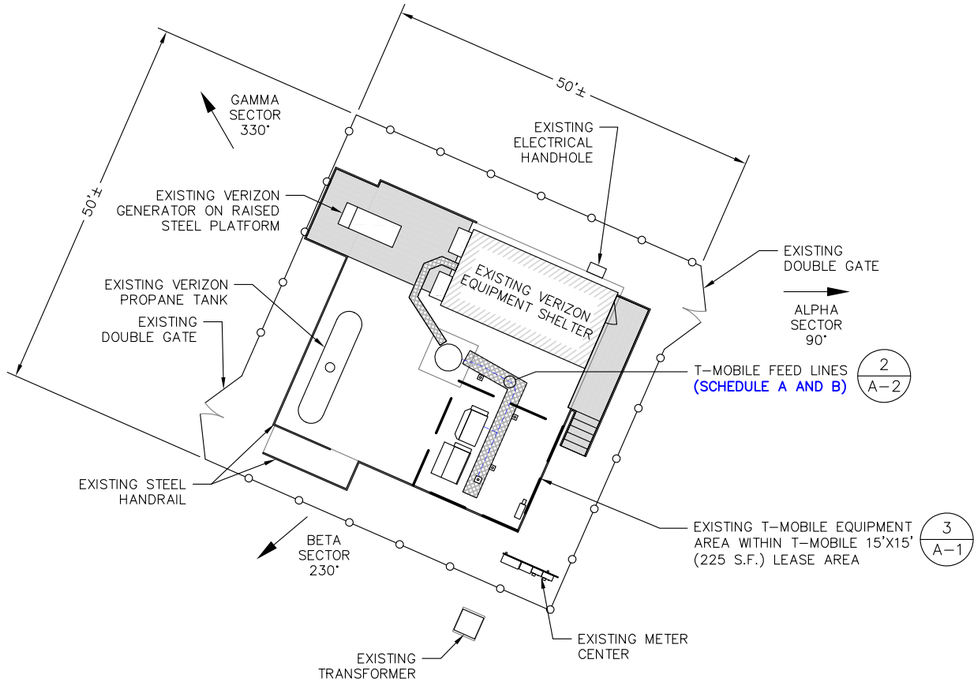
SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	09/06/18	ISSUED FOR CONSTRUCTION	PN
0	08/22/18	ISSUED FOR CONSTRUCTION	JEB PN

