October 15, 2015

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
51 Daniels Avenue
Waterford, CT 06385
N 41.33048
W -72.16663
T-Mobile Site #: CTNL808B_L700

Members of the Siting Council:

On behalf of T-Mobile, SBA Communications is submitting an exempt modification application to the Connecticut Siting council for modification of existing equipment at a tower facility located at 51 Daniels Avenue, Waterford, CT.

The 51 Daniels Avenue facility consists of a 180' Self Support Tower owned and operated by SBA Towers II, LLC. In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located, First Selectman Dan Steward. Since the Town of Waterford is the property owner in this instance, no additional notification letters are being sent.

As part of T-Mobile's L700 project, T-Mobile desires to upgrade their equipment to meet the new standards of 4G technology. The new equipment will allow customers to download files and browse the internet at a high rate of speed while also allowing their phones to be compatible with the latest 4G technology.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in T-Mobile's operations at the site along with the required fee of $625.

The changes to the facility do not constitute modifications as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The overall height of the structure will be unaffected.

2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.

4. The changes in radio frequency power density will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, SBA Communications on behalf of T-Mobile, respectfully submits that he proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at 508.251.0720 x 3804 with any questions you may have concerning this matter.

Thank you,

Kri Pelletier
SBA Communications Corporation
33 Boston Post Road West Suite 320
Marlborough, MA 01752
508-251-0720 x 3804 + T
508-251-1755 + F
203-446-7700 + C
kpelletier@sbasite.com

T-Mobile

Equipment Modification

51 Daniels Avenue, Waterford, CT 06385

Site number CTNL808B_L700

Tower Owner: SBA Towers II, LLC

Equipment Configuration: Self-Support

Current and/or approved:

- (3) Ericsson AIR B2A/B4P
- (3) Ericsson KRY 112 144 TMAs
- (12) 1-5/8" Lines
- (1) ½" Line
- (1) 1-5/8" Fiber

Final Configuration:

- (3) RFS APX16DWV-16DWVS antennas
- (3) Commscope LNX-6515DS-VTM antennas
- (3) Ericsson Double TMA 17/21
- (3) RFS ATMAA1412D-1A20
- (3) Kathrein 782 11056 Bias T's
- (18) 1-5/8" lines
- (1) ½" line
- (1) 1-5/8" Fiber

Structural Information:

The attached structural analysis demonstrates that the tower and foundation will have adequate structural capacity to accommodate the proposed modifications.

Power Density:

The anticipated Maximum Composite contributions from the T-Mobile facility are 1.23% of the allowable FCC established general public limit. The anticipated composite MPE value for this site assuming all carriers present is 3.92% of the allowable FCC established general public limit sampled at the ground level.

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	1.23 %
Verizon Wireless	1.95 %
AT&T	0.74 %
Site Total MPE %:	3.92 %

October 15, 2015

Mr. Dan Steward, First Selectman
Town of Waterford
Town Hall
15 Rope Ferry Road
Waterford, CT 06385

RE: Telecommunications Facility @ 51 Daniels Avenue, Waterford, CT 06385

Dear Mr. Steward,

In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies (R.C.S.A.) Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review T-Mobile's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The accompanying letter to the Siting Council fully describes T-Mobile's proposal for the referenced cell site. However, if you have any questions or require any further information on our plans or the Siting Council's procedures, please call me at 508.251.0720 x 3804.

Thank you,

Kri Pelletier
SBA Communications Company
33 Boston Post Road West Suite 320
Marlborough, MA 01752
508-251-0720 x 3804 + T
508-251-1755 + F
203-446-7700 + C
kpelletier@sbasite.com

SBA Network Services, LLC

To: CONNECTICUT SITING COUNCIL 129986

Check Number: 2100634
Date: 10/09/2015

Invoice Number	Invoice Date	Description	Gross Amount	Taxes Withheld	Net Amount
PRSF10071506	10/09/2015	CSC Fee CTNL808B_L700	$625.00	$0.00	$625.00
			$625.00	$0.00	$625.00

SBA Network Services, LLC
8051 Congress Avenue
Boca Raton, FL 33487-1307
(561) 995-7670

Wells Fargo Bank

2100634

061209756 129986

DATE	AMOUNT
10/09/2015	$625.00

Void After 120 Days

Six Hundred Twenty Five Dollars And 00 Cents

Pay to the Order of:

CONNECTICUT SITING COUNCIL
ACCOUNTS RECEIVABLE
TEN FRANKLIN SQUARE

NEW BRITAIN, CT 06051

Brenda Lazarus

⑈2100634⑈ ⑆061209756⑆ 2079900424566⑈

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

Tower Structural Analysis Report for SBA Communications Corporation

Existing 180' Self Supported Tower

SBA Site Name: Niantic
SBA Site ID: CT09865-S-04

Carrier Name: T-Mobile
Carrier Site ID: CTNL808B

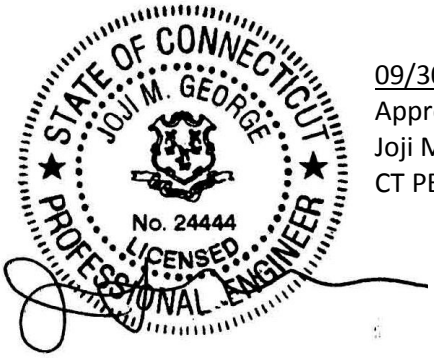
Site Location:
Southwest School 51 Daniels Road
Waterford, CT

Latitude: 41.330264°
Longitude: -72.166672°

ACGI Job # 15-4964

ANALYSIS RESULTS		
Tower Components	49.0 %	**Pass**
Tower Base Foundation	47.0 %	**Pass**

Prepared By:
Jainesh Shah, EIT



09/30/2015
Approved By:
Joji M. George, P.E.
CT PE # 24444

TABLE OF CONTENTS

1. ANALYSIS SUMMARY

The existing 180' Self Supported Tower located in Waterford, CT was analyzed by Allpro Consulting Group, Inc (ACGI) for the existing loads and the proposed antennas and coaxes as authorized by SBA Communication Corp. Based on the results of the analysis, the existing tower with mentioned proposed and existing loading is found **to be in compliance** with *TIA/EIA-222-F, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and IBC 2003.*

2. SCOPE & SOURCE OF INFORMATION

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

SOURCE OF INFORMATION		
Tower Data:	Tower Innovations	-Original Tower Drawings by Tower Innovations (Project Number : 5210 dated 11/05/2008)
	Allpro Consulting Group Inc.	-Previous Structural Analysis by Allpro Consulting Group Inc., (ACGI Job # 15-4557, dated 09/09/2015)
	FDH Engineering, Inc.	-Previous Structural Analysis by FDH Engineering, Inc.(FDH Project Number 1325881400, dated 4/26/2013)
Foundation Data:	Tower Innovations	- Existing MAT foundation data is as per original foundation design by Tower Innovations, Project Number 5210 dated 11/5/2008
Geotechnical Report:	Dr.Clearance Welti, P.E., P.C.Geotechnical Engineering	Soil data is as per Geotechnical Report by Dr.Clearance Welti, P.E., P.C.Geotechnical Engineering (Ref: Geotechnical Study for proposed Cell Tower at Southwest School 51 Daniels Road, Waterford,CT -SBA Network Services, Inc. dated 10/23/2008)
Loading Data:	FDH Engineering, Inc	-Previous Structural Analysis by Allpro Consulting Group Inc., (ACGI Job # 15-4557, dated 09/09/2015
	SBA and Verizon	-T-Mobile Collo App # 25391, v1
Authorization:	SBA Communication Corp.	

3. ANALYSIS METHODS & DATA

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

SITE DATA	
SBA Site Name:	Niantic
SBA Site Number:	CT09865-S-02
Carrier Site ID:	T-Mobile, CTNL808B
City, State:	Waterford, CT
County:	New London County
Code Wind Load Requirement:	ANSI/TIA-222-F (85 mph basic wind speed) IBC 2003 (85 mph basic wind speed)
Wind Load Used:	ANSI/TIA-222-F Code: • Basic wind speed of 85 mph (3 second gust wind speed) • A wind speed of 74 mph is used in combination with ice. • Nominal ice thickness of 0.5 in.

TOWER DATA	
Tower Type:	Self Supported Tower
Height:	180'
Cross Section:	Triangular
Steel Strength:	Legs – 50 ksi , Braces – 36 ksi
Type of Foundation:	Mat Foundation with Pedestal

TOWER HISTORY	
Tower Manufacturer / Model:	Tower Innovations
Date of Original Design:	11/05/2008
Previous Modifications:	Unknown
Original Design Code Requirements:	Unknown

4. CONCLUSIONS

RESULT SUMMARY		
MEMBER	***% Capacity***	***Result***
Legs	**49.0%**	**Pass**
Diagonals	**46.3 %**	**Pass**
Girt	**16.0 %**	**Pass**
Bolt Checks	**42.7 %**	**Pass**
Foundation (see attached MathCAD for details)	**Safety Factor against Overturning: SF: 3.73 > 1.5 (40.2 %)**	**Pass**
	Soil Pressure: 0.665 ksf < 4.408 ksf (Soil Bearing Capacity) (13.77 %)	**Pass**
	Shear: 37 kips < 86.327 kips (Shear Capacity) (42.86%)	**Pass**
OVERALL TOWER RATING = 45.9%		

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

Maximum tower member stress **is less than allowable,** making **it in code compliance** under the EIA/TIA-222-F code and IBC2003 requirements.

5. RECOMMENDATIONS

The existing tower is recommended for the final loading listed on page number 7.

6. DISCLAIMER

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

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

7. APPURTENANCE LISTING

EXISTING LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
180'±	2	Sinclair SC488-HF2LNF Omnis	(2) SitePRO1 HM6 6' Standoffs	(2) 1-5/8"	Town of Waterford
	1	DBSpectra ATS8TMA10 TMA			
170'±	6	Powerwave 7770.00	(3) T-Frames (CaAa = 18.81 ft2 each	(12) 1-5/8" (1) 3" Conduit	AT&T
	3	KMW 14-65			
	6	Powerwave TT19-08BP111-001 TMAs			
	6	Ericsson RRUS 11 RRUs			
	1	Raycap DC6-48-60-18-8F Surge Suppressor			
160'±	3	Ericsson AIR B2A/B4P	(3) T-Frames	(12) 1-5/8" (1) 1/2" (1) 1-5/8" Fiber	T-Mobile
	3	Ericsson KRY 112 144 TMAs			
140'±	3	Antel BXA-80063/6CF	(3) T-Frames	(18) 1-5/8" (1) 1-5/8" Hybriflex Fiber	Verizon
	3	Antel BXA-70063/6CF			
	6	Commscope SBNHH 1 D65B			
	3	Alcatel Lucent RRH 2x60-AWS RRUs			
	3	Alcatel Lucent RRH 2x60-PCS RRUs			
	3	Alcatel Lucent RRH 2x60-700 RRUs			
	2	ODU Celwave DB-T1-6Z			

FINAL T-MOBILE LOAD DESCRIPTION					
ELEV (ft.)	***Qty.***	***Antenna Description***	***Mount Type & Qty.***	***TX. LINE (in)***	***TENANT***
160'±	3	RFS APX16DWV-16DWVS antennas	(3) T-Frames	(18) 1-5/8" (1) 1/2" (1) 1-5/8" Fiber	T-Mobile
	3	Commscope LNX-6515DS-VTM antennas			
	3	Ericsson Double TMA 17/21			
	3	RFS ATMAA1412D-1A20			
	3	Kathrein 782 11056 Bias T's			

Notes:

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

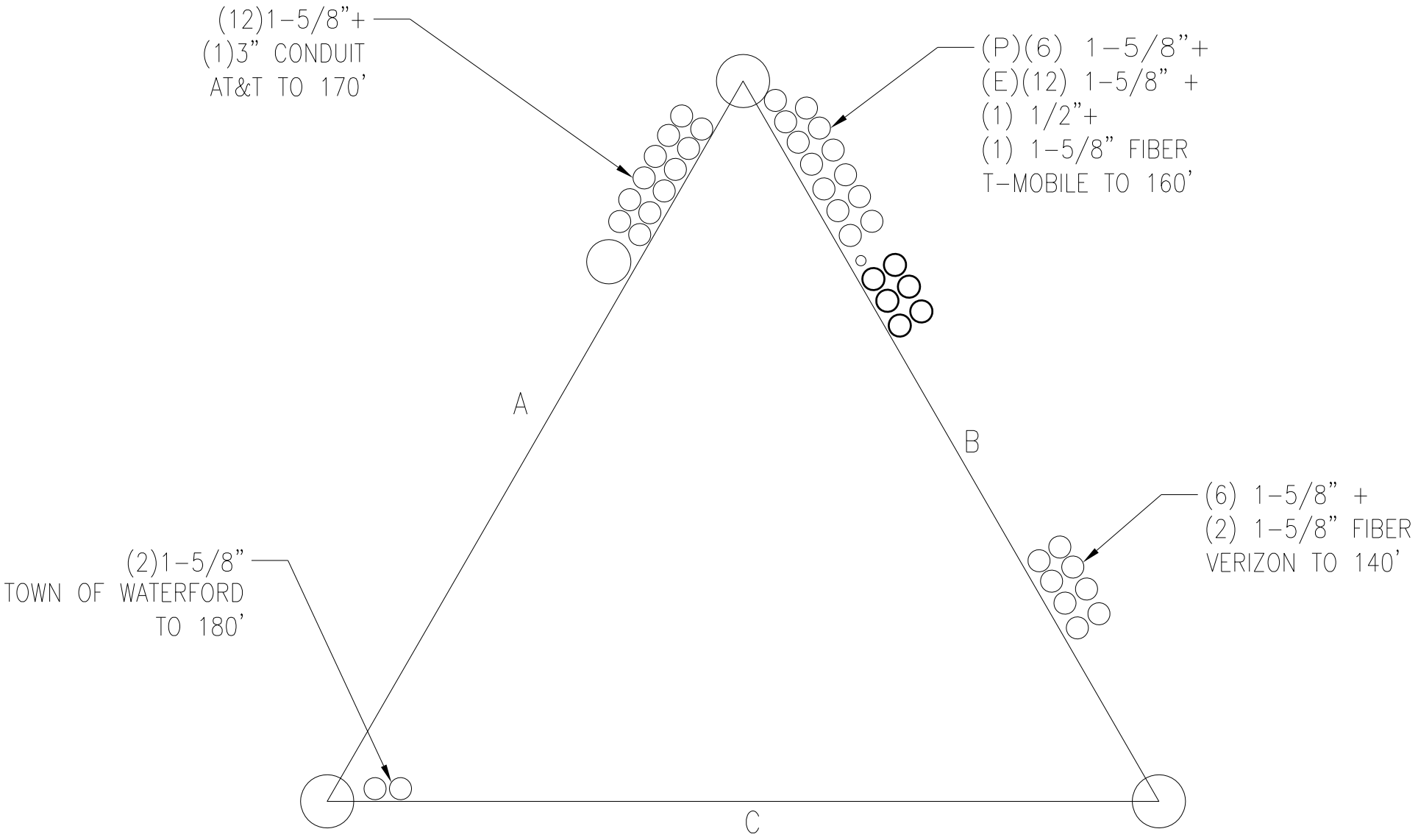
8. SUMMARY OF WORKING PERCENTAGE OF STRUCTURAL COMPONENTS

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
T1	180 - 160	Leg	1 3/4	3	-17.77	53.58	33.2	Pass
		Diagonal	7/8	13	-2.66	5.79	46.0	Pass
		Top Girt	7/8	4	-0.13	3.45	3.7	Pass
		Bottom Girt	7/8	7	-0.15	3.45	4.3	Pass
T2	160 - 140	Leg	2 1/2	48	-64.62	144.72	44.7	Pass
		Diagonal	1	58	-4.64	10.16	45.7	Pass
		Top Girt	1	51	-0.23	6.03	3.8	Pass
		Bottom Girt	1	53	-0.03	6.03	0.5	Pass
T3	140 - 120	Leg	3 1/2	93	-139.25	321.05	43.4	Pass
		Diagonal	1 1/8	103	-7.78	16.81	46.3	Pass
		Top Girt	1 1/8	96	-0.22	10.01	2.2	Pass
		Bottom Girt	1 1/8	97	-1.61	10.01	16.0	Pass
T4	120 - 90	Leg	4 1/4	138	-159.64	340.19	46.9	Pass
		Diagonal	L2 1/2x2 1/2x3/16	141	-1.84	11.64	15.8	Pass
							17.4 (b)	
T5	90 - 60	Leg	4 1/2	165	-179.96	401.80	44.8	Pass
		Diagonal	L3x3x3/16	168	-2.70	10.99	24.6	Pass
							25.9 (b)	
T6	60 - 30	Leg	4 3/4	192	-203.22	467.37	43.5	Pass
		Diagonal	L3 1/2x3 1/2x1/4	195	-3.63	12.05	30.1	Pass
							31.1 (b)	
T7	30 - 0	Leg	4 3/4	219	-228.99	467.37	49.0	Pass
		Diagonal	L4x4x5/16	228	-6.41	16.44	39.0	Pass
							42.7 (b)	
							Summary	
						Leg (T7)	49.0	Pass
						Diagonal (T3)	46.3	Pass
						Top Girt (T2)	3.8	Pass
						Bottom Girt (T3)	16.0	Pass
						Bolt Checks	42.7	Pass
						RATING =	**49.0**	**Pass**