SITE NUMBER:
CT11611B
SITE NAME:
NEXTEL MONOPOLE
HAMDEN
SITE ADDRESS:
2895 STATE ROAD
HAMDEN, CT 06517

SHEET TITLE
GENERAL NOTES

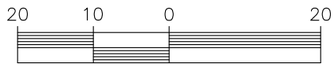
SHEET NUMBER
GN-1

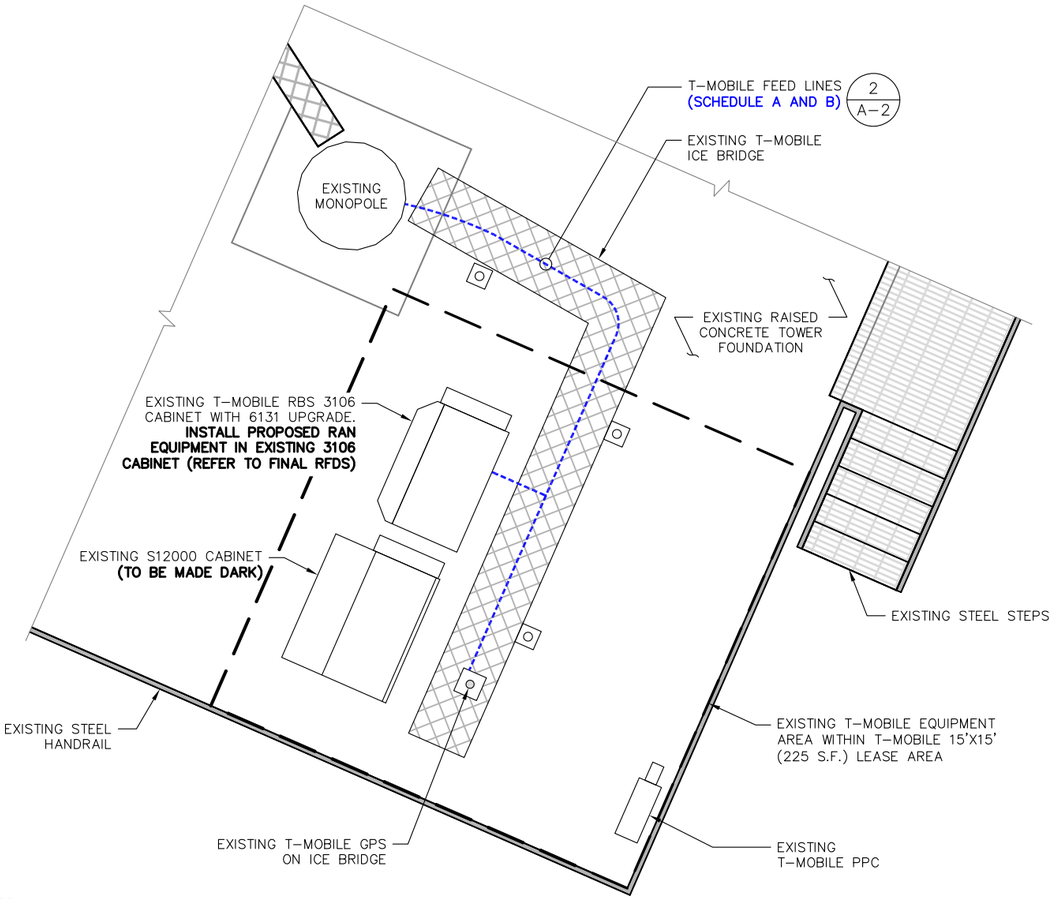


COMPOUND PLAN

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

1 / A-1





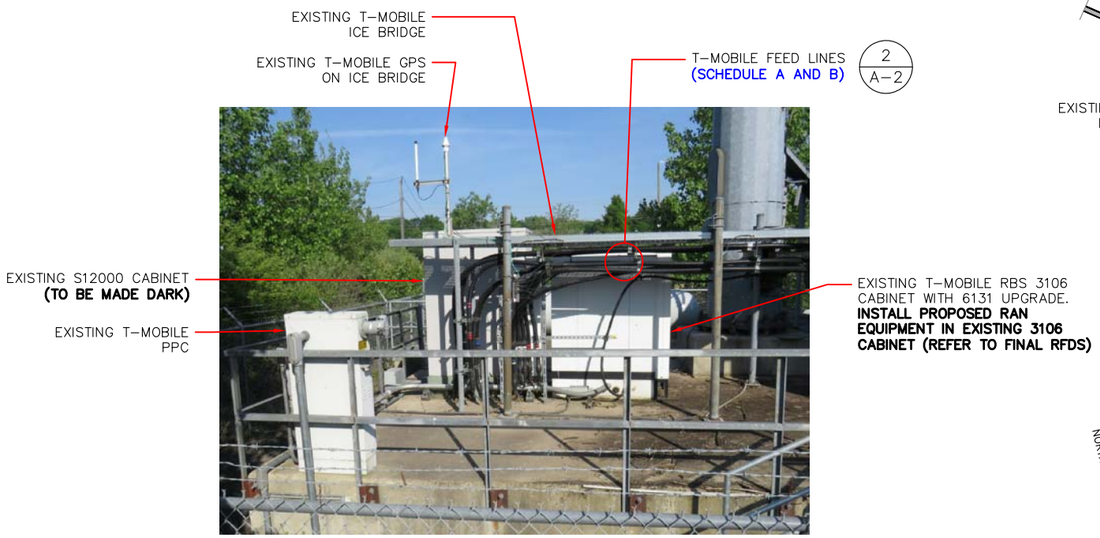
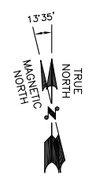


IMAGE SOURCE: PROTERRA 05/26/18

EQUIPMENT PHOTO DETAIL

SCALE: N.T.S.

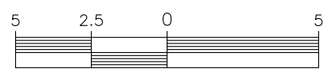
2 / A-1



GROUND EQUIPMENT PLAN

SCALE: 1"=5' (11"x17")
1"=2.5' (22"x34")

3 / A-1



T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	09/06/18	ISSUED FOR CONSTRUCTION	PN
0	08/22/18	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT11611B
SITE NAME:
NEXTEL MONOPOLE HAMDEN
SITE ADDRESS:
2895 STATE ROAD
HAMDEN, CT 06517

SHEET TITLE
COMPOUND PLAN

SHEET NUMBER
A-1

TOP MONOPOLE
ELEV.= 136'± (ABOVE BASE ELEVATION)
(SBA RECORD)

℄ OF PROPOSED T-MOBILE ANTENNAS
ELEV.= 128'± (ABOVE BASE ELEVATION)
(SBA DATABASE)

ALL / A-3 — ALL / A-4

EXISTING PANEL ANTENNA
BY OTHERS, TYP.

**PROPOSED T-MOBILE EQUIPMENT
ON PROPOSED SECTOR FRAME**

ALL / A-3 — ALL / A-4

2 / A-2 T-MOBILE FEED LINES
(SCHEDULE A AND B)

EXISTING 136'±
MONOPOLE

NOTE:
GROUND EQUIPMENT
NOT SHOWN FOR
CLARITY

5'±

EXISTING BASE ELEVATION
ELEV.= 0' (ABOVE BASE ELEVATION)
EXISTING GRADE (VARIES)

ELEVATION DETAIL

1 / A-2

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

20 10 0 20

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO BE REMAIN: (12) 1⅝" COAX & (1) 9 X 18 HYBRID TO 128' RAD	UP INSIDE MONOPOLE TO RAD
B	PROPOSED: (2) 6 X 12 HYBRID TO 128' RAD	UP INSIDE MONOPOLE TO RAD

NOTE: EXISTING T-MOBILE EQUIPMENT FEEDLINE LEASING ENTITLEMENTS BASED ON T-MOBILE RFDS & SBA RECORD. OBSERVED FIELD CONDITIONS MAY DIFFER.

T-MOBILE FEED LINES

IMAGE SOURCE: PROTERRA 05/26/18

FEEDLINE PHOTO DETAIL AT TOWER BASE

2 / A-2

SCALE: N.T.S.