APPENDIX

COAX LAYOUT

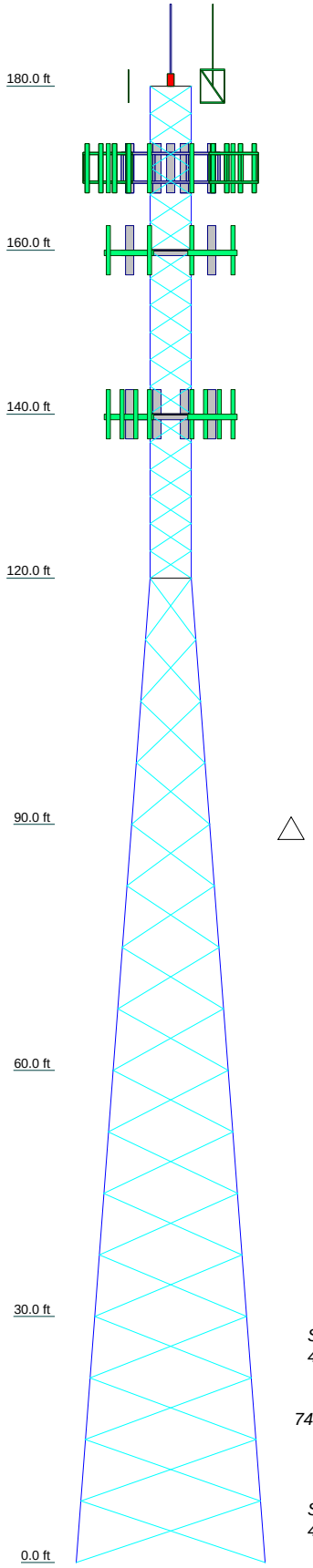


COAX LAYOUT

N.T.S

TOWER ELEVATION DRAWING

Section		T1	T2	T3	T4	T5	T6	T7
Legs		SR 1 3/4	SR 2 1/2	SR 3 1/2	SR 4 1/4	SR 4 1/2		SR 4 3/4
Leg Grade		A572-50						
Diagonals		SR 7/8	SR 1	SR 1 1/8	L2 1/2x2 1/2x3/16	L3x3x3/16	L3 1/2x3 1/2x1/4	L4x4x5/16
Diagonal Grade		A572-50				A36		
Top Girts		SR 7/8	SR 1	SR 1 1/8	N.A.			
Bottom Girts		SR 7/8	SR 1	SR 1 1/8	N.A.			
Face Width (ft)	23	5				9.5	14	18.5
# Panels @ (ft)		6 @ 3.31944	6 @ 3.30556	6 @ 3.31944	16 @ 7.5			
Weight (K)	34.9	1.0	1.7	2.8	5.4	6.4	7.9	9.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(E) Lightning Rod	180	APX16DWV-16DWVS-E-A20 (T-Mobile)	160
(E) Flash Beacon Lighting	180	APX16DWV-16DWVS-E-A20 (T-Mobile)	160
(E)Sinclair SC488-HF2LNF Omni (Town of Waterford)	180	LNX-6515DS-VTM (T-Mobile)	160
(E)Sinclair SC488-HF2LNF Omni (Town of Waterford)	180	LNX-6515DS-VTM (T-Mobile)	160
(E)DBSpectra ATS8TMA10 TMA (Town of Waterford)	180	(E)T-Frame (T-Mobile)	160
(E) SitePRO1 HM6 6' Stanoffs (Town of Waterford)	180	(E)T-Frame (T-Mobile)	160
(E) SitePRO1 HM6 6' Stanoffs (Town of Waterford)	180	(E)T-Frame (T-Mobile)	160
(2) (E)Powerwave 7770.00 (ATI)	170	LNX-6515DS-VTM (T-Mobile)	160
(E)KMW 14-65 (ATI)	170	Double TMA 17/21 (T-Mobile)	160
(E)KMW 14-65 (ATI)	170	Double TMA 17/21 (T-Mobile)	160
(E)KMW 14-65 (ATI)	170	(2) (E)Antenna Pipe Mount (T-Mobile)	160
(2) (E)Powerwave TT19-08BP111-001 TMAs (ATI)	170	(2) (E)Antenna Pipe Mount (T-Mobile)	160
(2) (E)Powerwave TT19-08BP111-001 TMAs (ATI)	170	(2) (E)Antenna Pipe Mount (T-Mobile)	160
(2) (E)Powerwave TT19-08BP111-001 TMAs (ATI)	170	(E)T-Frame (Verizon)	140
(2) (E) RRUS 11 (ATI)	170	(E)T-Frame (Verizon)	140
(2) (E) RRUS 11 (ATI)	170	(E)T-Frame (Verizon)	140
(2) (E) RRUS 11 (ATI)	170	(4) (E)Antenna Pipe Mount (Verizon)	140
(E)Raycap DC6-48-60-18-F (ATI)	170	(4) (E)Antenna Pipe Mount (Verizon)	140
(2) (E)Powerwave 7770.00 (ATI)	170	(4) (E)Antenna Pipe Mount (Verizon)	140
(2) (E)Powerwave 7770.00 (ATI)	170	(E)Antel BXA-80063/6CF (Verizon)	140
(E) T-Frame (ATI)	170	(E)Antel BXA-80063/6CF (Verizon)	140
(E) T-Frame (ATI)	170	(E)Antel BXA-80063/6CF (Verizon)	140
(E) T-Frame (ATI)	170	(E)Antel BXA-70063/6CF (Verizon)	140
(3) (E)Antenna Pipe Mount (ATI)	170	(E)Antel BXA-70063/6CF (Verizon)	140
(3) (E)Antenna Pipe Mount (ATI)	170	(E)Antel BXA-70063/6CF (Verizon)	140
(3) (E)Antenna Pipe Mount (ATI)	170	(2) (E)SBNHH 1 D65B (Verizon)	140
Double TMA 17/21 (T-Mobile)	160	(2) (E)SBNHH 1 D65B (Verizon)	140
ATMAA1412D-1A20 (T-Mobile)	160	(2) (E)SBNHH 1 D65B (Verizon)	140
ATMAA1412D-1A20 (T-Mobile)	160	(E)Alcatel RRH2-AWS (Verizon)	140
ATMAA1412D-1A20 (T-Mobile)	160	(E)Alcatel RRH2-AWS (Verizon)	140
782 11056 (T-Mobile)	160	(E)Alcatel RRH2-AWS (Verizon)	140
782 11056 (T-Mobile)	160	(E)Alcatel RRH2-pcs (Verizon)	140
782 11056 (T-Mobile)	160	(E)Alcatel RRH2-pcs (Verizon)	140
APX16DWV-16DWVS-E-A20 (T-Mobile)	160	(E)Alcatel RRH2-pcs (Verizon)	140
		(E)Alcatel RRH2--700 (Verizon)	140
		(E)Alcatel RRH2--700 (Verizon)	140
		(E) ODU Celwave DB-T1-6Z (Verizon)	140
		(E) ODU Celwave DB-T1-6Z (Verizon)	140

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 49%

MAX. C
DOV
SHE
UPLIFT: -189 K
SHEAR: 23 K

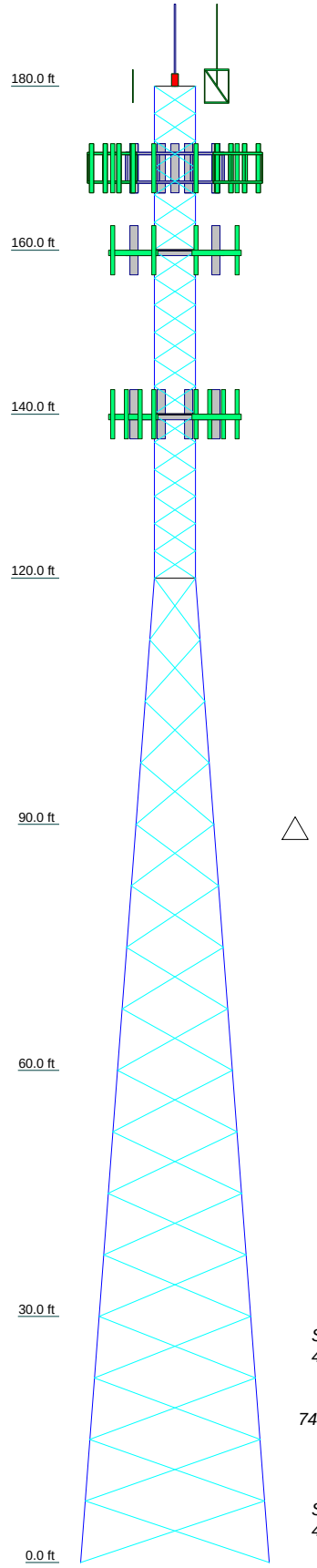
AXIAL 73 K
SHEAR 40 K
MOMENT 4091 kip-ft
TORQUE 2 kip-ft
74 mph WIND - 0.5000 in ICE

AXIAL 51 K
SHEAR 41 K
MOMENT 4156 kip-ft
TORQUE 2 kip-ft
REACTIONS - 85 mph WIND

Allpro Consulting Group
9221 LBJ FREEWAY
Dallas, Texas
Phone: 972-231-8893
FAX: 1-866-364-8375

Job: **15-4964**		
Project: **CT09865-S-02_Niantic_T-Mobile_SA_09292015**		
Client: SBA	Drawn by: Jainesh Shah, EIT	App'd:
Code: TIA/EIA-222-F	Date: 09/30/15	Scale: NTS
Path:		Dwg No. E-1

Section	T7	T6	T5	T4	T3	T2	T1
Legs	SR 4 3/4		SR 4 1/2	SR 4 1/4	SR 3 1/2	SR 2 1/2	SR 1 3/4
Leg Grade	A572-50						
Diagonals	L4x4x5/16	L3 1/2x3 1/2x1/4	L3x3x3/16	L2 1/2x2 1/2x3/16	SR 1 1/8	SR 1	SR 7/8
Diagonal Grade	A36					A572-50	
Top Girts	N.A.				SR 1 1/8	SR 1	SR 7/8
Bottom Girts	N.A.				SR 1 1/8	SR 1	SR 7/8
Face Width (ft)	18.5	14	9.5	5			
# Panels @ (ft)	16 @ 7.5				6 @ 3.31944	6 @ 3.30556	6 @ 3.31944
Weight (K)	34.9	7.9	6.4	5.4	2.8	1.7	1.0



MATERIAL STRENGTH

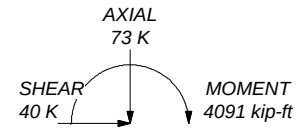
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

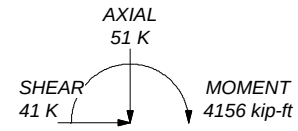
1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 49%

MAX. CORNER REACTIONS AT BASE:
DOWN: 230 K
SHEAR: 23 K

UPLIFT: -189 K
SHEAR: 23 K



TORQUE 2 kip-ft
74 mph WIND - 0.5000 in ICE



TORQUE 2 kip-ft
REACTIONS - 85 mph WIND

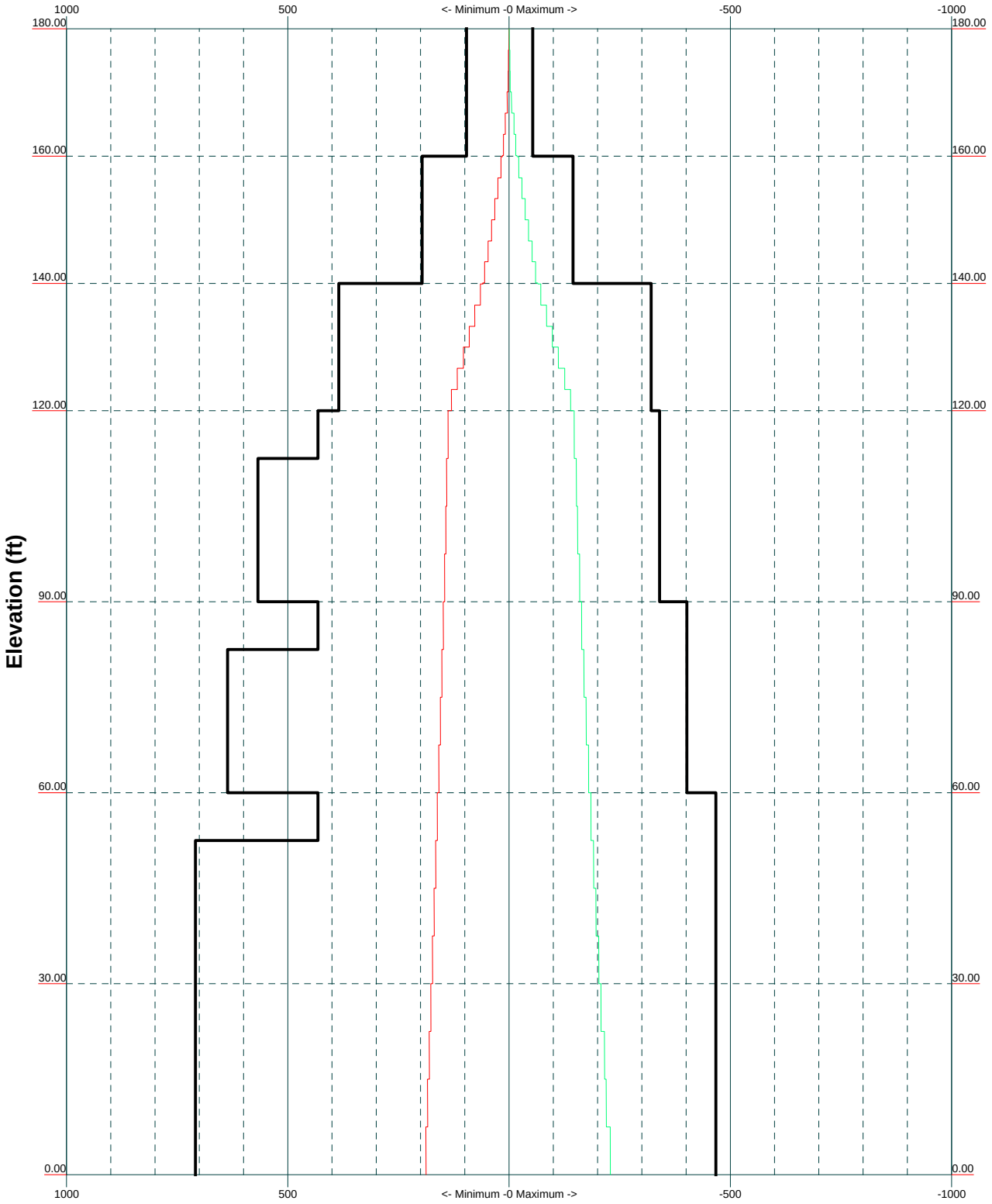
Allpro Consulting Group
9221 LBJ FREEWAY
Dallas, Texas
Phone: 972-231-8893
FAX: 1-866-364-8375

Job: 15-4964		
Project: CT09865-S-02_Niantic_T-Mobile_SA_09292015		
Client: SBA	Drawn by: Jainesh Shah, EIT	App'd:
Code: TIA/EIA-222-F	Date: 09/30/15	Scale: NTS
Path:		Dwg No. E-1

MISCELLANEOUS PLOTS

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

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



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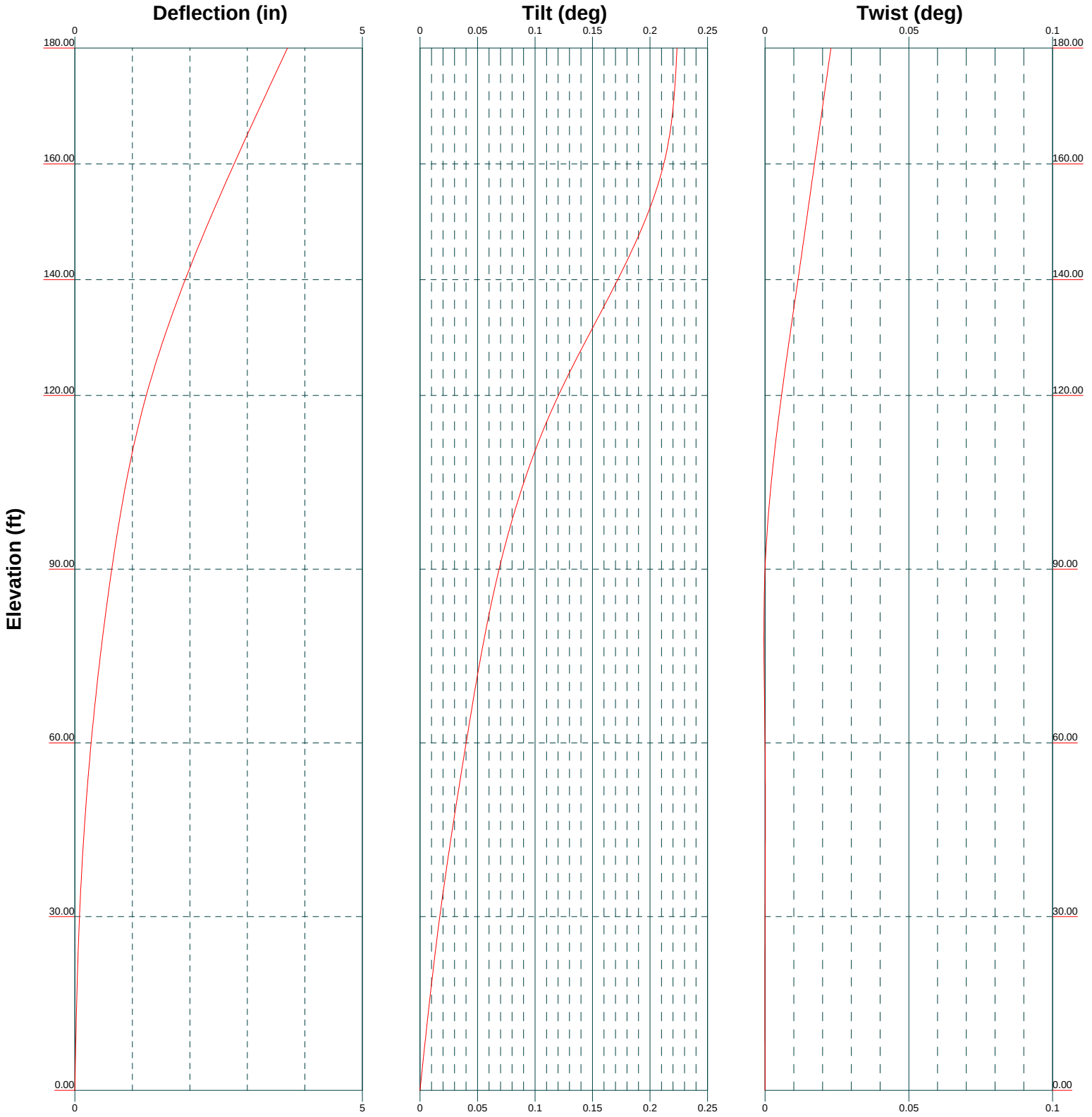
Job: ***15-4964***			
Project: ***CT09865-S-02_Niantic_T-Mobile_SA_09292015***			
Client: SBA	Drawn by: Jainesh Shah, EIT	App'd:	
Code: TIA/EIA-222-F	Date: 09/30/15	Scale: NTS	
Path:		Dwg No. E-3	

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

Maximum Values



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Job: ***15-4964***			
Project: ***CT09865-S-02_Niantic_T-Mobile_SA_09292015***			
Client: SBA	Drawn by: Jainesh Shah, EIT	App'd:	
Code: TIA/EIA-222-F	Date: 09/30/15	Scale: NTS	
Path:		Dwg No. E-5	

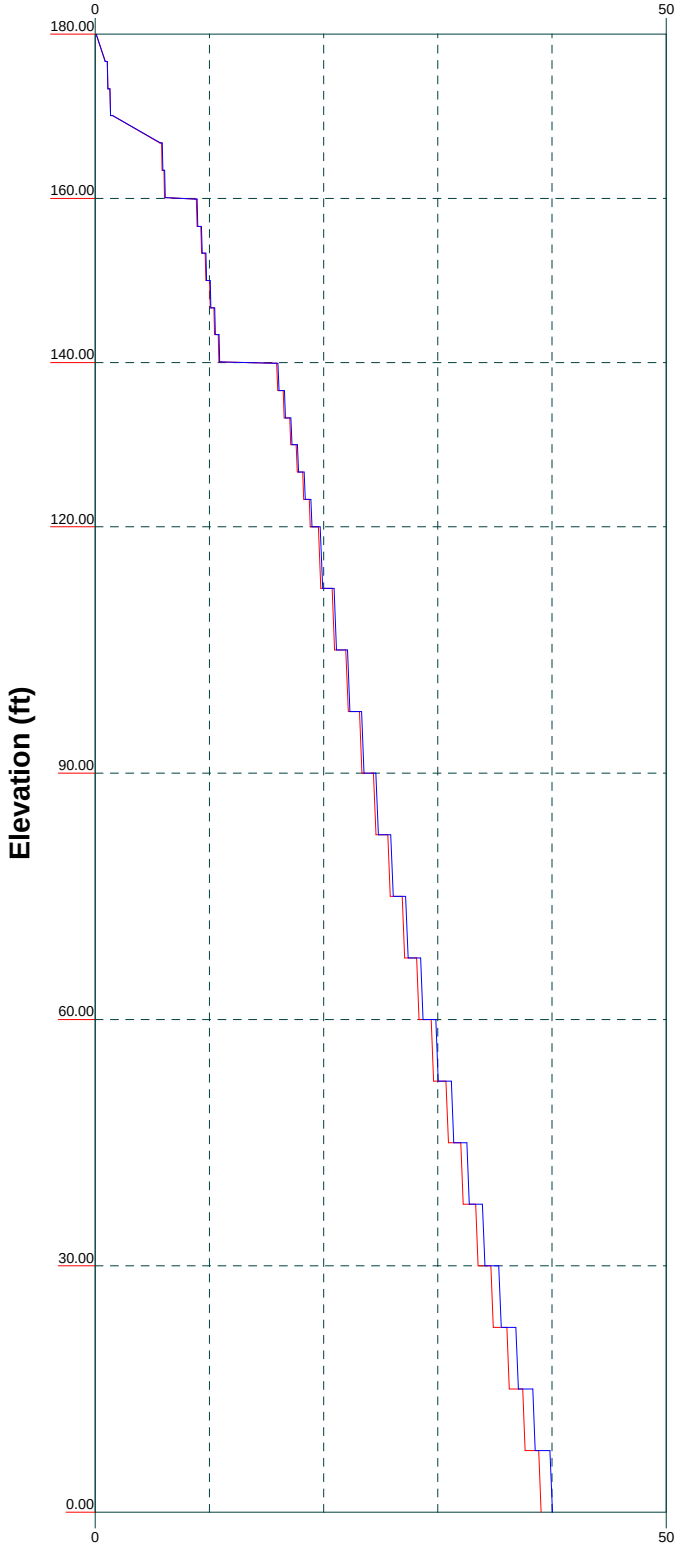
TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Vx Vz