ALL / A-3 — ALL / A-4

℄ OF PROPOSED T-MOBILE ANTENNAS
ELEV.= 128'± AGL (SBA DATABASE)

EXISTING 136'±
MONOPOLE

2 / A-2 T-MOBILE FEED LINES
(SCHEDULE A AND B)

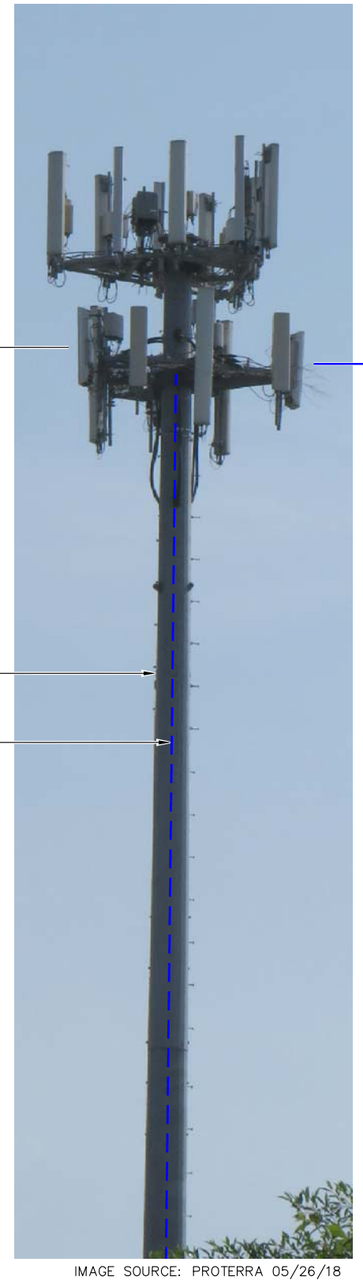


IMAGE SOURCE: PROTERRA 05/26/18

PARTIAL ELEVATION PHOTO DETAIL

3 / A-2

SCALE: N.T.S.

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
PROFESSIONAL ENGINEER
LICENSED

CHECKED BY: JMM/TEJ 9/6/18

APPROVED BY: JMM/TEJ

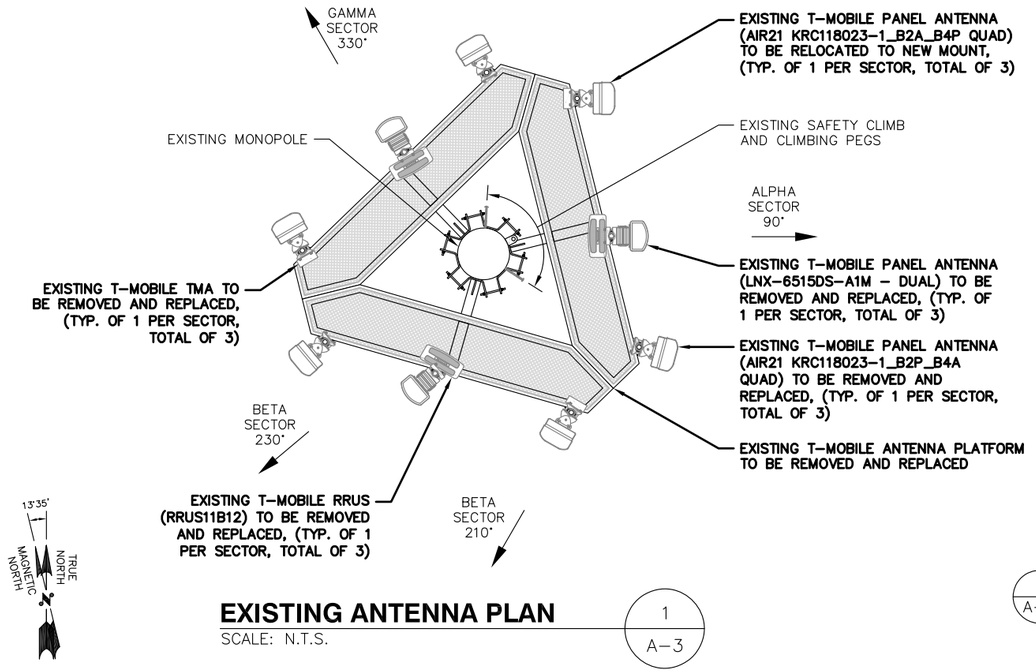
SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	09/06/18	ISSUED FOR CONSTRUCTION	PN
0	08/22/18	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT11611B
SITE NAME:
NEXTEL MONOPOLE
HAMDEN
SITE ADDRESS:
2895 STATE ROAD
HAMDEN, CT 06517

SHEET TITLE
ELEVATIONS

SHEET NUMBER
A-2



EXISTING ANTENNA PLAN

SCALE: N.T.S.

1 / A-3

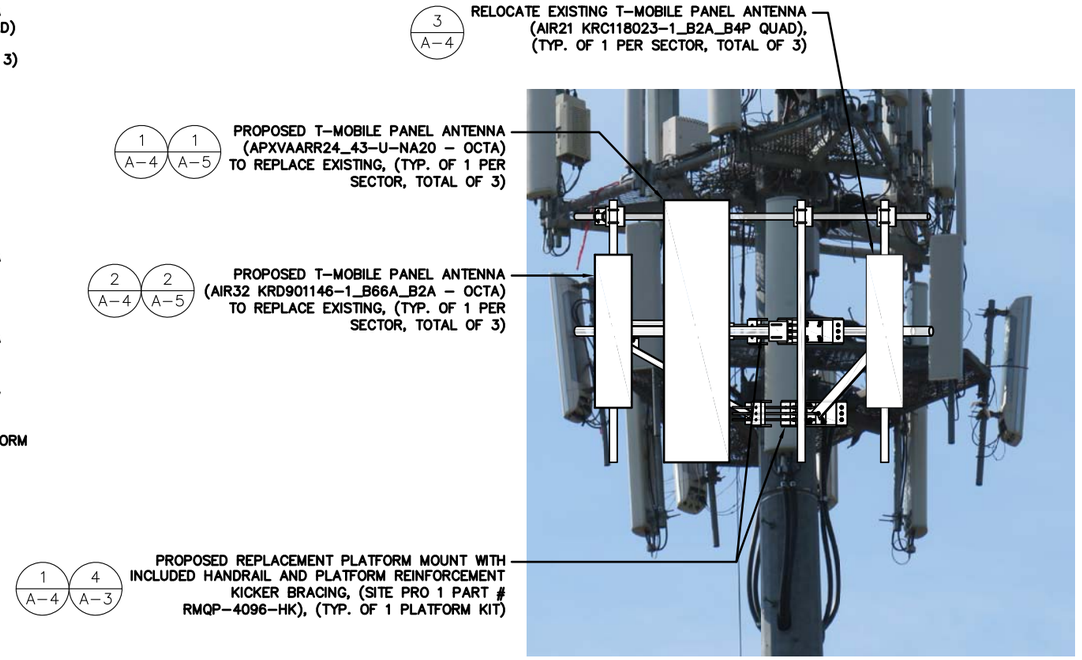
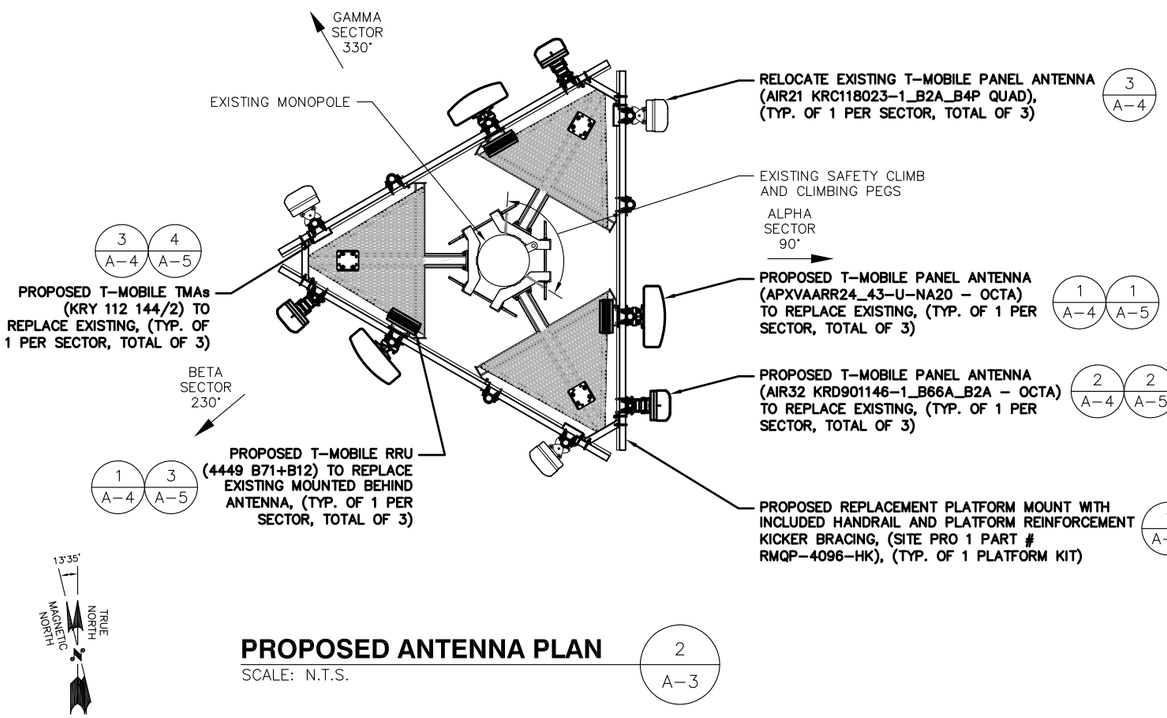


IMAGE SOURCE: PROTERRA 05/26/18
NOTE: ONLY SECTOR SHOWN FOR CLARITY

ANTENNA PHOTO DETAIL

SCALE: N.T.S.