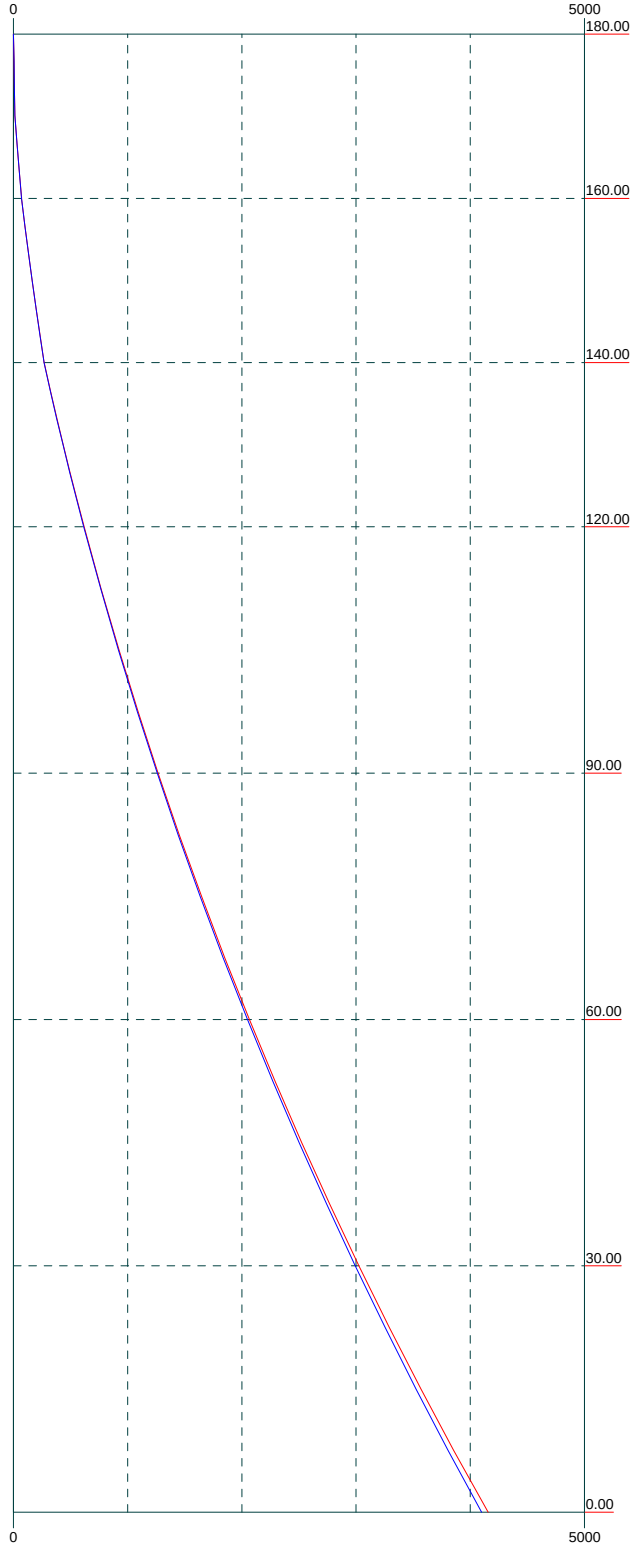
Maximum Values

Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)



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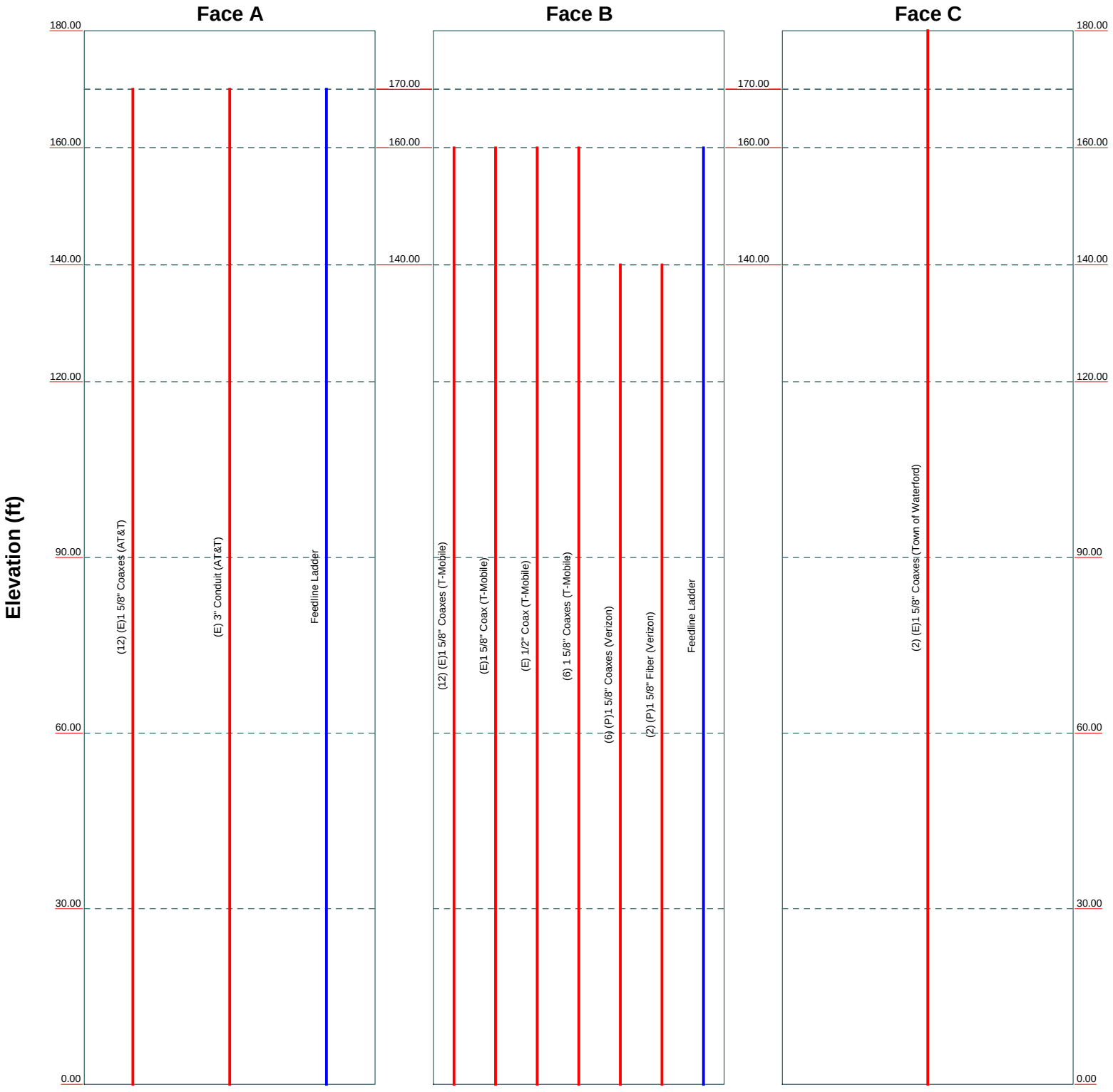
Job: ***15-4964***			
Project: ***CT09865-S-02_Niantic_T-Mobile_SA_09292015***			
Client: SBA	Drawn by: Jainesh Shah, EIT	App'd:	
Code: TIA/EIA-222-F	Date: 09/30/15	Scale: NTS	
Path:		Dwg No. E-4	

Feed Line Distribution Chart
0' - 180'

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



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FAX: 1-866-364-8375

Job: ***15-4964***		
Project: ***CT09865-S-02_Niantic_T-Mobile_SA_09292015***		
Client: SBA	Drawn by: Jainesh Shah, EIT	App'd:
Code: TIA/EIA-222-F	Date: 09/30/15	Scale: NTS
Path:		Dwg No. E-7

CALCULATION PRINTOUT

Allpro Consulting Group
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Dallas, Texas
Phone: 972-231-8893
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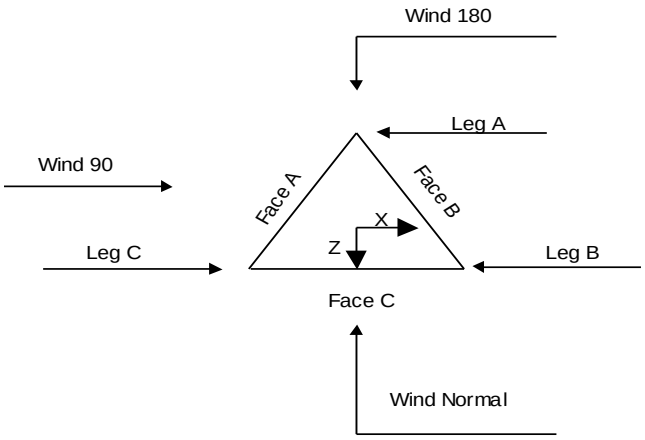
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 23.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

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

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.00-160.00			5.00	1	20.00
T2	160.00-140.00			5.00	1	20.00
T3	140.00-120.00			5.00	1	20.00
T4	120.00-90.00			5.00	1	30.00
T5	90.00-60.00			9.50	1	30.00
T6	60.00-30.00			14.00	1	30.00
T7	30.00-0.00			18.50	1	30.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180.00-160.00	3.32	X Brace	No	Yes	0.0000	1.0000
T2	160.00-140.00	3.31	X Brace	No	Yes	1.0000	1.0000
T3	140.00-120.00	3.32	X Brace	No	Yes	1.0000	0.0000
T4	120.00-90.00	7.50	X Brace	No	No	0.0000	0.0000
T5	90.00-60.00	7.50	X Brace	No	No	0.0000	0.0000
T6	60.00-30.00	7.50	X Brace	No	No	0.0000	0.0000
T7	30.00-0.00	7.50	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-160.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 160.00-140.00	Solid Round	2 1/2	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T3 140.00-120.00	Solid Round	3 1/2	A572-50 (50 ksi)	Solid Round	1 1/8	A572-50 (50 ksi)
T4 120.00-90.00	Solid Round	4 1/4	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 90.00-60.00	Solid Round	4 1/2	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T6 60.00-30.00	Solid Round	4 3/4	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T7 30.00-0.00	Solid Round	4 3/4	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180.00-160.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	7/8	A570-50 (50 ksi)
T2 160.00-140.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T3 140.00-120.00	Solid Round	1 1/8	A572-50 (50 ksi)	Solid Round	1 1/8	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 120.00-90.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 90.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 60.00-30.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T7 30.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Single Diags X	K Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
180.00-160.00				1	1	1	1	1	1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
120.00-90.00				1	1	1	1	1	1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
90.00-60.00				1	1	1	1	1	1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
60.00-30.00				1	1	1	1	1	1	1	1	1	1	1	1
T7 30.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 120.00-90.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 90.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 60.00-30.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 30.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180.00-160.00	Flange	0.0000 A325N	0	0.0000 A325N	0	0.5000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 160.00-140.00	Flange	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 140.00-120.00	Flange	1.2500 A325N	6	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 120.00-90.00	Flange	1.2500 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 90.00-60.00	Flange	1.2500 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 60.00-30.00	Flange	1.2500 A325N	6	0.8750 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 30.00-0.00	Flange	1.5000 A325N	0	0.8750 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(E)1 5/8" Coaxes (Town of Waterford)	C	Yes	Ar (CfAe)	180.00 - 0.00	2	2	0.5000	1.9800		1.04
(E)1 5/8" Coaxes (AT&T)	A	Yes	Ar (CfAe)	170.00 - 0.00	12	6	0.5000	1.9800		1.04
(E) 3" Conduit (AT&T)	A	Yes	Ar (CfAe)	170.00 - 0.00	1	1	3.0100	3.0100		0.50
*										
*										
(E)1 5/8" Coaxes (T-Mobile)	B	Yes	Ar (CfAe)	160.00 - 0.00	12	6	0.5000	1.9800		1.04
(E)1 5/8" Coax (T-Mobile)	B	Yes	Ar (CfAe)	160.00 - 0.00	1	1	0.5000	1.9800		1.04
(E) 1/2" Coax (T-Mobile)	B	Yes	Ar (CfAe)	160.00 - 0.00	1	1	0.5800	0.5800		0.25
1 5/8" Coaxes (T-Mobile)	B	Yes	Ar (CfAe)	160.00 - 0.00	6	3	0.5000	1.9800		1.04
*										
*										
(P)1 5/8" Coaxes (Verizon)	B	Yes	Ar (CfAe)	140.00 - 0.00	6	3	0.5000	1.9800		1.04
(P)1 5/8" Fiber (Verizon)	B	Yes	Ar (CfAe)	140.00 - 0.00	2	1	0.5000	1.9800		1.04

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
*								
*								
Feedline Ladder	A	No	CaAa (In Face)	170.00 - 0.00	1	No Ice	0.00	8.40
						1/2" Ice	0.00	13.50
Feedline Ladder	B	No	CaAa (In Face)	160.00 - 0.00	1	No Ice	0.00	8.40
						1/2" Ice	0.00	13.50

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180.00-160.00	A	14.696	0.000	0.000	0.000	0.21
		B	0.000	0.000	0.000	0.000	0.00
		C	6.600	0.000	0.000	0.000	0.04
T2	160.00-140.00	A	29.393	0.000	0.000	0.000	0.43
		B	41.185	0.000	0.000	0.000	0.57
		C	6.600	0.000	0.000	0.000	0.04
T3	140.00-120.00	A	29.393	0.000	0.000	0.000	0.43
		B	60.327	0.000	0.000	0.000	0.73
		C	6.600	0.000	0.000	0.000	0.04
T4	120.00-90.00	A	44.089	0.000	0.000	0.000	0.64
		B	90.491	0.000	0.000	0.000	1.10
		C	9.900	0.000	0.000	0.000	0.06
T5	90.00-60.00	A	44.089	0.000	0.000	0.000	0.64
		B	90.491	0.000	0.000	0.000	1.10
		C	9.900	0.000	0.000	0.000	0.06
T6	60.00-30.00	A	44.089	0.000	0.000	0.000	0.64
		B	90.491	0.000	0.000	0.000	1.10
		C	9.900	0.000	0.000	0.000	0.06
T7	30.00-0.00	A	44.089	0.000	0.000	0.000	0.64
		B	90.491	0.000	0.000	0.000	1.10
		C	9.900	0.000	0.000	0.000	0.06

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180.00-160.00	A	0.500	5.825	10.538	0.000	0.000	0.46
		B		0.000	0.000	0.000	0.000	0.00
		C		4.967	4.133	0.000	0.000	0.11
T2	160.00-140.00	A	0.500	11.650	21.076	0.000	0.000	0.92
		B		17.533	30.318	0.000	0.000	1.24
		C		4.967	4.133	0.000	0.000	0.11
T3	140.00-120.00	A	0.500	11.650	21.076	0.000	0.000	0.92
		B		31.600	39.561	0.000	0.000	1.65
		C		4.967	4.133	0.000	0.000	0.11
T4	120.00-90.00	A	0.500	17.475	31.614	0.000	0.000	1.39
		B		47.400	59.341	0.000	0.000	2.47
		C		7.450	6.200	0.000	0.000	0.16
T5	90.00-60.00	A	0.500	17.475	31.614	0.000	0.000	1.39
		B		47.400	59.341	0.000	0.000	2.47
		C		7.450	6.200	0.000	0.000	0.16
T6	60.00-30.00	A	0.500	17.475	31.614	0.000	0.000	1.39

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		47.400	59.341	0.000	0.000	2.47
		C		7.450	6.200	0.000	0.000	0.16
T7	30.00-0.00	A	0.500	17.475	31.614	0.000	0.000	1.39
		B		47.400	59.341	0.000	0.000	2.47
		C		7.450	6.200	0.000	0.000	0.16

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	180.00-160.00	A	0.742	2.071	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.395	1.166	0.000	0.000
T2	160.00-140.00	A	1.694	4.413	0.000	0.000
		B	2.319	6.345	0.000	0.000
		C	0.451	1.243	0.000	0.000
T3	140.00-120.00	A	1.908	4.694	0.000	0.000
		B	3.627	9.392	0.000	0.000
		C	0.507	1.322	0.000	0.000
T4	120.00-90.00	A	0.000	1.581	3.034	3.951
		B	0.000	3.163	5.767	7.907
		C	0.000	0.445	0.807	1.113
T5	90.00-60.00	A	0.000	1.284	2.957	3.851
		B	0.000	2.569	5.621	7.706
		C	0.000	0.361	0.787	1.084
T6	60.00-30.00	A	0.000	1.188	3.193	4.159
		B	0.000	2.378	6.070	8.321
		C	0.000	0.335	0.849	1.171
T7	30.00-0.00	A	0.000	1.146	3.521	4.584
		B	0.000	2.293	6.691	9.174
		C	0.000	0.323	0.936	1.291