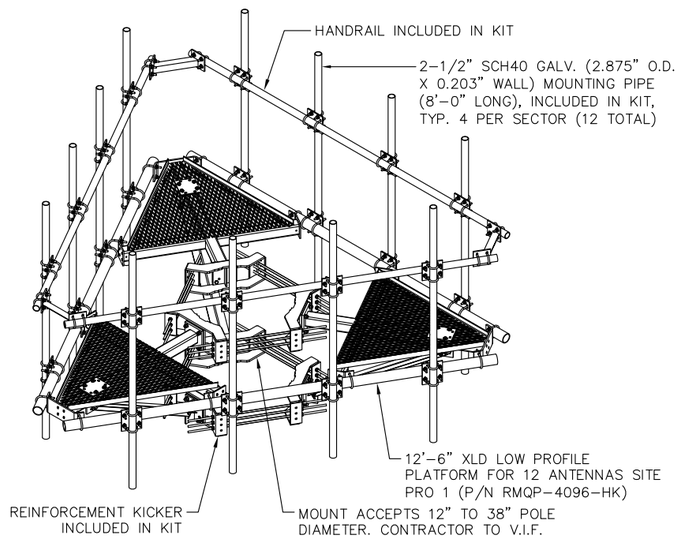
3 / A-3



PROPOSED ANTENNA PLAN

SCALE: N.T.S.

2 / A-3



PLATFORM DETAIL

SCALE: N.T.S.

4 / A-3

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: 9/6/18 JMM/TEJ

APPROVED BY: JMM/TEJ

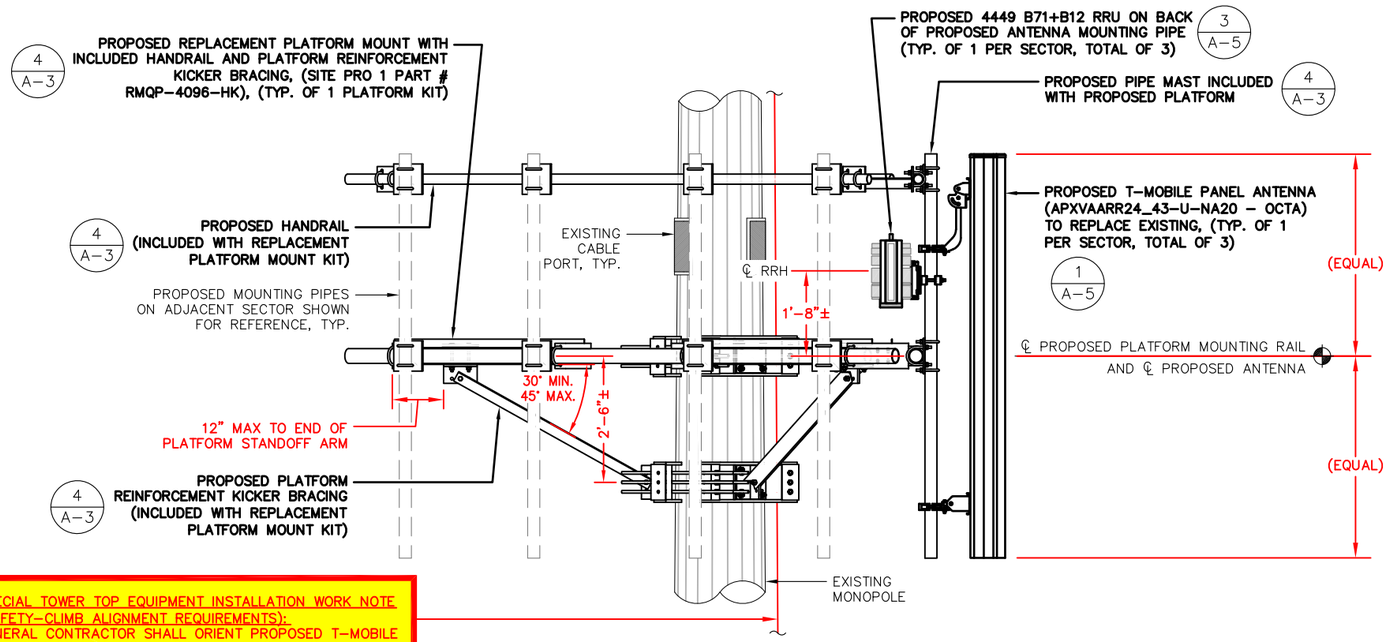
SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	09/06/18	ISSUED FOR CONSTRUCTION	PN
0	08/22/18	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT11611B
SITE NAME:
NEXTEL MONOPOLE
HAMDEN
SITE ADDRESS:
2895 STATE ROAD
HAMDEN, CT 06517

SHEET TITLE
EXISTING & PROPOSED ANTENNA PLAN

SHEET NUMBER
A-3

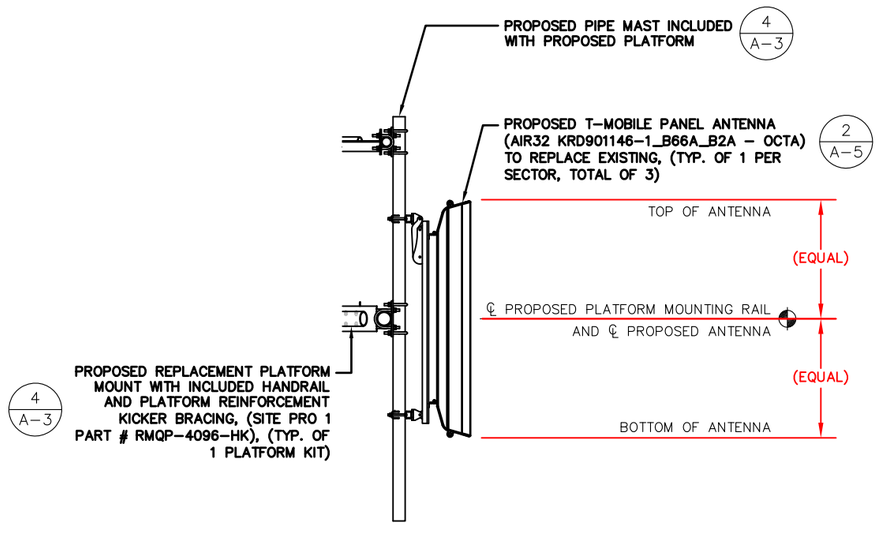


SPECIAL TOWER TOP EQUIPMENT INSTALLATION WORK NOTE (SAFETY-CLIMB ALIGNMENT REQUIREMENTS):
GENERAL CONTRACTOR SHALL ORIENT PROPOSED T-MOBILE PLATFORM COLLAR-MOUNT SO THAT EXISTING SAFETY CLIMB CABLE IS NOT OBSTRUCTED/RE-ROUTED FROM VERTICAL ALIGNMENT AND IS NOT IN PHYSICAL CONTACT WITH PROPOSED COLLAR-MOUNT 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.

PROPOSED ANTENNA MOUNTING DETAIL (APXVAARR24_43-U-NA20 - OCTA)

SCALE: N.T.S.

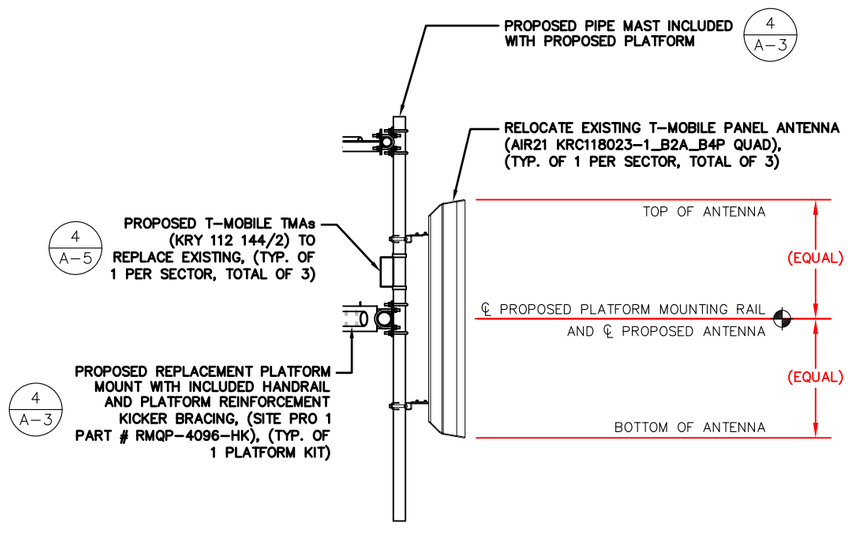
1 A-4



PROPOSED ANTENNA MOUNTING DETAIL (AIR32 KRD901146-1_B66A_B2A - OCTA)

SCALE: N.T.S.

2 A-4



RELOCATED ANTENNA MOUNTING DETAIL (AIR21 KRC118023-1_B2A_B4P - QUAD)

SCALE: N.T.S.

3 A-4

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ 9/6/18

APPROVED BY: JMM/TEJ

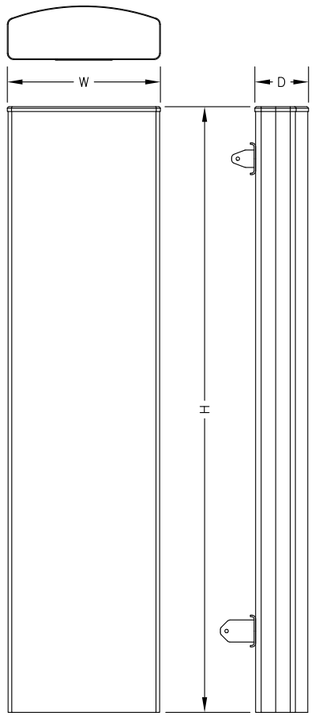
SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	09/06/18	ISSUED FOR CONSTRUCTION	PN
0	08/22/18	ISSUED FOR CONSTRUCTION	JEB PN

SITE NUMBER:
CT11611B
SITE NAME:
NEXTEL MONOPOLE
HAMDEN
SITE ADDRESS:
2895 STATE ROAD
HAMDEN, CT 06517

SHEET TITLE
DETAILS

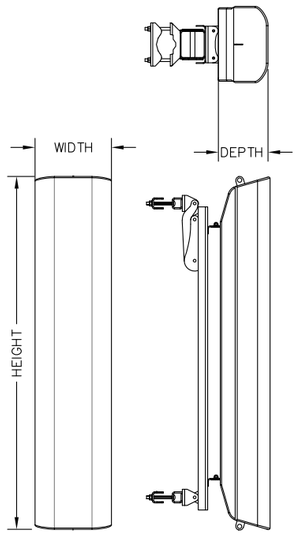
SHEET NUMBER
A-4



APXVAARR24_43-U-NA20 (OCTA) ANTENNA SPECIFICATIONS	
MANUF.	RFS
MODEL #	APXVAARR24_43-U-NA20 (OCTA)
HEIGHT	95.9"
WIDTH	24"
DEPTH	8.7"
WEIGHT	128± LBS.