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E) Lightning Rod	C	From Leg	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	0.25 0.66	0.25 0.66	0.03 0.04
(E) Flash Beacon Lighting	C	None		0.0000	180.00	No Ice 1/2" Ice	2.70 3.10	2.70 3.10	0.05 0.07
(E)Sinclair SC488-HF2LNF Omni (Town of Waterford)	A	From Leg	3.00 0.00 5.00	0.0000	180.00	No Ice 1/2" Ice	4.39 5.95	4.39 5.95	0.03 0.06
(E)Sinclair SC488-HF2LNF Omni	B	From Leg	3.00 0.00	0.0000	180.00	No Ice 1/2" Ice	4.39 5.95	4.39 5.95	0.03 0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Town of Waterford)			5.00						
(E)DBSpectra ATS8TMA10	C	From Leg	3.00	0.0000	180.00	No Ice	2.74	2.74	0.03
TMA			0.00			1/2" Ice	3.03	3.03	0.04
(Town of Waterford)			0.00						
**									
(2) (E)Powerwave 7770.00	A	From Leg	3.00	0.0000	170.00	No Ice	6.74	3.47	0.04
(AT&T)			0.00			1/2" Ice	7.36	3.90	0.08
			0.00						
(2) (E)Powerwave 7770.00	B	From Leg	3.00	0.0000	170.00	No Ice	6.74	3.47	0.04
(AT&T)			0.00			1/2" Ice	7.36	3.90	0.08
			0.00						
(2) (E)Powerwave 7770.00	C	From Leg	3.00	0.0000	170.00	No Ice	6.74	3.47	0.04
(AT&T)			0.00			1/2" Ice	7.36	3.90	0.08
			0.00						
(E)KMW 14-65	A	From Leg	3.00	0.0000	170.00	No Ice	4.70	4.70	0.05
(AT&T)			0.00			1/2" Ice	5.20	5.20	0.09
			0.00						
(E)KMW 14-65	B	From Leg	3.00	0.0000	170.00	No Ice	4.70	4.70	0.05
(AT&T)			0.00			1/2" Ice	5.20	5.20	0.09
			0.00						
(E)KMW 14-65	C	From Leg	3.00	0.0000	170.00	No Ice	4.70	4.70	0.05
(AT&T)			0.00			1/2" Ice	5.20	5.20	0.09
			0.00						
(2) (E)Powerwave	A	From Leg	3.00	0.0000	170.00	No Ice	2.74	1.86	0.03
TT19-08BP111-001 TMAs			0.00			1/2" Ice	3.03	2.12	0.05
(AT&T)			0.00						
(2) (E)Powerwave	B	From Leg	3.00	0.0000	170.00	No Ice	2.74	1.86	0.03
TT19-08BP111-001 TMAs			0.00			1/2" Ice	3.03	2.12	0.05
(AT&T)			0.00						
(2) (E)Powerwave	C	From Leg	3.00	0.0000	170.00	No Ice	2.74	1.86	0.03
TT19-08BP111-001 TMAs			0.00			1/2" Ice	3.03	2.12	0.05
(AT&T)			0.00						
(2) (E) RRUS 11	A	From Leg	3.00	0.0000	170.00	No Ice	2.17	1.66	0.05
(AT&T)			0.00			1/2" Ice	2.44	1.90	0.07
			0.00						
(2) (E) RRUS 11	B	From Leg	3.00	0.0000	170.00	No Ice	2.17	1.66	0.05
(AT&T)			0.00			1/2" Ice	2.44	1.90	0.07
			0.00						
(2) (E) RRUS 11	C	From Leg	3.00	0.0000	170.00	No Ice	2.17	1.66	0.05
(AT&T)			0.00			1/2" Ice	2.44	1.90	0.07
			0.00						
(E)Raycap DC6-48-60-18-F	A	From Leg	3.00	0.0000	170.00	No Ice	3.34	0.73	0.03
(AT&T)			0.00			1/2" Ice	3.70	0.95	0.04
			0.00						
*									
**									
***									
APX16DWV-16DWVS-E-A	A	From Leg	3.00	0.0000	160.00	No Ice	7.23	2.15	0.04
20			0.00			1/2" Ice	7.68	2.49	0.07
(T-Mobile)			0.00						
APX16DWV-16DWVS-E-A	B	From Leg	3.00	0.0000	160.00	No Ice	7.23	2.15	0.04
20			0.00			1/2" Ice	7.68	2.49	0.07
(T-Mobile)			0.00						
APX16DWV-16DWVS-E-A	C	From Leg	3.00	0.0000	160.00	No Ice	7.23	2.15	0.04
20			0.00			1/2" Ice	7.68	2.49	0.07
(T-Mobile)			0.00						
LNX-6515DS-VTM	A	From Leg	3.00	0.0000	160.00	No Ice	11.45	7.70	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(T-Mobile)			0.00 0.00			1/2" Ice	12.06	8.29	0.12
LNX-6515DS-VTM	B	From Leg	3.00	0.0000	160.00	No Ice	11.45	7.70	0.05
(T-Mobile)			0.00 0.00			1/2" Ice	12.06	8.29	0.12
LNX-6515DS-VTM	C	From Leg	3.00	0.0000	160.00	No Ice	11.45	7.70	0.05
(T-Mobile)			0.00 0.00			1/2" Ice	12.06	8.29	0.12
Double TMA 17/21	A	From Leg	3.00	0.0000	160.00	No Ice	0.41	0.16	0.01
(T-Mobile)			0.00 0.00			1/2" Ice	0.50	0.22	0.01
Double TMA 17/21	B	From Leg	3.00	0.0000	160.00	No Ice	0.41	0.16	0.01
(T-Mobile)			0.00 0.00			1/2" Ice	0.50	0.22	0.01
Double TMA 17/21	C	From Leg	3.00	0.0000	160.00	No Ice	0.41	0.16	0.01
(T-Mobile)			0.00 0.00			1/2" Ice	0.50	0.22	0.01
ATMAA1412D-1A20	A	From Leg	3.00	0.0000	160.00	No Ice	1.17	0.47	0.01
(T-Mobile)			0.00 0.00			1/2" Ice	1.31	0.57	0.02
ATMAA1412D-1A20	B	From Leg	3.00	0.0000	160.00	No Ice	1.17	0.47	0.01
(T-Mobile)			0.00 0.00			1/2" Ice	1.31	0.57	0.02
ATMAA1412D-1A20	C	From Leg	3.00	0.0000	160.00	No Ice	1.17	0.47	0.01
(T-Mobile)			0.00 0.00			1/2" Ice	1.31	0.57	0.02
782 11056	A	From Leg	3.00	0.0000	160.00	No Ice	0.17	0.10	0.00
(T-Mobile)			0.00 0.00			1/2" Ice	0.23	0.15	0.00
782 11056	B	From Leg	3.00	0.0000	160.00	No Ice	0.17	0.10	0.00
(T-Mobile)			0.00 0.00			1/2" Ice	0.23	0.15	0.00
782 11056	C	From Leg	3.00	0.0000	160.00	No Ice	0.17	0.10	0.00
(T-Mobile)			0.00 0.00			1/2" Ice	0.23	0.15	0.00
**** *****									
(E) SitePRO1 HM6 6'	A	From Leg	3.00	0.0000	180.00	No Ice	2.64	4.40	0.08
Stanoffs			0.00			1/2" Ice	3.69	6.20	0.10
(Town of Waterford)			0.00						
(E) SitePRO1 HM6 6'	B	From Leg	3.00	0.0000	180.00	No Ice	2.64	4.40	0.08
Stanoffs			0.00			1/2" Ice	3.69	6.20	0.10
(Town of Waterford)			0.00						
(E) T-Frame	A	From Leg	3.00	0.0000	170.00	No Ice	18.81	9.20	0.30
(AT&T)			0.00 0.00			1/2" Ice	25.20	13.30	0.40
(E) T-Frame	B	From Leg	3.00	0.0000	170.00	No Ice	18.81	9.20	0.30
(AT&T)			0.00 0.00			1/2" Ice	25.20	13.30	0.40
(E) T-Frame	C	From Leg	3.00	0.0000	170.00	No Ice	18.81	9.20	0.30
(AT&T)			0.00 0.00			1/2" Ice	25.20	13.30	0.40
(E)T-Frame	A	From Leg	3.00	0.0000	160.00	No Ice	10.60	5.00	0.26
(T-Mobile)			0.00 0.00			1/2" Ice	16.80	8.00	0.36
(E)T-Frame	B	From Leg	3.00	0.0000	160.00	No Ice	10.60	5.00	0.26
(T-Mobile)			0.00			1/2" Ice	16.80	8.00	0.36

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
(E)T-Frame	C	From Leg	3.00	0.0000	160.00	No Ice	10.60	5.00	0.26
(T-Mobile)			0.00			1/2" Ice	16.80	8.00	0.36
			0.00						
(E)T-Frame	A	From Leg	3.00	0.0000	140.00	No Ice	10.60	5.00	0.26
(Verizon)			0.00			1/2" Ice	16.80	8.00	0.36
			0.00						
(E)T-Frame	B	From Leg	3.00	0.0000	140.00	No Ice	10.60	5.00	0.26
(Verizon)			0.00			1/2" Ice	16.80	8.00	0.36
			0.00						
(E)T-Frame	C	From Leg	3.00	0.0000	140.00	No Ice	10.60	5.00	0.26
(Verizon)			0.00			1/2" Ice	16.80	8.00	0.36
			0.00						
(3) (E)Antenna Pipe Mount	A	From Leg	3.00	0.0000	170.00	No Ice	1.32	1.32	0.04
(AT&T)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
(3) (E)Antenna Pipe Mount	B	From Leg	3.00	0.0000	170.00	No Ice	1.32	1.32	0.04
(AT&T)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
(3) (E)Antenna Pipe Mount	C	From Leg	3.00	0.0000	170.00	No Ice	1.32	1.32	0.04
(AT&T)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
(2) (E)Antenna Pipe Mount	A	From Leg	4.00	0.0000	160.00	No Ice	1.32	1.32	0.04
(T-Mobile)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
(2) (E)Antenna Pipe Mount	B	From Leg	4.00	0.0000	160.00	No Ice	1.32	1.32	0.04
(T-Mobile)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
(2) (E)Antenna Pipe Mount	C	From Leg	4.00	0.0000	160.00	No Ice	1.32	1.32	0.04
(T-Mobile)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
(4) (E)Antenna Pipe Mount	A	From Leg	4.00	0.0000	140.00	No Ice	1.32	1.32	0.04
(Verizon)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
(4) (E)Antenna Pipe Mount	B	From Leg	4.00	0.0000	140.00	No Ice	1.32	1.32	0.04
(Verizon)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
(4) (E)Antenna Pipe Mount	C	From Leg	4.00	0.0000	140.00	No Ice	1.32	1.32	0.04
(Verizon)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
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(E)Antel BXA-80063/6CF	A	From Leg	3.00	0.0000	140.00	No Ice	7.74	4.17	0.02
(Verizon)			0.00			1/2" Ice	8.44	4.63	0.06
			0.00						
(E)Antel BXA-80063/6CF	B	From Leg	3.00	0.0000	140.00	No Ice	7.74	4.17	0.02
(Verizon)			0.00			1/2" Ice	8.44	4.63	0.06
			0.00						
(E)Antel BXA-80063/6CF	C	From Leg	3.00	0.0000	140.00	No Ice	7.74	4.17	0.02
(Verizon)			0.00			1/2" Ice	8.44	4.63	0.06
			0.00						
(E)Antel BXA-70063/6CF	A	From Leg	3.00	0.0000	140.00	No Ice	7.74	4.17	0.02
(Verizon)			0.00			1/2" Ice	8.44	4.63	0.06
			0.00						
(E)Antel BXA-70063/6CF	B	From Leg	3.00	0.0000	140.00	No Ice	7.74	4.17	0.02
(Verizon)			0.00			1/2" Ice	8.44	4.63	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
(E)Antel BXA-70063/6CF	C	From Leg	3.00	0.0000	140.00	No Ice	7.74	4.17	0.02
(Verizon)			0.00			1/2" Ice	8.44	4.63	0.06
			0.00						
(2) (E)SBNHH 1 D65B	A	From Leg	3.00	0.0000	140.00	No Ice	8.40	5.40	0.05
(Verizon)			0.00			1/2" Ice	9.11	5.93	0.10
			0.00						
(2) (E)SBNHH 1 D65B	B	From Leg	3.00	0.0000	140.00	No Ice	8.40	5.40	0.05
(Verizon)			0.00			1/2" Ice	9.11	5.93	0.10
			0.00						
(2) (E)SBNHH 1 D65B	C	From Leg	3.00	0.0000	140.00	No Ice	8.40	5.40	0.05
(Verizon)			0.00			1/2" Ice	9.11	5.93	0.10
			0.00						
(E)Alcatel RRH2-AWS	A	From Leg	3.00	0.0000	140.00	No Ice	3.96	1.82	0.06
(Verizon)			0.00			1/2" Ice	4.37	2.16	0.08
			0.00						
(E)Alcatel RRH2-AWS	B	From Leg	3.00	0.0000	140.00	No Ice	3.96	1.82	0.06
(Verizon)			0.00			1/2" Ice	4.37	2.16	0.08
			0.00						
(E)Alcatel RRH2-AWS	C	From Leg	3.00	0.0000	140.00	No Ice	3.96	1.82	0.06
(Verizon)			0.00			1/2" Ice	4.37	2.16	0.08
			0.00						
(E)Alcatel RRH2-pcs	A	From Leg	3.00	0.0000	140.00	No Ice	2.57	2.01	0.06
(Verizon)			0.00			1/2" Ice	2.86	2.28	0.07
			0.00						
(E)Alcatel RRH2-pcs	B	From Leg	3.00	0.0000	140.00	No Ice	2.57	2.01	0.06
(Verizon)			0.00			1/2" Ice	2.86	2.28	0.07
			0.00						
(E)Alcatel RRH2-pcs	C	From Leg	3.00	0.0000	140.00	No Ice	2.57	2.01	0.06
(Verizon)			0.00			1/2" Ice	2.86	2.28	0.07
			0.00						
(E)Alcatel RRH2--700	A	From Leg	3.00	0.0000	140.00	No Ice	3.96	1.82	0.06
(Verizon)			0.00			1/2" Ice	4.37	2.16	0.08
			0.00						
(E)Alcatel RRH2--700	B	From Leg	3.00	0.0000	140.00	No Ice	3.96	1.82	0.06
(Verizon)			0.00			1/2" Ice	4.37	2.16	0.08
			0.00						
(E)Alcatel RRH2--700	C	From Leg	3.00	0.0000	140.00	No Ice	3.96	1.82	0.06
(Verizon)			0.00			1/2" Ice	4.37	2.16	0.08
			0.00						
(E) ODU Celwave DB-T1-6Z	A	From Leg	3.00	0.0000	140.00	No Ice	5.60	2.33	0.04
(Verizon)			0.00			1/2" Ice	6.01	2.63	0.08
			0.00						
(E) ODU Celwave DB-T1-6Z	B	From Leg	3.00	0.0000	140.00	No Ice	5.60	2.33	0.04
(Verizon)			0.00			1/2" Ice	6.01	2.63	0.08
			0.00						
**									
**									

Tower Pressures - No Ice

G_H = 1.121

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	170.00	1.597	30	102.917	A	0.000	25.594	5.833	22.79	0.000	0.000
180.00-160.00					B	0.000	11.639		50.12	0.000	0.000
					C	0.000	17.845		32.69	0.000	0.000
T2	150.00	1.541	29	104.167	A	0.000	42.574	8.333	19.57	0.000	0.000
160.00-140.00					B	0.000	53.742		15.51	0.000	0.000
					C	0.000	21.025		39.63	0.000	0.000
T3	130.00	1.48	27	105.833	A	0.000	46.392	11.667	25.15	0.000	0.000
140.00-120.00					B	0.000	75.608		15.43	0.000	0.000
					C	0.000	25.000		46.67	0.000	0.000
T4	105.00	1.392	26	228.155	A	13.581	65.418	21.330	27.00	0.000	0.000
120.00-90.00					B	10.848	111.821		17.39	0.000	0.000
					C	15.809	31.230		45.35	0.000	0.000
T5 90.00-60.00	75.00	1.264	23	363.782	A	24.075	66.673	22.584	24.89	0.000	0.000
					B	21.412	113.075		16.79	0.000	0.000
					C	26.246	32.484		38.45	0.000	0.000
T6 60.00-30.00	45.00	1.093	20	499.408	A	37.580	67.928	23.839	22.59	0.000	0.000
					B	34.704	114.330		16.00	0.000	0.000
					C	39.924	33.739		32.36	0.000	0.000
T7 30.00-0.00	15.00	1	18	634.408	A	54.211	67.928	23.839	19.52	0.000	0.000
					B	51.040	114.330		14.42	0.000	0.000
					C	56.795	33.739		26.33	0.000	0.000

Tower Pressure - With Ice

G_H = 1.121

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	170.00	1.597	22	0.5000	104.583	A	10.538	25.363	9.167	25.53	0.000	0.000
180.00-160.00						B	0.000	21.608		42.42	0.000	0.000
						C	4.133	25.409		31.03	0.000	0.000
T2	150.00	1.541	21	0.5000	105.833	A	21.076	31.990	11.667	21.99	0.000	0.000
160.00-140.00						B	30.318	35.941		17.61	0.000	0.000
						C	4.133	28.476		35.78	0.000	0.000
T3	130.00	1.48	21	0.5000	107.500	A	21.076	35.633	15.000	26.45	0.000	0.000
140.00-120.00						B	39.561	50.885		16.58	0.000	0.000
						C	4.133	32.322		41.15	0.000	0.000
T4 120.00-90.00	105.00	1.392	19	0.5000	230.662	A	44.278	48.889	26.348	28.28	0.000	0.000
						B	68.050	77.232		18.14	0.000	0.000
						C	21.703	39.999		42.70	0.000	0.000
T5 90.00-60.00	75.00	1.264	18	0.5000	366.289	A	54.796	52.805	27.603	25.65	0.000	0.000
						B	78.668	81.445		17.24	0.000	0.000
						C	32.148	43.702		36.39	0.000	0.000
T6 60.00-30.00	45.00	1.093	15	0.5000	501.915	A	68.229	56.794	28.858	23.08	0.000	0.000
						B	91.793	85.530		16.27	0.000	0.000
						C	45.803	47.623		30.89	0.000	0.000
T7 30.00-0.00	15.00	1	14	0.5000	636.915	A	84.761	59.619	28.858	19.99	0.000	0.000
						B	107.899	88.397		14.70	0.000	0.000
						C	62.640	50.418		25.52	0.000	0.000

Tower Pressure - Service

G_H = 1.121

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	170.00	1.597	10	102.917	A	0.000	25.594	5.833	22.79	0.000	0.000
180.00-160.00					B	0.000	11.639		50.12	0.000	0.000
					C	0.000	17.845		32.69	0.000	0.000
T2	150.00	1.541	10	104.167	A	0.000	42.574	8.333	19.57	0.000	0.000
160.00-140.00					B	0.000	53.742		15.51	0.000	0.000
					C	0.000	21.025		39.63	0.000	0.000
T3	130.00	1.48	9	105.833	A	0.000	46.392	11.667	25.15	0.000	0.000
140.00-120.00					B	0.000	75.608		15.43	0.000	0.000
					C	0.000	25.000		46.67	0.000	0.000
T4	105.00	1.392	9	228.155	A	13.581	65.418	21.330	27.00	0.000	0.000
120.00-90.00					B	10.848	111.821		17.39	0.000	0.000
					C	15.809	31.230		45.35	0.000	0.000
T5 90.00-60.00	75.00	1.264	8	363.782	A	24.075	66.673	22.584	24.89	0.000	0.000
					B	21.412	113.075		16.79	0.000	0.000
					C	26.246	32.484		38.45	0.000	0.000
T6 60.00-30.00	45.00	1.093	7	499.408	A	37.580	67.928	23.839	22.59	0.000	0.000
					B	34.704	114.330		16.00	0.000	0.000
					C	39.924	33.739		32.36	0.000	0.000
T7 30.00-0.00	15.00	1	6	634.408	A	54.211	67.928	23.839	19.52	0.000	0.000
					B	51.040	114.330		14.42	0.000	0.000
					C	56.795	33.739		26.33	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.26	0.99	A	0.249	2.441	0.602	1	1	15.396	1.24	62.24	A
180.00-160.00			B	0.113	2.912	0.577	1	1	6.710			
			C	0.173	2.687	0.585	1	1	10.445			
T2	1.04	1.66	A	0.409	2.047	0.655	1	1	27.895	2.28	113.93	B
160.00-140.00			B	0.516	1.88	0.706	1	1	37.929			
			C	0.202	2.59	0.591	1	1	12.421			
T3	1.20	2.80	A	0.438	1.993	0.668	1	1	30.990	3.42	171.14	B
140.00-120.00			B	0.714	1.778	0.83	1	1	62.777			
			C	0.236	2.479	0.598	1	1	14.961			
T4	1.81	5.38	A	0.346	2.18	0.631	1	1	54.870	4.88	162.58	B
120.00-90.00			B	0.538	1.856	0.717	1	1	91.072			
			C	0.206	2.576	0.592	1	1	34.286			
T5	1.81	6.40	A	0.249	2.439	0.602	1	1	64.195	5.23	174.23	B
90.00-60.00			B	0.37	2.127	0.64	1	1	93.747			
			C	0.161	2.73	0.583	1	1	45.194			
T6	1.81	7.92	A	0.211	2.559	0.593	1	1	77.845	5.47	182.48	B
60.00-30.00			B	0.298	2.3	0.615	1	1	105.065			
			C	0.148	2.781	0.581	1	1	59.530			
T7 30.00-0.00	1.81	9.77	A	0.193	2.621	0.589	1	1	94.214	5.99	199.79	B
			B	0.261	2.406	0.605	1	1	120.170			
			C	0.143	2.799	0.58	1	1	76.377			
Sum Weight:	9.72	34.92						OTM	2238.77	28.52		

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
									kip-ft			

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.26	0.99	A	0.249	2.441	0.602	0.8	1	15.396	1.24	62.24	A
180.00-160.00			B	0.113	2.912	0.577	0.8	1	6.710			
			C	0.173	2.687	0.585	0.8	1	10.445			
T2	1.04	1.66	A	0.409	2.047	0.655	0.8	1	27.895	2.28	113.93	B
160.00-140.00			B	0.516	1.88	0.706	0.8	1	37.929			
			C	0.202	2.59	0.591	0.8	1	12.421			
T3	1.20	2.80	A	0.438	1.993	0.668	0.8	1	30.990	3.42	171.14	B
140.00-120.00			B	0.714	1.778	0.83	0.8	1	62.777			
			C	0.236	2.479	0.598	0.8	1	14.961			
T4	1.81	5.38	A	0.346	2.18	0.631	0.8	1	52.153	4.76	158.71	B
120.00-90.00			B	0.538	1.856	0.717	0.8	1	88.902			
			C	0.206	2.576	0.592	0.8	1	31.125			
T5	1.81	6.40	A	0.249	2.439	0.602	0.8	1	59.380	4.99	166.27	B
90.00-60.00			B	0.37	2.127	0.64	0.8	1	89.464			
			C	0.161	2.73	0.583	0.8	1	39.945			
T6	1.81	7.92	A	0.211	2.559	0.593	0.8	1	70.329	5.11	170.43	B
60.00-30.00			B	0.298	2.3	0.615	0.8	1	98.124			
			C	0.148	2.781	0.581	0.8	1	51.545			
T7 30.00-0.00	1.81	9.77	A	0.193	2.621	0.589	0.8	1	83.372	5.48	182.82	B
			B	0.261	2.406	0.605	0.8	1	109.962			
			C	0.143	2.799	0.58	0.8	1	65.018			
Sum Weight:	9.72	34.92						OTM	2184.75 kip-ft	27.29		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.26	0.99	A	0.249	2.441	0.602	0.85	1	15.396	1.24	62.24	A
180.00-160.00			B	0.113	2.912	0.577	0.85	1	6.710			
			C	0.173	2.687	0.585	0.85	1	10.445			
T2	1.04	1.66	A	0.409	2.047	0.655	0.85	1	27.895	2.28	113.93	B
160.00-140.00			B	0.516	1.88	0.706	0.85	1	37.929			
			C	0.202	2.59	0.591	0.85	1	12.421			
T3	1.20	2.80	A	0.438	1.993	0.668	0.85	1	30.990	3.42	171.14	B
140.00-120.00			B	0.714	1.778	0.83	0.85	1	62.777			
			C	0.236	2.479	0.598	0.85	1	14.961			
T4	1.81	5.38	A	0.346	2.18	0.631	0.85	1	52.833	4.79	159.67	B
120.00-90.00			B	0.538	1.856	0.717	0.85	1	89.444			
			C	0.206	2.576	0.592	0.85	1	31.915			
T5	1.81	6.40	A	0.249	2.439	0.602	0.85	1	60.584	5.05	168.26	B

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
90.00-60.00			B	0.37	2.127	0.64	0.85	1	90.535			
			C	0.161	2.73	0.583	0.85	1	41.257			
T6	1.81	7.92	A	0.211	2.559	0.593	0.85	1	72.208	5.20	173.44	B
60.00-30.00			B	0.298	2.3	0.615	0.85	1	99.859			
			C	0.148	2.781	0.581	0.85	1	53.541			
T7 30.00-0.00	1.81	9.77	A	0.193	2.621	0.589	0.85	1	86.082	5.61	187.07	B
			B	0.261	2.406	0.605	0.85	1	112.514			
			C	0.143	2.799	0.58	0.85	1	67.857			
Sum Weight:	9.72	34.92						OTM	2198.26 kip-ft	27.60		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.57	1.28	A	0.343	2.187	0.63	1	1	26.519	1.44	72.03	A
180.00-160.00			B	0.207	2.574	0.592	1	1	12.787			
			C	0.282	2.344	0.611	1	1	19.650			
T2	2.27	1.99	A	0.501	1.898	0.698	1	1	43.412	2.49	124.39	B
160.00-140.00			B	0.626	1.79	0.77	1	1	57.989			
			C	0.308	2.275	0.618	1	1	21.744			
T3	2.68	3.19	A	0.528	1.867	0.712	1	1	46.444	3.70	185.23	B
140.00-120.00			B	0.841	1.852	0.931	1	1	86.935			
			C	0.339	2.197	0.629	1	1	24.452			
T4	4.02	6.22	A	0.404	2.056	0.653	1	1	76.212	4.94	164.77	B
120.00-90.00			B	0.63	1.789	0.772	1	1	127.697			
			C	0.268	2.386	0.606	1	1	45.962			
T5	4.02	7.59	A	0.294	2.313	0.614	1	1	87.218	5.22	173.93	B
90.00-60.00			B	0.437	1.995	0.667	1	1	133.028			
			C	0.207	2.573	0.592	1	1	58.014			
T6	4.02	9.54	A	0.249	2.44	0.602	1	1	102.399	5.37	178.90	B
60.00-30.00			B	0.353	2.164	0.634	1	1	145.990			
			C	0.186	2.643	0.588	1	1	73.789			
T7 30.00-0.00	4.02	11.91	A	0.227	2.509	0.596	1	1	120.306	5.75	191.64	B
			B	0.308	2.274	0.618	1	1	162.567			
			C	0.178	2.673	0.586	1	1	92.189			
Sum Weight:	21.58	41.73						OTM	2337.80 kip-ft	28.91		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.57	1.28	A	0.343	2.187	0.63	0.8	1	24.411	1.33	66.31	A
180.00-160.00			B	0.207	2.574	0.592	0.8	1	12.787			
			C	0.282	2.344	0.611	0.8	1	18.824			
T2	2.27	1.99	A	0.501	1.898	0.698	0.8	1	39.196	2.23	111.38	B

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
160.00-140.00			B	0.626	1.79	0.77	0.8	1	51.926			
			C	0.308	2.275	0.618	0.8	1	20.917			
T3	2.68	3.19	A	0.528	1.867	0.712	0.8	1	42.229	3.37	168.38	B
140.00-120.00			B	0.841	1.852	0.931	0.8	1	79.023			
			C	0.339	2.197	0.629	0.8	1	23.626			
T4	4.02	6.22	A	0.404	2.056	0.653	0.8	1	67.357	4.42	147.21	B
120.00-90.00			B	0.63	1.789	0.772	0.8	1	114.087			
			C	0.268	2.386	0.606	0.8	1	41.622			
T5	4.02	7.59	A	0.294	2.313	0.614	0.8	1	76.259	4.60	153.36	B
90.00-60.00			B	0.437	1.995	0.667	0.8	1	117.295			
			C	0.207	2.573	0.592	0.8	1	51.585			
T6	4.02	9.54	A	0.249	2.44	0.602	0.8	1	88.753	4.69	156.41	B
60.00-30.00			B	0.353	2.164	0.634	0.8	1	127.631			
			C	0.186	2.643	0.588	0.8	1	64.628			
T7 30.00-0.00	4.02	11.91	A	0.227	2.509	0.596	0.8	1	103.354	4.99	166.20	B
			B	0.308	2.274	0.618	0.8	1	140.988			
			C	0.178	2.673	0.586	0.8	1	79.661			
Sum Weight:	21.58	41.73						OTM	2092.06 kip-ft	25.62		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.57	1.28	A	0.343	2.187	0.63	0.85	1	24.938	1.35	67.74	A
180.00-160.00			B	0.207	2.574	0.592	0.85	1	12.787			
			C	0.282	2.344	0.611	0.85	1	19.030			
T2	2.27	1.99	A	0.501	1.898	0.698	0.85	1	40.250	2.29	114.63	B
160.00-140.00			B	0.626	1.79	0.77	0.85	1	53.441			
			C	0.308	2.275	0.618	0.85	1	21.124			
T3	2.68	3.19	A	0.528	1.867	0.712	0.85	1	43.283	3.45	172.59	B
140.00-120.00			B	0.841	1.852	0.931	0.85	1	81.001			
			C	0.339	2.197	0.629	0.85	1	23.832			
T4	4.02	6.22	A	0.404	2.056	0.653	0.85	1	69.571	4.55	151.60	B
120.00-90.00			B	0.63	1.789	0.772	0.85	1	117.490			
			C	0.268	2.386	0.606	0.85	1	42.707			
T5	4.02	7.59	A	0.294	2.313	0.614	0.85	1	78.999	4.76	158.50	B
90.00-60.00			B	0.437	1.995	0.667	0.85	1	121.228			
			C	0.207	2.573	0.592	0.85	1	53.192			
T6	4.02	9.54	A	0.249	2.44	0.602	0.85	1	92.164	4.86	162.03	B
60.00-30.00			B	0.353	2.164	0.634	0.85	1	132.221			
			C	0.186	2.643	0.588	0.85	1	66.919			
T7 30.00-0.00	4.02	11.91	A	0.227	2.509	0.596	0.85	1	107.592	5.18	172.56	B
			B	0.308	2.274	0.618	0.85	1	146.382			
			C	0.178	2.673	0.586	0.85	1	82.793			
Sum Weight:	21.58	41.73						OTM	2153.49 kip-ft	26.44		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.26	0.99	A	0.249	2.441	0.602	1	1	15.396	0.43	21.54	A
180.00-160.00			B	0.113	2.912	0.577	1	1	6.710			
			C	0.173	2.687	0.585	1	1	10.445			
T2	1.04	1.66	A	0.409	2.047	0.655	1	1	27.895	0.79	39.42	B
160.00-140.00			B	0.516	1.88	0.706	1	1	37.929			
			C	0.202	2.59	0.591	1	1	12.421			
T3	1.20	2.80	A	0.438	1.993	0.668	1	1	30.990	1.18	59.22	B
140.00-120.00			B	0.714	1.778	0.83	1	1	62.777			
			C	0.236	2.479	0.598	1	1	14.961			
T4	1.81	5.38	A	0.346	2.18	0.631	1	1	54.870	1.69	56.26	B
120.00-90.00			B	0.538	1.856	0.717	1	1	91.072			
			C	0.206	2.576	0.592	1	1	34.286			
T5	1.81	6.40	A	0.249	2.439	0.602	1	1	64.195	1.81	60.29	B
90.00-60.00			B	0.37	2.127	0.64	1	1	93.747			
			C	0.161	2.73	0.583	1	1	45.194			
T6	1.81	7.92	A	0.211	2.559	0.593	1	1	77.845	1.89	63.14	B
60.00-30.00			B	0.298	2.3	0.615	1	1	105.065			
			C	0.148	2.781	0.581	1	1	59.530			
T7 30.00-0.00	1.81	9.77	A	0.193	2.621	0.589	1	1	94.214	2.07	69.13	B
			B	0.261	2.406	0.605	1	1	120.170			
			C	0.143	2.799	0.58	1	1	76.377			
Sum Weight:	9.72	34.92						OTM	774.66 kip-ft	9.87		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.26	0.99	A	0.249	2.441	0.602	0.8	1	15.396	0.43	21.54	A
180.00-160.00			B	0.113	2.912	0.577	0.8	1	6.710			
			C	0.173	2.687	0.585	0.8	1	10.445			
T2	1.04	1.66	A	0.409	2.047	0.655	0.8	1	27.895	0.79	39.42	B
160.00-140.00			B	0.516	1.88	0.706	0.8	1	37.929			
			C	0.202	2.59	0.591	0.8	1	12.421			
T3	1.20	2.80	A	0.438	1.993	0.668	0.8	1	30.990	1.18	59.22	B
140.00-120.00			B	0.714	1.778	0.83	0.8	1	62.777			
			C	0.236	2.479	0.598	0.8	1	14.961			
T4	1.81	5.38	A	0.346	2.18	0.631	0.8	1	52.153	1.65	54.92	B
120.00-90.00			B	0.538	1.856	0.717	0.8	1	88.902			
			C	0.206	2.576	0.592	0.8	1	31.125			
T5	1.81	6.40	A	0.249	2.439	0.602	0.8	1	59.380	1.73	57.53	B
90.00-60.00			B	0.37	2.127	0.64	0.8	1	89.464			
			C	0.161	2.73	0.583	0.8	1	39.945			
T6	1.81	7.92	A	0.211	2.559	0.593	0.8	1	70.329	1.77	58.97	B
60.00-30.00			B	0.298	2.3	0.615	0.8	1	98.124			
			C	0.148	2.781	0.581	0.8	1	51.545			
T7 30.00-0.00	1.81	9.77	A	0.193	2.621	0.589	0.8	1	83.372	1.90	63.26	B
			B	0.261	2.406	0.605	0.8	1	109.962			
			C	0.143	2.799	0.58	0.8	1	65.018			
Sum Weight:	9.72	34.92						OTM	755.97 kip-ft	9.44		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.26	0.99	A	0.249	2.441	0.602	0.85	1	15.396	0.43	21.54	A
180.00-160.00			B	0.113	2.912	0.577	0.85	1	6.710			
			C	0.173	2.687	0.585	0.85	1	10.445			
T2	1.04	1.66	A	0.409	2.047	0.655	0.85	1	27.895	0.79	39.42	B
160.00-140.00			B	0.516	1.88	0.706	0.85	1	37.929			
			C	0.202	2.59	0.591	0.85	1	12.421			
T3	1.20	2.80	A	0.438	1.993	0.668	0.85	1	30.990	1.18	59.22	B
140.00-120.00			B	0.714	1.778	0.83	0.85	1	62.777			
			C	0.236	2.479	0.598	0.85	1	14.961			
T4	1.81	5.38	A	0.346	2.18	0.631	0.85	1	52.833	1.66	55.25	B
120.00-90.00			B	0.538	1.856	0.717	0.85	1	89.444			
			C	0.206	2.576	0.592	0.85	1	31.915			
T5	1.81	6.40	A	0.249	2.439	0.602	0.85	1	60.584	1.75	58.22	B
90.00-60.00			B	0.37	2.127	0.64	0.85	1	90.535			
			C	0.161	2.73	0.583	0.85	1	41.257			
T6	1.81	7.92	A	0.211	2.559	0.593	0.85	1	72.208	1.80	60.01	B
60.00-30.00			B	0.298	2.3	0.615	0.85	1	99.859			
			C	0.148	2.781	0.581	0.85	1	53.541			
T7 30.00-0.00	1.81	9.77	A	0.193	2.621	0.589	0.85	1	86.082	1.94	64.73	B
			B	0.261	2.406	0.605	0.85	1	112.514			
			C	0.143	2.799	0.58	0.85	1	67.857			
Sum Weight:	9.72	34.92						OTM	760.64 kip-ft	9.55		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	23.60					
Bracing Weight	11.32					
Total Member Self-Weight	34.92			-0.45	-0.50	
Total Weight	50.75			-0.45	-0.50	
Wind 0 deg - No Ice		-0.02	-40.66	-4145.45	1.09	1.37
Wind 30 deg - No Ice		19.80	-34.40	-3554.24	-2043.10	0.72
Wind 60 deg - No Ice		34.04	-19.70	-2044.56	-3528.28	-0.12
Wind 90 deg - No Ice		39.63	0.02	1.14	-4088.45	-0.94
Wind 120 deg - No Ice		35.12	20.34	2073.43	-3576.65	-1.50
Wind 150 deg - No Ice		19.83	34.42	3554.93	-2045.86	-1.66
Wind 180 deg - No Ice		0.02	39.43	4090.52	-2.10	-1.37
Wind 210 deg - No Ice		-19.80	34.40	3553.34	2042.09	-0.72
Wind 240 deg - No Ice		-35.11	20.31	2070.67	3574.05	0.12
Wind 270 deg - No Ice		-39.63	-0.02	-2.04	4087.44	0.94
Wind 300 deg - No Ice		-34.06	-19.73	-2047.32	3528.86	1.50
Wind 330 deg - No Ice		-19.83	-34.42	-3555.83	2044.85	1.66
Member Ice	6.81					
Total Weight Ice	72.69			-0.74	-0.84	
Wind 0 deg - Ice		-0.01	-39.96	-4077.25	-0.96	1.41
Wind 30 deg - Ice		18.70	-32.46	-3371.55	-1941.30	0.74
Wind 60 deg - Ice		31.69	-18.33	-1916.23	-3308.49	-0.12

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 90 deg - Ice		37.41	0.01	-0.86	-3881.55	-0.95
Wind 120 deg - Ice		34.54	19.99	2037.41	-3521.18	-1.53
Wind 150 deg - Ice		18.71	32.47	3369.95	-1941.09	-1.70
Wind 180 deg - Ice		0.01	36.67	3830.04	-0.72	-1.41
Wind 210 deg - Ice		-18.70	32.46	3370.07	1939.62	-0.74
Wind 240 deg - Ice		-34.54	19.97	2037.62	3519.63	0.12
Wind 270 deg - Ice		-37.41	-0.01	-0.62	3879.88	0.95
Wind 300 deg - Ice		-31.69	-18.34	-1916.02	3306.70	1.53
Wind 330 deg - Ice		-18.71	-32.47	-3371.43	1939.42	1.70
Total Weight	50.75			-0.45	-0.50	
Wind 0 deg - Service		-0.01	-14.07	-1434.70	0.05	0.48
Wind 30 deg - Service		6.85	-11.90	-1230.13	-707.28	0.25
Wind 60 deg - Service		11.78	-6.82	-707.75	-1221.19	-0.04
Wind 90 deg - Service		13.71	0.01	0.10	-1415.02	-0.32
Wind 120 deg - Service		12.15	7.04	717.15	-1237.93	-0.52
Wind 150 deg - Service		6.86	11.91	1229.79	-708.24	-0.57
Wind 180 deg - Service		0.01	13.64	1415.11	-1.06	-0.48
Wind 210 deg - Service		-6.85	11.90	1229.23	706.28	-0.25
Wind 240 deg - Service		-12.15	7.03	716.20	1236.37	0.04
Wind 270 deg - Service		-13.71	-0.01	-1.00	1414.01	0.32
Wind 300 deg - Service		-11.79	-6.83	-708.71	1220.73	0.52
Wind 330 deg - Service		-6.86	-11.91	-1230.69	707.23	0.57