ANTENNA DETAIL (APXVAARR24_43-U-NA20 OCTA) 1 / A-5

SCALE: N.T.S.

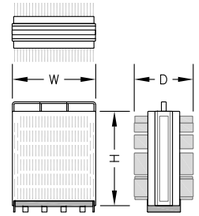


AIR ANTENNA SPECIFICATIONS	
MANUF.	ERICSSON
MODEL #	AIR32 KRD901146-1_B66A _B2A (OCTA)
HEIGHT	56.6"
WIDTH	12.9"
DEPTH	8.7"
WEIGHT	132.2± LBS.

ANTENNA DETAIL (AIR32 KRD901146-1_B66A_B2A OCTA) 2 / A-5

SCALE: N.T.S.

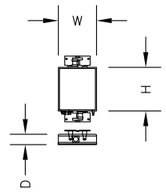
RRU SPECIFICATIONS	
MANUF.	ERICSSON
MODEL #	4449 B71+B12
HEIGHT	14.9"
WIDTH	13.2"
DEPTH	9.2"
WEIGHT	74± LBS.



REMOTE RADIO UNIT (RRU) DETAIL (4449 B71+B12) 3 / A-5

SCALE: N.T.S.

TMA SPECIFICATIONS	
MANUF.	ERICSSON
MODEL #	KRY 112 144/2
HEIGHT	6.9"
WIDTH	6.1"
DEPTH	2.8"
WEIGHT	11± LBS.



TMA DETAIL (KRY 112 144/2) 4 / A-5

SCALE: N.T.S.

ANTENNA CONFIGURATION

SECTOR	BAND	ANTENNA MODEL	ANTENNA RAD (SBA DATABASE)	AZIMUTH	RADIOS/TMAs	CABLE FEED LINES
ALPHA	G1900 U1900 U2100	EXISTING ERICSSON – AIR21 KRC118023-1_B2A_B4P (QUAD)	128'±	90°	PROPOSED (1) KRY 112 144/2 TMA	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	L600 L700	RFS – APXVAARR24_43-U-NA20 (OCTA)	128'±	90°	PROPOSED (1) 4449 B71+B12 RRU,	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	L1900 L2100	ERICSSON – AIR32 KRD901146-1_B66A_B2A (OCTA)	128'±	90°	–	EXISTING HYBRID CABLE TRUNK
BETA	G1900 U1900 U2100	EXISTING ERICSSON – AIR21 KRC118023-1_B2A_B4P (QUAD)	128'±	230°	PROPOSED (1) KRY 112 144/2 TMA	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	L600 L700	RFS – APXVAARR24_43-U-NA20 (OCTA)	128'±	230°	PROPOSED (1) 4449 B71+B12 RRU,	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	L1900 L2100	ERICSSON – AIR32 KRD901146-1_B66A_B2A (OCTA)	128'±	230°	–	EXISTING HYBRID CABLE TRUNK
GAMMA	G1900 U1900 U2100	EXISTING ERICSSON – AIR21 KRC118023-1_B2A_B4P (QUAD)	128'±	330°	PROPOSED (1) KRY 112 144/2 TMA	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	L600 L700	RFS – APXVAARR24_43-U-NA20 (OCTA)	128'±	330°	PROPOSED (1) 4449 B71+B12 RRU,	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	L1900 L2100	ERICSSON – AIR32 KRD901146-1_B66A_B2A (OCTA)	128'±	330°	–	EXISTING HYBRID CABLE TRUNK

REFER TO FINAL RFDS FOR FINAL ANTENNA SETTINGS, CONFIGURATION, QUANTITIES AND RAN WIRING.

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ 9/6/18

APPROVED BY: JMM/TEJ

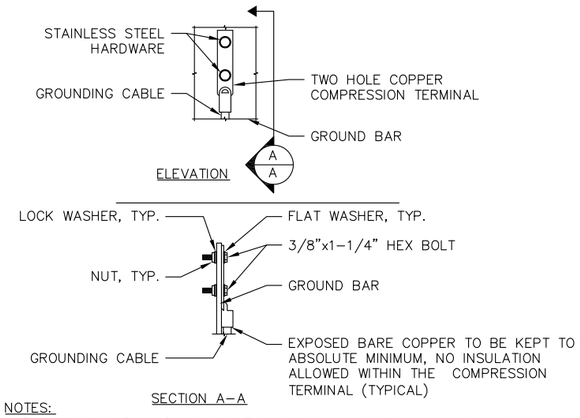
SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	09/06/18	ISSUED FOR CONSTRUCTION	PN
0	08/22/18	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT11611B
SITE NAME:
NEXTEL MONOPOLE
HAMDEN
SITE ADDRESS:
2895 STATE ROAD
HAMDEN, CT 06517