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service

Comb. No.	Description
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 160	Leg	Max Tension	4	15.21	0.10	-0.06
			Max. Compression	15	-17.77	0.01	0.16
			Max. Mx	10	-17.46	0.14	-0.08
			Max. My	2	-17.57	0.01	0.16
			Max. Vy	10	-2.84	0.14	-0.08
			Max. Vx	2	-3.30	0.01	0.16
		Diagonal	Max Tension	7	2.64	0.00	0.00
			Max. Compression	13	-2.66	0.00	0.00
			Max. Mx	15	0.63	-0.00	-0.00
			Max. My	13	-2.41	-0.00	0.00
			Max. Vy	15	-0.00	-0.00	-0.00
			Max. Vx	13	-0.00	-0.00	0.00
		Top Girt	Max Tension	8	0.11	0.00	0.00
			Max. Compression	2	-0.13	0.00	0.00
			Max. Mx	14	-0.02	0.01	0.00
			Max. My	26	-0.01	0.00	0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.16	0.00	0.00
			Max. Compression	2	-0.15	0.00	0.00
			Max. Mx	14	0.01	0.01	0.00
			Max. My	26	0.01	0.00	0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
T2	160 - 140	Leg	Max Tension	4	59.50	0.13	-0.07
			Max. Compression	2	-64.62	0.00	0.35
			Max. Mx	10	-17.90	0.44	-0.26
			Max. My	2	-18.01	0.02	0.51
			Max. Vy	10	-5.04	0.30	-0.18
			Max. Vx	2	-5.85	0.00	0.35
		Diagonal	Max Tension	7	4.58	0.00	0.00
			Max. Compression	13	-4.64	0.00	0.00
			Max. Mx	15	3.75	-0.01	0.00
			Max. My	5	-4.33	-0.00	-0.00
			Max. Vy	15	0.01	-0.01	0.00
			Max. Vx	5	0.00	-0.00	-0.00
		Top Girt	Max Tension	10	0.25	0.00	0.00
			Max. Compression	12	-0.23	0.00	0.00
			Max. Mx	14	0.02	0.01	0.00
			Max. My	26	0.01	0.00	0.00
			Max. Vy	14	0.01	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Bottom Girt	Max Tension	17	0.05	0.00	0.00
			Max. Compression	23	-0.03	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	14	0.02	0.01	0.00
			Max. My	26	0.02	0.00	0.00
			Max. Vy	14	0.01	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
T3	140 - 120	Leg	Max Tension	8	130.19	0.00	0.04
			Max. Compression	2	-139.25	0.01	1.04
			Max. Mx	10	-138.54	0.90	-0.52
			Max. My	2	-139.25	0.01	1.04
			Max. Vy	10	-6.37	0.83	-0.48
			Max. Vx	2	-7.41	0.02	0.97
		Diagonal	Max Tension	7	7.60	0.00	0.00
			Max. Compression	13	-7.78	0.00	0.00
			Max. Mx	15	5.94	-0.01	0.00
			Max. My	5	-7.35	0.00	-0.00
			Max. Vy	15	0.01	-0.01	0.00
			Max. Vx	5	0.00	0.00	-0.00
		Top Girt	Max Tension	6	0.24	0.00	0.00
			Max. Compression	12	-0.22	0.00	0.00
			Max. Mx	14	0.03	0.01	0.00
			Max. My	26	0.03	0.00	0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Bottom Girt	Max Tension	2	1.31	0.00	0.00
			Max. Compression	8	-1.61	0.00	0.00
			Max. Mx	14	-0.19	0.01	0.00
			Max. My	26	-0.23	0.00	0.00
			Max. Vy	14	-0.01	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
T4	120 - 90	Leg	Max Tension	8	145.83	-0.22	0.00
			Max. Compression	15	-159.64	0.28	-0.00
			Max. Mx	2	-147.08	1.04	-0.01
			Max. My	3	-4.80	-0.06	-0.85
			Max. Vy	8	-0.17	-0.99	0.01
			Max. Vx	3	-0.15	-0.06	-0.85
		Diagonal	Max Tension	11	1.89	0.00	0.00
			Max. Compression	5	-2.03	0.00	0.00
			Max. Mx	26	0.80	0.06	-0.01
			Max. My	26	-1.22	-0.03	-0.02
			Max. Vy	26	-0.02	0.06	-0.01
			Max. Vx	26	0.01	0.00	0.00
T5	90 - 60	Leg	Max Tension	8	158.77	-0.24	-0.00
			Max. Compression	15	-179.96	0.06	-0.00
			Max. Mx	21	144.05	-0.43	0.00
			Max. My	7	-7.86	-0.04	-0.30
			Max. Vy	25	0.09	-0.43	-0.00
			Max. Vx	7	0.06	-0.04	-0.30
		Diagonal	Max Tension	7	2.59	0.00	0.00
			Max. Compression	7	-2.70	0.00	0.00
			Max. Mx	21	1.97	0.06	0.01
			Max. My	19	0.10	0.05	0.01
			Max. Vy	21	0.03	0.06	0.01
			Max. Vx	19	0.00	0.00	0.00
T6	60 - 30	Leg	Max Tension	8	173.16	-0.22	-0.00
			Max. Compression	15	-203.22	-0.87	-0.00
			Max. Mx	21	155.37	-1.37	0.00
			Max. My	16	-18.86	-1.13	-0.25
			Max. Vy	25	0.30	-1.37	-0.00
			Max. Vx	24	0.05	-1.13	-0.25
		Diagonal	Max Tension	20	3.95	0.00	0.00
			Max. Compression	20	-3.68	0.00	0.00
			Max. Mx	21	1.98	0.12	0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	20	-2.79	0.06	0.02
			Max. Vy	21	0.05	0.12	0.02
			Max. Vx	25	-0.00	0.00	0.00
T7	30 - 0	Leg	Max Tension	8	187.92	-0.22	0.00
			Max. Compression	15	-228.99	0.00	0.00
			Max. Mx	15	-219.88	2.35	0.00
			Max. My	7	-15.99	-0.06	-0.39
			Max. Vy	21	-0.62	-2.29	-0.00
			Max. Vx	7	-0.09	-0.06	-0.39
		Diagonal	Max Tension	20	6.78	0.00	0.00
			Max. Compression	20	-6.41	0.00	0.00
			Max. Mx	21	0.86	0.32	0.04
			Max. My	20	-6.36	0.27	0.04
			Max. Vy	21	0.09	0.32	0.04
			Max. Vx	20	-0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	23	229.12	19.82	-11.45
	Max. H_x	10	224.81	23.19	-13.39
	Max. H_z	17	-168.40	-21.34	12.32
	Min. Vert	4	-188.34	-19.52	11.27
	Min. H_x	17	-168.40	-21.34	12.32
	Min. H_z	10	224.81	23.19	-13.39
Leg B	Max. Vert	19	229.18	-19.81	-11.48
	Max. H_x	25	-168.31	21.32	12.35
	Max. H_z	25	-168.31	21.32	12.35
	Min. Vert	12	-188.43	19.52	11.31
	Min. H_x	6	224.99	-23.18	-13.43
	Min. H_z	6	224.99	-23.18	-13.43
Leg A	Max. Vert	15	229.64	0.04	22.93
	Max. H_x	11	17.02	1.96	1.82
	Max. H_z	2	225.56	0.04	26.84
	Min. Vert	8	-188.97	-0.04	-22.60
	Min. H_x	5	16.86	-1.96	1.79
	Min. H_z	21	-168.73	-0.04	-24.68

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	50.75	0.00	-0.00	-0.45	-0.50	0.00
Dead+Wind 0 deg - No Ice	50.75	-0.02	-40.65	-4155.88	1.08	1.38
Dead+Wind 30 deg - No Ice	50.75	19.80	-34.40	-3563.23	-2048.26	0.73
Dead+Wind 60 deg - No Ice	50.75	34.04	-19.70	-2049.82	-3537.35	-0.12
Dead+Wind 90 deg - No Ice	50.75	39.63	0.02	1.15	-4098.78	-0.95
Dead+Wind 120 deg - No Ice	50.75	35.12	20.34	2078.63	-3585.65	-1.50
Dead+Wind 150 deg - No Ice	50.75	19.83	34.42	3563.90	-2051.04	-1.66
Dead+Wind 180 deg - No Ice	50.75	0.02	39.43	4101.04	-2.11	-1.38

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 210 deg - No Ice	50.75	-19.80	34.40	3562.31	2047.26	-0.73
Dead+Wind 240 deg - No Ice	50.75	-35.10	20.31	2075.88	3583.04	0.13
Dead+Wind 270 deg - No Ice	50.75	-39.63	-0.02	-2.04	4097.76	0.95
Dead+Wind 300 deg - No Ice	50.75	-34.06	-19.73	-2052.58	3537.92	1.50
Dead+Wind 330 deg - No Ice	50.75	-19.83	-34.42	-3564.83	2049.99	1.66
Dead+Ice+Temp	72.69	-0.00	0.00	-0.74	-0.84	0.00
Dead+Wind 0 deg+Ice+Temp	72.69	-0.01	-39.96	-4091.46	-0.98	1.42
Dead+Wind 30 deg+Ice+Temp	72.69	18.70	-32.46	-3383.44	-1948.15	0.75
Dead+Wind 60 deg+Ice+Temp	72.69	31.68	-18.33	-1923.02	-3320.21	-0.12
Dead+Wind 90 deg+Ice+Temp	72.69	37.41	0.01	-0.87	-3895.23	-0.96
Dead+Wind 120 deg+Ice+Temp	72.69	34.54	19.99	2044.50	-3533.45	-1.54
Dead+Wind 150 deg+Ice+Temp	72.69	18.71	32.47	3381.82	-1947.94	-1.70
Dead+Wind 180 deg+Ice+Temp	72.69	0.01	36.67	3843.59	-0.72	-1.42
Dead+Wind 210 deg+Ice+Temp	72.69	-18.70	32.46	3381.96	1946.46	-0.75
Dead+Wind 240 deg+Ice+Temp	72.69	-34.54	19.97	2044.72	3531.89	0.12
Dead+Wind 270 deg+Ice+Temp	72.69	-37.41	-0.01	-0.62	3893.55	0.96
Dead+Wind 300 deg+Ice+Temp	72.69	-31.69	-18.34	-1922.81	3318.39	1.54
Dead+Wind 330 deg+Ice+Temp	72.69	-18.71	-32.47	-3383.32	1946.23	1.70
Dead+Wind 0 deg - Service	50.75	-0.01	-14.07	-1438.35	0.04	0.48
Dead+Wind 30 deg - Service	50.75	6.85	-11.90	-1233.27	-709.09	0.25
Dead+Wind 60 deg - Service	50.75	11.78	-6.82	-709.52	-1224.23	-0.04
Dead+Wind 90 deg - Service	50.75	13.71	0.01	0.09	-1418.63	-0.33
Dead+Wind 120 deg - Service	50.75	12.15	7.04	718.97	-1241.07	-0.52
Dead+Wind 150 deg - Service	50.75	6.86	11.91	1232.92	-710.05	-0.57
Dead+Wind 180 deg - Service	50.75	0.01	13.64	1418.63	-1.06	-0.48
Dead+Wind 210 deg - Service	50.75	-6.85	11.90	1232.37	708.07	-0.25
Dead+Wind 240 deg - Service	50.75	-12.15	7.03	718.02	1239.50	0.04
Dead+Wind 270 deg - Service	50.75	-13.71	-0.01	-1.01	1417.61	0.33
Dead+Wind 300 deg - Service	50.75	-11.79	-6.83	-710.47	1223.76	0.52
Dead+Wind 330 deg - Service	50.75	-6.86	-11.91	-1233.83	709.03	0.57

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-50.75	0.00	-0.00	50.75	0.00	0.000%
2	-0.02	-50.75	-40.66	0.02	50.75	40.65	0.002%
3	19.80	-50.75	-34.40	-19.80	50.75	34.40	0.002%
4	34.04	-50.75	-19.70	-34.04	50.75	19.70	0.001%
5	39.63	-50.75	0.02	-39.63	50.75	-0.02	0.002%
6	35.12	-50.75	20.34	-35.12	50.75	-20.34	0.002%
7	19.83	-50.75	34.42	-19.83	50.75	-34.42	0.002%
8	0.02	-50.75	39.43	-0.02	50.75	-39.43	0.001%
9	-19.80	-50.75	34.40	19.80	50.75	-34.40	0.002%
10	-35.11	-50.75	20.31	35.10	50.75	-20.31	0.002%
11	-39.63	-50.75	-0.02	39.63	50.75	0.02	0.002%
12	-34.06	-50.75	-19.73	34.06	50.75	19.73	0.001%
13	-19.83	-50.75	-34.42	19.83	50.75	34.42	0.002%
14	0.00	-72.69	0.00	0.00	72.69	-0.00	0.000%
15	-0.01	-72.69	-39.96	0.01	72.69	39.96	0.001%
16	18.70	-72.69	-32.46	-18.70	72.69	32.46	0.001%
17	31.69	-72.69	-18.33	-31.68	72.69	18.33	0.001%
18	37.41	-72.69	0.01	-37.41	72.69	-0.01	0.001%
19	34.54	-72.69	19.99	-34.54	72.69	-19.99	0.001%
20	18.71	-72.69	32.47	-18.71	72.69	-32.47	0.001%
21	0.01	-72.69	36.67	-0.01	72.69	-36.67	0.001%
22	-18.70	-72.69	32.46	18.70	72.69	-32.46	0.001%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
23	-34.54	-72.69	19.97	34.54	72.69	-19.97	0.001%
24	-37.41	-72.69	-0.01	37.41	72.69	0.01	0.001%
25	-31.69	-72.69	-18.34	31.69	72.69	18.34	0.001%
26	-18.71	-72.69	-32.47	18.71	72.69	32.47	0.001%
27	-0.01	-50.75	-14.07	0.01	50.75	14.07	0.001%
28	6.85	-50.75	-11.90	-6.85	50.75	11.90	0.001%
29	11.78	-50.75	-6.82	-11.78	50.75	6.82	0.001%
30	13.71	-50.75	0.01	-13.71	50.75	-0.01	0.001%
31	12.15	-50.75	7.04	-12.15	50.75	-7.04	0.001%
32	6.86	-50.75	11.91	-6.86	50.75	-11.91	0.001%
33	0.01	-50.75	13.64	-0.01	50.75	-13.64	0.001%
34	-6.85	-50.75	11.90	6.85	50.75	-11.90	0.001%
35	-12.15	-50.75	7.03	12.15	50.75	-7.03	0.001%
36	-13.71	-50.75	-0.01	13.71	50.75	0.01	0.001%
37	-11.79	-50.75	-6.83	11.79	50.75	6.83	0.001%
38	-6.86	-50.75	-11.91	6.86	50.75	11.91	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	9	0.00000001	0.00013804
3	Yes	9	0.00000001	0.00014660
4	Yes	10	0.00000001	0.00005248
5	Yes	9	0.00000001	0.00014661
6	Yes	9	0.00000001	0.00013801
7	Yes	9	0.00000001	0.00014669
8	Yes	10	0.00000001	0.00005248
9	Yes	9	0.00000001	0.00014667
10	Yes	9	0.00000001	0.00013804
11	Yes	9	0.00000001	0.00014655
12	Yes	10	0.00000001	0.00005245
13	Yes	9	0.00000001	0.00014657
14	Yes	6	0.00000001	0.00000001
15	Yes	10	0.00000001	0.00007197
16	Yes	10	0.00000001	0.00007520
17	Yes	10	0.00000001	0.00007806
18	Yes	10	0.00000001	0.00007518
19	Yes	10	0.00000001	0.00007195
20	Yes	10	0.00000001	0.00007518
21	Yes	10	0.00000001	0.00007801
22	Yes	10	0.00000001	0.00007518
23	Yes	10	0.00000001	0.00007195
24	Yes	10	0.00000001	0.00007513
25	Yes	10	0.00000001	0.00007799
26	Yes	10	0.00000001	0.00007515
27	Yes	9	0.00000001	0.00014009
28	Yes	9	0.00000001	0.00014310
29	Yes	9	0.00000001	0.00014583
30	Yes	9	0.00000001	0.00014302
31	Yes	9	0.00000001	0.00013999
32	Yes	9	0.00000001	0.00014298
33	Yes	9	0.00000001	0.00014574
34	Yes	9	0.00000001	0.00014299
35	Yes	9	0.00000001	0.00013996

36	Yes	9	0.00000001	0.00014290
37	Yes	9	0.00000001	0.00014567
38	Yes	9	0.00000001	0.00014297

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	3.697	27	0.2211	0.0205
T2	160 - 140	2.769	27	0.2101	0.0148
T3	140 - 120	1.919	27	0.1729	0.0103
T4	120 - 90	1.242	27	0.1231	0.0055
T5	90 - 60	0.642	27	0.0706	0.0017
T6	60 - 30	0.283	27	0.0402	0.0007
T7	30 - 0	0.080	27	0.0186	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	(E) Lightning Rod	27	3.697	0.2211	0.0205	249641
170.00	(2) (E)Powerwave 7770.00	27	3.228	0.2178	0.0176	124821
160.00	APX16DWV-16DWVS-E-A20	27	2.769	0.2101	0.0148	61824
140.00	(E)T-Frame	27	1.919	0.1729	0.0103	27951

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	10.670	2	0.6368	0.0628
T2	160 - 140	7.994	2	0.6060	0.0448
T3	140 - 120	5.543	2	0.4991	0.0305
T4	120 - 90	3.589	2	0.3554	0.0163
T5	90 - 60	1.854	2	0.2040	0.0050
T6	60 - 30	0.819	2	0.1160	0.0020
T7	30 - 0	0.232	2	0.0538	0.0007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	(E) Lightning Rod	2	10.670	0.6368	0.0628	88055
170.00	(2) (E)Powerwave 7770.00	2	9.318	0.6279	0.0534	44027

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	APX16DWV-16DWVS-E-A20	2	7.994	0.6060	0.0448	21779
140.00	(E)T-Frame	2	5.543	0.4991	0.0305	9703

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T3	140	Leg	A325N	1.2500	6	9.92	53.94	0.184 ✔	1.333	Bolt Tension
T4	120	Leg	A325N	1.2500	6	22.98	54.00	0.426 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	1.89	8.16	0.232 ✔	1.333	Member Bearing
T5	90	Leg	A325N	1.2500	6	24.79	54.00	0.459 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	2.59	7.50	0.345 ✔	1.333	Member Bearing
T6	60	Leg	A325N	1.2500	6	27.05	54.00	0.501 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.8750	1	3.95	9.52	0.415 ✔	1.333	Member Bearing
T7	30	Diagonal	A325N	0.8750	1	6.78	11.89	0.570 ✔	1.333	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	180 - 160	1 3/4	20.00	3.32	91.0 K=1.00	16.71	2.4053	-17.77	40.20	0.442 ✔
T2	160 - 140	2 1/2	20.00	3.31	63.5 K=1.00	22.12	4.9087	-64.62	108.57	0.595 ✔
T3	140 - 120	3 1/2	20.00	3.32	45.5 K=1.00	25.03	9.6211	-139.25	240.85	0.578 ✔
T4	120 - 90	4 1/4	30.11	7.53	85.0 K=1.00	17.99	14.1863	-159.64	255.20	0.626 ✔
T5	90 - 60	4 1/2	30.11	7.53	80.3 K=1.00	18.95	15.9043	-179.96	301.43	0.597 ✔
T6	60 - 30	4 3/4	30.11	7.53	76.1 K=1.00	19.79	17.7205	-203.22	350.62	0.580 ✔
T7	30 - 0	4 3/4	30.11	7.53	76.1 K=1.00	19.79	17.7205	-228.99	350.62	0.653 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	7/8	6.00	2.91	143.8 K=0.90	7.22	0.6013	-2.66	4.34	0.613 ✔
T2	160 - 140	1	5.99	2.87	124.1 K=0.90	9.70	0.7854	-4.64	7.62	0.609 ✔
T3	140 - 120	1 1/8	6.00	2.83	108.5 K=0.90	12.68	0.9940	-7.78	12.61	0.617 ✔
T4	120 - 90	L2 1/2x2 1/2x3/16	11.67	5.84	142.5 K=1.00	7.35	1.1875	-1.84	8.73	0.211 ✔
T5	90 - 60	L3x3x3/16	15.39	7.67	155.0 K=1.00	6.21	1.3271	-2.70	8.25	0.328 ✔
T6	60 - 30	L3 1/2x3 1/2x1/4	19.44	9.66	167.1 K=1.00	5.35	1.6900	-3.63	9.04	0.402 ✔
T7	30 - 0	L4x4x5/16	22.60	11.24	170.5 K=1.00	5.14	2.4000	-6.41	12.33	0.520 ✔

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	7/8	5.00	4.85	186.4 K=0.70	4.30	0.6013	-0.13	2.58	0.050 ✔
T2	160 - 140	1	5.00	4.79	161.0 K=0.70	5.76	0.7854	-0.23	4.52	0.050 ✔
T3	140 - 120	1 1/8	5.00	4.71	140.6 K=0.70	7.55	0.9940	-0.22	7.51	0.029 ✔

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	7/8	5.00	4.85	186.4 K=0.70	4.30	0.6013	-0.15	2.58	0.057 ✔
T2	160 - 140	1	5.00	4.79	161.0 K=0.70	5.76	0.7854	-0.03	4.52	0.007 ✔
T3	140 - 120	1 1/8	5.00	4.71	140.6 K=0.70	7.55	0.9940	-1.61	7.51	0.214 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	1 3/4	20.00	3.32	91.0	30.00	2.4053	15.21	72.16	0.211 ✔
T2	160 - 140	2 1/2	20.00	3.31	63.5	30.00	4.9087	59.50	147.26	0.404 ✔
T3	140 - 120	3 1/2	20.00	3.32	45.5	30.00	9.6211	130.19	288.63	0.451 ✔
T4	120 - 90	4 1/4	30.11	7.53	85.0	30.00	14.1863	145.83	425.59	0.343 ✔
T5	90 - 60	4 1/2	30.11	7.53	80.3	30.00	15.9043	158.77	477.13	0.333 ✔
T6	60 - 30	4 3/4	30.11	7.53	76.1	30.00	17.7205	173.16	531.62	0.326 ✔
T7	30 - 0	4 3/4	30.11	7.53	76.1	30.00	17.7205	187.92	531.62	0.353 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	7/8	6.00	2.91	159.8	30.00	0.6013	2.64	18.04	0.146 ✔
T2	160 - 140	1	5.99	2.87	137.9	30.00	0.7854	4.58	23.56	0.195 ✔
T3	140 - 120	1 1/8	6.00	2.83	120.6	30.00	0.9940	7.60	29.82	0.255 ✔
T4	120 - 90	L2 1/2x2 1/2x3/16	9.34	4.78	76.6	29.00	0.7266	1.89	21.07	0.090 ✔
T5	90 - 60	L3x3x3/16	15.39	7.67	100.3	29.00	0.8444	2.59	24.49	0.106 ✔
T6	60 - 30	L3 1/2x3 1/2x1/4	19.44	9.66	108.0	29.00	1.0800	3.95	31.32	0.126 ✔
T7	30 - 0	L4x4x5/16	23.66	11.77	115.3	29.00	1.5656	6.78	45.40	0.149 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	7/8	5.00	4.85	266.3	30.00	0.6013	0.11	18.04	0.006 ✔
T2	160 - 140	1	5.00	4.79	230.0	30.00	0.7854	0.25	23.56	0.010 ✔
T3	140 - 120	1 1/8	5.00	4.71	200.9	30.00	0.9940	0.24	29.82	0.008

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
										✔

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	180 - 160	7/8	5.00	4.85	266.3	30.00	0.6013	0.16	18.04	0.009 ✔
T2	160 - 140	1	5.00	4.79	230.0	30.00	0.7854	0.05	23.56	0.002 ✔
T3	140 - 120	1 1/8	5.00	4.71	200.9	30.00	0.9940	1.31	29.82	0.044 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	180 - 160	Leg	1 3/4	3	-17.77	53.58	33.2	Pass
		Diagonal	7/8	13	-2.66	5.79	46.0	Pass
		Top Girt	7/8	4	-0.13	3.45	3.7	Pass
		Bottom Girt	7/8	7	-0.15	3.45	4.3	Pass
T2	160 - 140	Leg	2 1/2	48	-64.62	144.72	44.7	Pass
		Diagonal	1	58	-4.64	10.16	45.7	Pass
		Top Girt	1	51	-0.23	6.03	3.8	Pass
		Bottom Girt	1	53	-0.03	6.03	0.5	Pass
T3	140 - 120	Leg	3 1/2	93	-139.25	321.05	43.4	Pass
		Diagonal	1 1/8	103	-7.78	16.81	46.3	Pass
		Top Girt	1 1/8	96	-0.22	10.01	2.2	Pass
		Bottom Girt	1 1/8	97	-1.61	10.01	16.0	Pass
T4	120 - 90	Leg	4 1/4	138	-159.64	340.19	46.9	Pass
		Diagonal	L2 1/2x2 1/2x3/16	141	-1.84	11.64	15.8 17.4 (b)	Pass
T5	90 - 60	Leg	4 1/2	165	-179.96	401.80	44.8	Pass
		Diagonal	L3x3x3/16	168	-2.70	10.99	24.6 25.9 (b)	Pass
T6	60 - 30	Leg	4 3/4	192	-203.22	467.37	43.5	Pass
		Diagonal	L3 1/2x3 1/2x1/4	195	-3.63	12.05	30.1 31.1 (b)	Pass
T7	30 - 0	Leg	4 3/4	219	-228.99	467.37	49.0	Pass
		Diagonal	L4x4x5/16	228	-6.41	16.44	39.0 42.7 (b)	Pass
						Summary		
						Leg (T7)	49.0	Pass
						Diagonal (T3)	46.3	Pass
						Top Girt (T2)	3.8	Pass
						Bottom Girt (T3)	16.0	Pass
						Bolt Checks	42.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						RATING =	**49.0**	**Pass**

MATHCAD CALCULATION PRINTOUT

Existing 180 ft. Self Supported Tower Foundation Check

Customer Name: SBA Communications Corp
Customer Site Name: Niantic
Customer Site ID: CT09865-S-04

Carrier Name: T-Mobile
Carrier Site ID: CTNL808B

Site Location:
Southwest School 51 Daniels Road
Waterford, CT

Latitude: 41.330264
Longitude:-72.166672

ACGI Job # 15-4964

September 30, 2015

Foundation check

-Foundation Reactions-

As per TNX output results:

Total Shear $S := 41 \cdot kips$

Moment $M := 4156 \cdot ft\_K$

Down load, Tower weight $Pv := 51 \cdot kips$

Compression on Pedestal: $P_c := 230 \cdot kips$

Uplift on Pedestal: $P_{up} := 189 \cdot kips$

Shear on Pedestal: $Sh := 23 \cdot kips$

-Soil Properties- **Soil data is as per Geotechnical Report by Dr.Clearance Welti, P.E., P.C.Geotechnical Engineering (Ref: Geotechnical Study for proposed Cell Tower at Southwest School 51 Daniels Road, Waterford,CT -SBA Network Services, Inc. dated 10/23/2008)**

Allowable Bearing Capacity $Brg_{allw} := 4408 \cdot psf$ $SF_b := 2$

Ultimate Bearing Capacity $Brg_{ult} := Brg_{allw} \cdot SF_b = 8.816 \cdot ksf$

Internal angle of friction for soil, $\phi := 34 \cdot deg$

Unit wt. of soil, $\gamma_s := 0.125 \cdot kcf$

Alowable Passive Pressure see next page

Cohesion of soil, $c_u := 0 \cdot ksf$

Friction Factor $FF := 0.6$

Depth to be neglected $L_{neg} := 1 \cdot ft$

-Material Parameters-

Conforming to the design requirements as in ACI 318

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

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

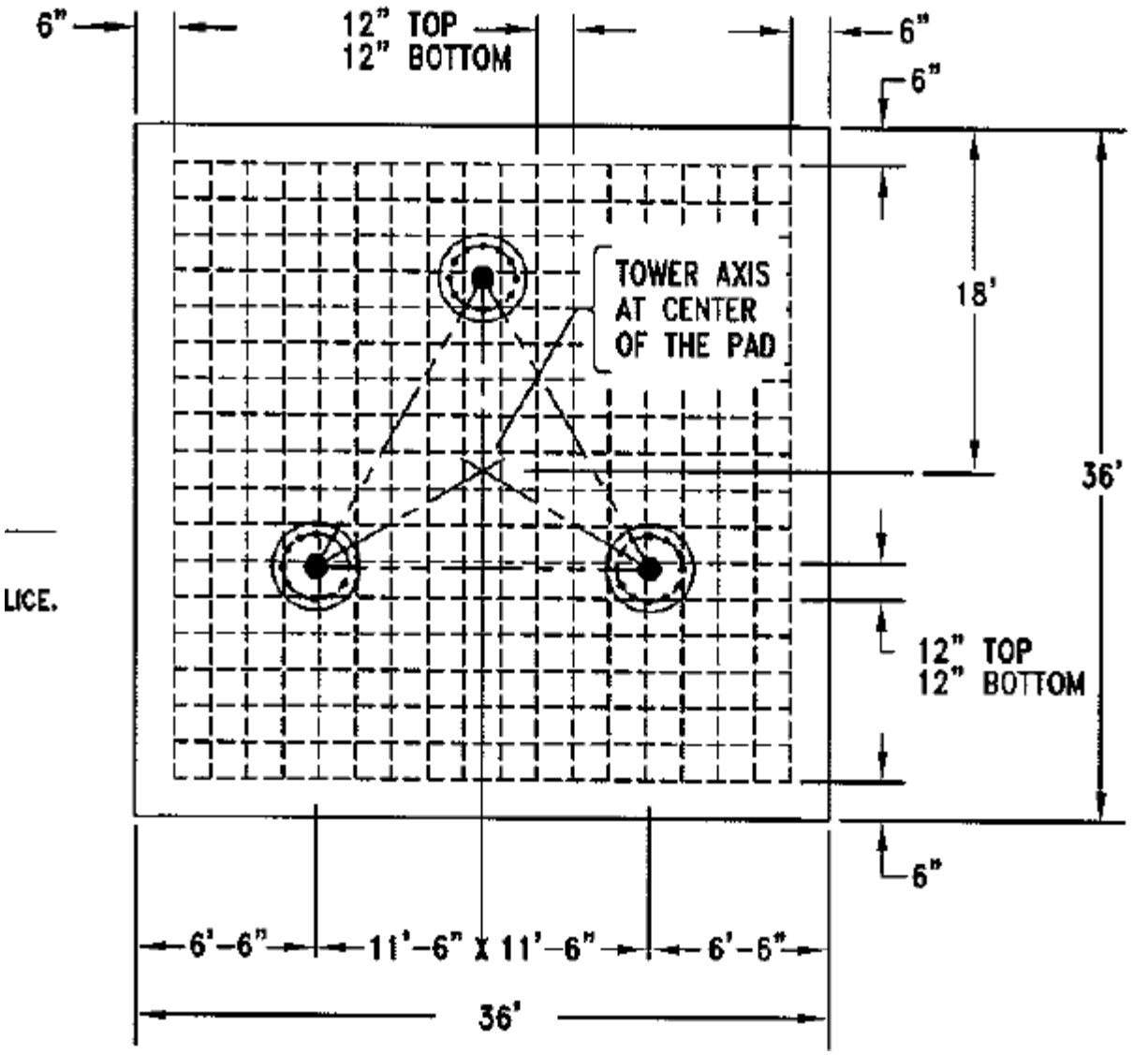
-Factor of Safety-

FS concrete weight $FS_c := 1.25$

FS soil weight $FS_s := 1.50$

FS passive pressure $FS_{pp} := 2.00$

FS bearing pressure $FS_{bp} := 2.00$



DIMENSIONS

Tower face width TWFW := 23·ft Tower ht. Tw_{ht} := 180·ft

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

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

(Existing MAT foundation data is as per original foundation design by Tower Innovations, Project Number 5210 dated 11/5/2008).

Depth of mat, D_f := 6.5·ft

Thickness of mat, T_f := 2·ft

Pedestal size, Ped_s := 3.5·ft No. of pedestals Nped := 3

Extension above the grade, E_g := 0.5·ft

Mat Dimensions, LxB L := 36·ft x B := 36·ft

Brg_{allw} = 4.408·ksf

MAT CALCULATIONS

$K_p := \tan\left(45\cdot deg + \frac{\Phi}{2}\right)^2$ $K_p = 3.537$

$P_{pave} := \frac{\left(D_f - T_f - L_{neg}\right)\cdot K_p\cdot\gamma_s + \left(D_f - L_{neg}\right)\cdot K_p\cdot\gamma_s}{2}$ $P_{pave} = 1.99\cdot ksf$

Safety against overturning and location of resultant on the base

Resisting Moments about mid axis parallel to base

$Area_{ped} := if\left(col_t = 1\ , Ped_s^2\ , \frac{\pi}{4}\cdot Ped_s^2\right)$ $Area_{ped} = 9.621\ ft^2$

component	value, kips	lever arm, ft	resisting moment, ft-kips
1) Concrete wt.	$C_w := L\cdot B\cdot T_f\cdot\left(\gamma_c\right) + Area_{ped}\cdot\gamma_c\cdot\left(D_f + E_g - T_f\right)\cdot Nped$ $C_w = 410.448\cdot kips$	$L_c := \frac{L}{2}$ $L_c = 18\ ft$	$R_c := C_w\cdot L_c$ $R_c = 7388.056\cdot ft\_K$
2) Soil wt.	$S_w := \left[L\cdot B\cdot\left(D_f - T_f\right) - Area_{ped}\cdot\left(D_f - T_f\right)\cdot Nped\right]\cdot\gamma_s$ $S_w = 712.764\cdot kips$	$L_s := \frac{L}{2}$ $L_s = 18\ ft$	$R_s := S_w\cdot L_s$ $R_s = 12829.758\cdot ft\_K$
3) Wt. of soil wedge	$W_w := \left(D_f\right)\cdot\frac{1}{2}\cdot\left(D_f\cdot\tan(\phi)\right)\cdot B\cdot\left(\gamma_s\right)$ $W_w = 64.12\cdot kips$	$L_w := \left(L + D_f\cdot\frac{\tan(\phi)}{3}\right)$ $L_w = 37.461\ ft$	$R_w := W_w\cdot L_w$ $R_w = 2402.045\cdot ft\_K$
4) Passive pressure	$Pe_p := T_f\cdot B\cdot P_{pave}$ $Pe_p = 143.254\cdot kips$	$L_p := \frac{T_f}{3}$ $L_p = 0.667\ ft$	$R_p := Pe_p\cdot L_p$ $R_p = 95.503\cdot ft\_K$
5) Vertical	$Pv = 51\cdot kips$	$L_v := \frac{L}{2}$ $L_v = 18\ ft$	$R_v := Pv\cdot L_v$ $R_v = 918\cdot ft\_K$

$S_{w1} := L\cdot B\cdot D_f\cdot\gamma_s$ $S_{w1} = 1053\cdot kips$ <--- for net calcs

Total weight $T_w := C_w + S_w + W_w + Pv$ $T_w = 1238.332\cdot kips$

Total resisting Moment= $M_r := \frac{R_c}{FS_c} + \frac{R_s}{FS_s} + \frac{R_w}{FS_s} + \frac{R_p}{FS_{pp}} + \frac{R_v}{FS_{bp}}$ $M_r = 16571.731\cdot ft\_K$

Overturning Moments

component	value, kips	lever arm, ft	Overturning Moment ft-kips
1) Moment on foundation due to eccentric location of tower	$Pv = 51\cdot kips$	$L_{pe} = 0$	$M_{pe} := L_{pe}\cdot Pv$ $M_{pe} = 0\cdot ft\_K$
2) Moment on foundation	-	-	$M = 4156\cdot ft\_K$
3) Moment due to horizontal shear	$S_t := S$	$L_{hs} := D_f + E_g$ $L_{hs} = 7\ ft$	$O_{hs} := L_{hs}\cdot S_t$ $O_{hs} = 287\cdot ft\_K$

Total Overturning Moment= $M_o := M + O_{hs} + M_{pe}$ $M_o = 4443\cdot ft\_K$

Check Safety Factor against Overturning about mid axis parallel to base

$SF := \frac{M_r}{M_o}$ $SF = 3.73$ > 1.5 **O.K!**

Calculate eccentricity, e

$e := \frac{M_o}{T_w}$ $e = 3.588\,ft$

Check location of eccentricity and determine pressure distribution under the mat

$L_{loc} := \frac{L}{6}$ $L_{loc} = 6\,ft$ For net bearing calcs $T_{w1} := S_{w1} + W_w$ $T_{w1} = 1117.12 \cdot kips$

$P_{max1} := if\left[e \le L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[1 + \left(6 \cdot \frac{e}{L}\right)\right], 4 \cdot \frac{T_w}{3 \cdot B \cdot (L - 2 \cdot e)}\right]$ $P_{max1} = 1.527 \cdot ksf$

$P_{max2} := \left(\frac{T_{w1}}{L \cdot B}\right)$ $P_{max2} = 0.862 \cdot ksf$ $P_{net} := P_{max1} - P_{max2}$ $P_{max} := P_{net}$

Net soil pressure, $P_{net} = 0.665 \cdot ksf$ < $Brg_{allw} = 4.408 \cdot ksf$ **O.K.!**

$P_{min} := if\left[e \le L_{loc}, \frac{T_w}{L \cdot B} \cdot \left[1 - \left(6 \cdot \frac{e}{L}\right)\right], 0 \cdot ksf\right]$ $P_{min} = 0.384 \cdot ksf$ $FS_{shear} := 2$

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

$P_{hor} = 86.927 \cdot kips$ > $S = 41 \cdot kips$ Since P.hor > S it is safe!