SHEET TITLE
DETAILS

SHEET NUMBER
A-5

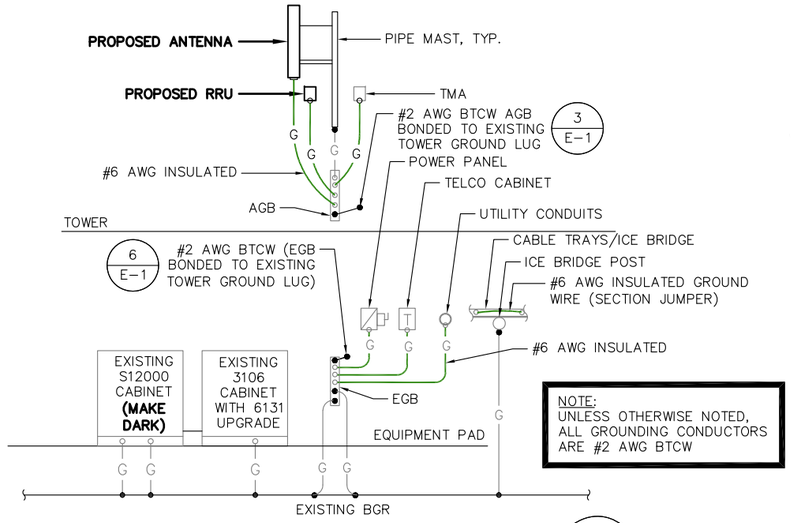


NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL

1 / E-1

SCALE: N.T.S.

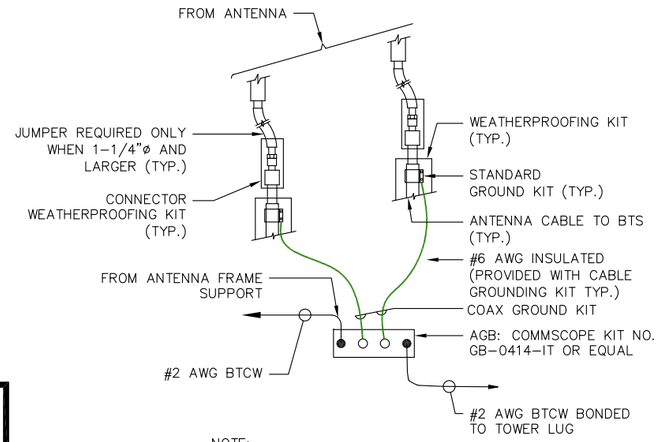


NOTE:
UNLESS OTHERWISE NOTED, ALL GROUNDING CONDUCTORS ARE #2 AWG BTCW

TYPICAL GROUNDING RISER DIAGRAM

2 / E-1

SCALE: N.T.S.

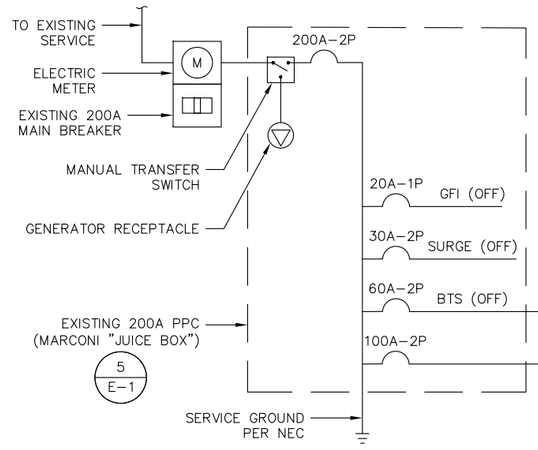


NOTE:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.

TOWER TOP CABLE GROUNDING DETAIL

3 / E-1

SCALE: N.T.S.



ONE LINE POWER SCHEMATIC

4 / E-1

SCALE: N.T.S.

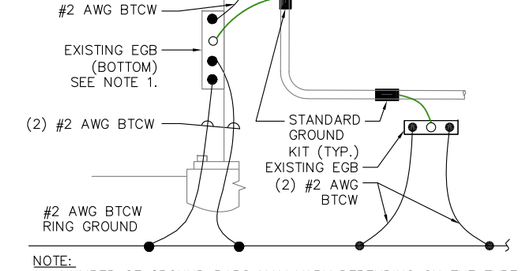
IMAGE SOURCE: PROTERRA 05/26/18

IMAGE SOURCE: PROTERRA 05/26/18

PHOTO DETAIL: PPC PANEL

5 / E-1

SCALE: N.T.S.



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

TOWER BOTTOM CABLE GROUNDING DETAIL

6 / E-1

SCALE: N.T.S.

ELECTRICAL LEGEND

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

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

ELECTRICAL & GROUNDING NOTES:

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

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

PROTERRA DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
PROFESSIONAL ENGINEER
FOR PERMITTING ONLY

CHECKED BY: 9/6/18 JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	09/06/18	ISSUED FOR CONSTRUCTION	PN
0	08/22/18	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT11611B
SITE NAME:
NEXTEL MONOPOLE
HAMDEN
SITE ADDRESS:
2895 STATE ROAD
HAMDEN, CT 06517

SHEET TITLE
ONE-LINE DIAGRAM & GROUNDING DETAILS

SHEET NUMBER
E-1