Summary

-Foundation Reactions-

Shear $S = 41 \cdot kips$

Down load $Pv = 51 \cdot kips$ (Weight)

Uplift load $P_{up} = 189 \cdot kips$

Moment; $M = 4156 \cdot ft \cdot kip$

Size of Mat

$L = 36\,ft$ $B = 36\,ft$

Depth of base of mat $D_f = 6.5\,ft$ Thickness of Mat $T_f = 2\,ft$

Pedestal size $Ped_s = 3.5\,ft$

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

Stability Calculations

Safety Factor against Overturning	$SF = 3.73$	>	1.5	$\frac{1.5}{SF} = 0.402$	**O.K.!**
Net soil pressure,	$P_{net} = 0.665 \cdot ksf$	<	$\frac{Brg_{allw}}{FS_{bp}} = 2.204 \cdot ksf$	$\frac{P_{net}}{\left(\frac{Brg_{allw}}{FS_{bp}}\right)} = 0.302$	**O.K.!**
Check for horizontal shear	$P_{hor} = 86.927 \cdot kips$	>	$S = 41 \cdot kips$	$\frac{S}{P_{hor}} = 0.472$	**O.K.!**

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

T-Mobile Existing Facility

Site ID: CTNL808B

Amtrak_Waterford2
51 Daniels Avenue
Waterford, CT 06385

October 13, 2015

EBI Project Number: 6215005138

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	3.92 %

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October 13, 2015

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

Emissions Analysis for Site: **CTNL808B – Amtrak_Waterford2**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **51 Daniels Avenue, Waterford, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the PCS and AWS 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 **51 Daniels Avenue, Waterford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

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

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

3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

5) Since the radios are ground mounted there are additional cabling losses accounted for. For each RF path the following losses were calculated. 1.85 dB of additional cable loss for all 1900 MHz channels, 1.91 dB of additional cable loss for all 2100 MHz channels and 1.01 dB of additional cable loss at 700 MHz. This is based on manufacturers Specifications for 180 feet of 1-5/8” coax cable on each path.

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

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

8) The antennas used in this modeling are the **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **RFS APX16DWV-16DWVS-E-A20** has a maximum gain of **16.3 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerline of the proposed antennas is **160 feet** above ground level (AGL).

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	160	Height (AGL):	160	Height (AGL):	160
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	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	6,640.82	ERP (W):	6,640.82	ERP (W):	6,640.82
Antenna A1 MPE%	1.01	Antenna B1 MPE%	1.01	Antenna C1 MPE%	1.01
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	160	Height (AGL):	160	Height (AGL):	160
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	685.68	ERP (W):	685.68	ERP (W):	685.68
Antenna A2 MPE%	0.22	Antenna B2 MPE%	0.22	Antenna C2 MPE%	0.22

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.23 %**
Verizon Wireless	1.95 %
AT&T	0.74 %
Site Total MPE %:	**3.92 %**

T-Mobile Sector 1 Total:	1.23 %
T-Mobile Sector 2 Total:	1.23 %
T-Mobile Sector 3 Total:	1.23 %
Site Total:	3.92 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	**2**	**1648.74**	**160**	**5.00**	**2100**	**1000**	**0.50%**
T-Mobile 700 MHz LTE	**1**	**685.68**	**160**	**1.04**	**700**	**467**	**0.22 %**
T-Mobile 1900 MHz (PCS) GSM	**2**	**835.84**	**160**	**2.53**	**1900**	**1000**	**0.25 %**
T-Mobile 1900 MHz (PCS) UMTS	**2**	**835.84**	**160**	**2.53**	**2100**	**1000**	**0.25%**
						Total:	**1.23%**

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Summary

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

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

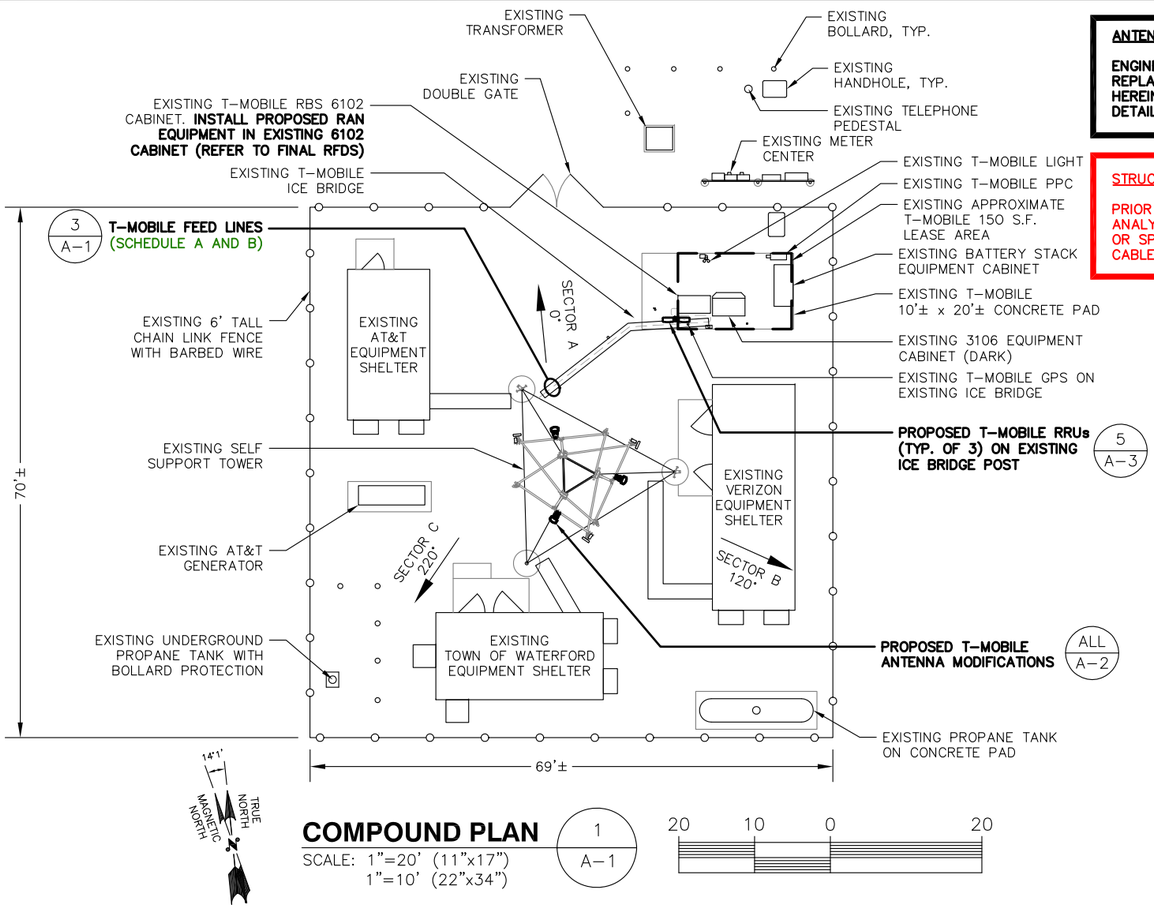
T-Mobile Sector	Power Density Value (%)
Sector 1:	1.23 %
Sector 2:	1.23 %
Sector 3 :	1.23 %
T-Mobile Per Sector Maximum:	1.23 %
Site Total:	3.92 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **3.92%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803



COMPOUND PLAN

1 / A-1

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

20 10 0 20

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

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

STRUCTURAL NOTES:

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

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING: TO REMAIN (12) 1-5/8" COAX TO 160' RAD	UP EXISTING CABLE LADDER TO RAD
B	PROPOSED: (6) 1-5/8" COAX TO 160' RAD	UP EXISTING CABLE LADDER TO RAD

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

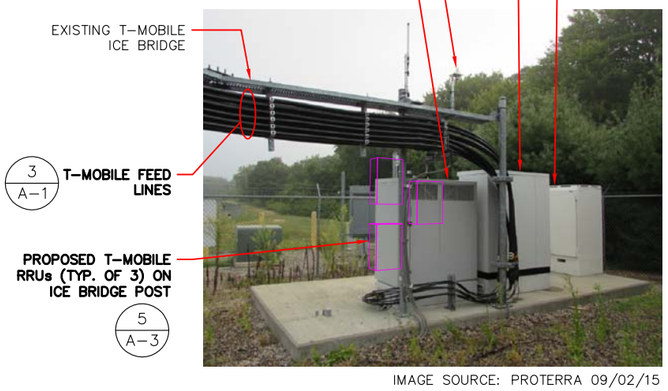


IMAGE SOURCE: PROTERRA 09/02/15

EQUIPMENT PHOTO DETAIL

2 / A-1

SCALE: N.T.S.

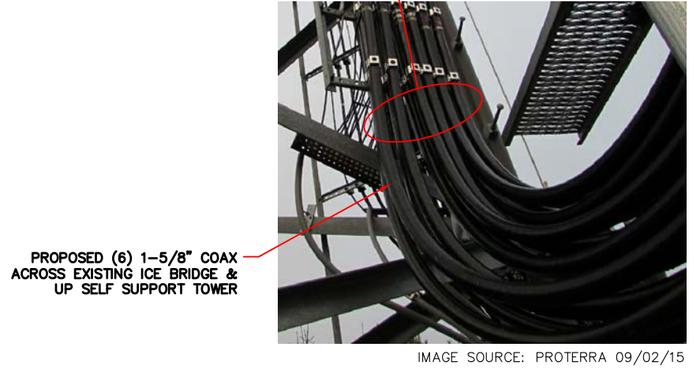


IMAGE SOURCE: PROTERRA 09/02/15

FEEDLINE PHOTO DETAIL AT TOWER BASE

3 / A-1

SCALE: N.T.S.

℄ OF EXISTING T-MOBILE ANTENNAS
ELEV.= 160'± AGL (SBA DATABASE)

ALL A-2 ALL A-3

IMAGE SOURCE: PROTERRA 09/02/15

PARTIAL ELEVATION PHOTO DETAIL

4 / A-1

SCALE: N.T.S.

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

SBA COMMUNICATIONS CORP.
33 BOSTON POST ROAD WEST, SUITE 320
MARLBOROUGH, MA 01752 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
JESSE M. MORENO
No. 24389
LICENSED PROFESSIONAL ENGINEER
10/5/15

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

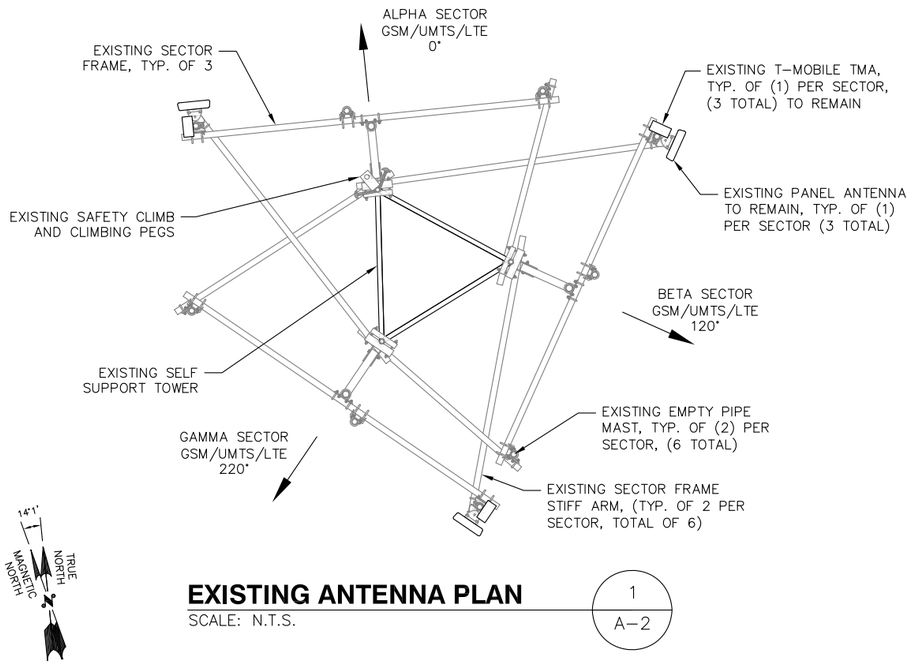
REV.	DATE	DESCRIPTION	BY
1	10/05/15	CONSTRUCTION REVISED	JEB
0	09/28/15	ISSUED FOR CONSTRUCTION	BLM

SITE NUMBER:
CTNL808B
SITE NAME:
AMTRAK_WATERFORD2

SITE ADDRESS:
51 DANIELS AVENUE
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE
COMPOUND & ELEVATION PLAN

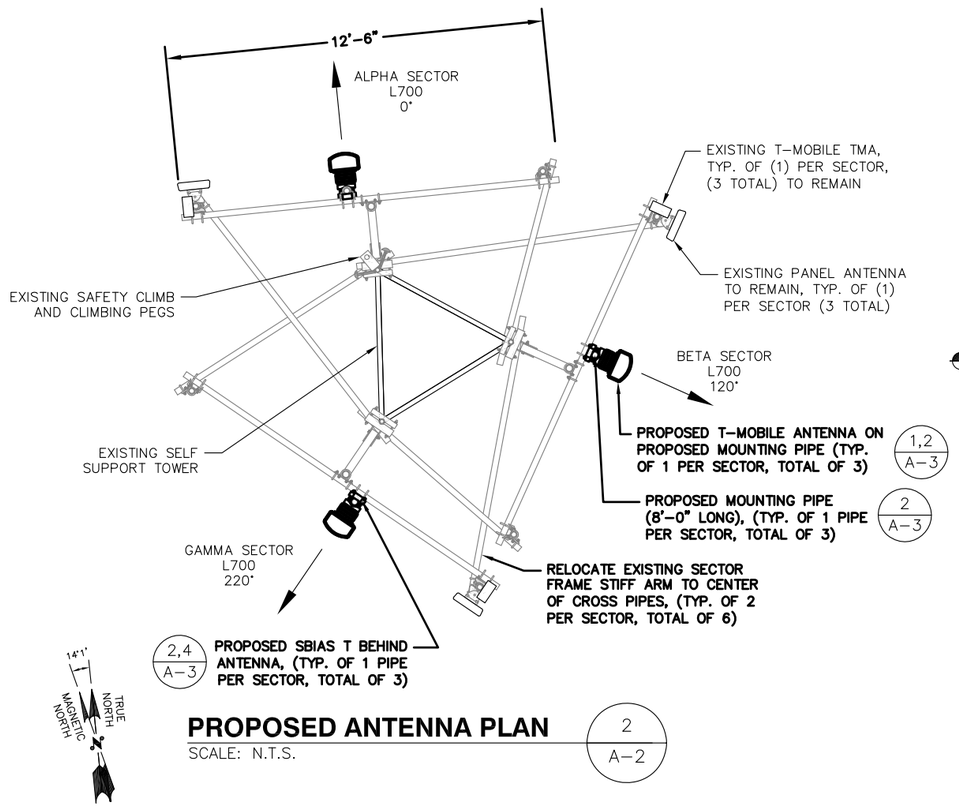
SHEET NUMBER
A-1



EXISTING ANTENNA PLAN

SCALE: N.T.S.

1 / A-2



PROPOSED ANTENNA PLAN

SCALE: N.T.S.

2 / A-2

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

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

SPECIAL WORK NOTE:

VERTICALLY CENTER THE PIPE MAST AND THE PROPOSED ANTENNAS ON THE EXISTING MOUNTING RAIL

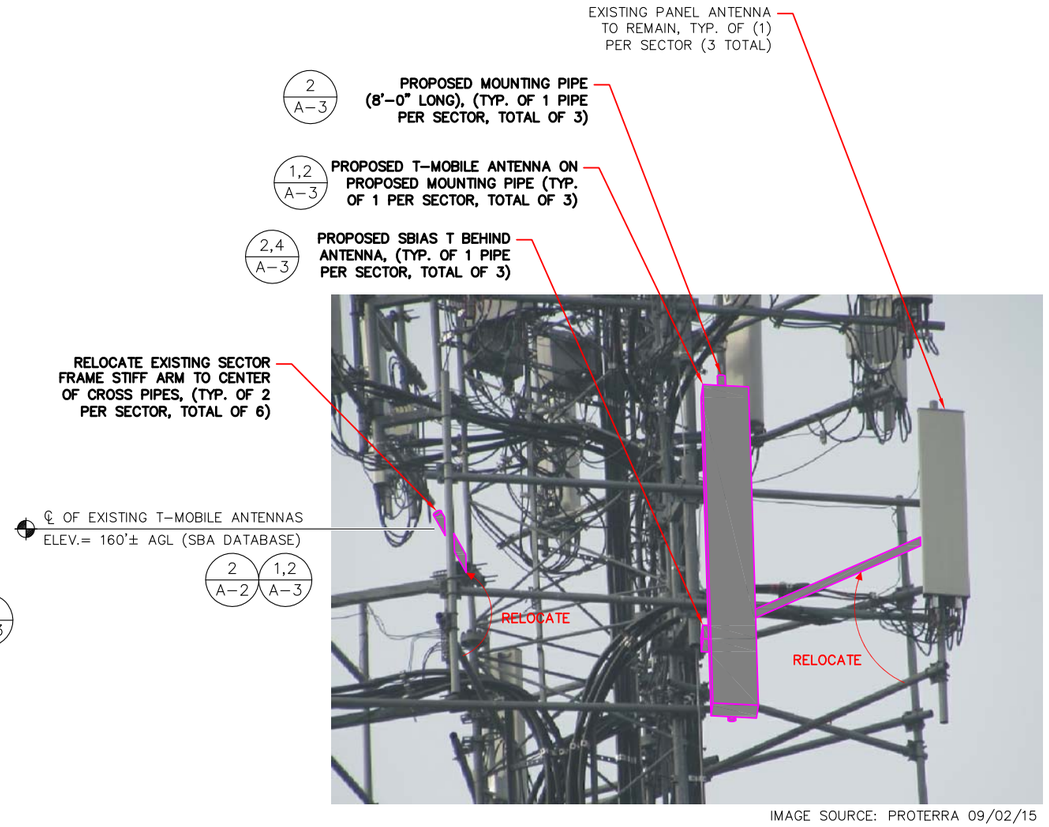

IMAGE SOURCE: PROTERRA 09/02/15
NOTE: ONE SECTOR SHOWN FOR CLARITY

ANTENNA PHOTO DETAIL

SCALE: N.T.S.

3 / A-2

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

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STATE OF CONNECTICUT
JESSE M. MORENO
No. 24389
LICENSED PROFESSIONAL ENGINEER
10/15

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

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SITE NAME:
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SITE ADDRESS:
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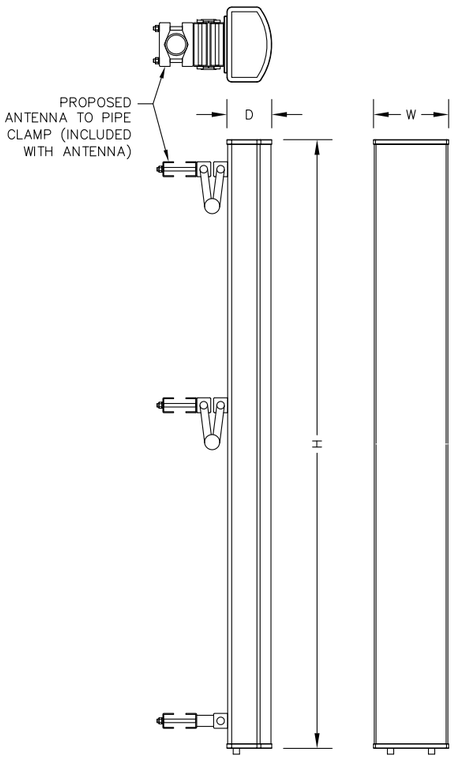
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE
EXISTING & PROPOSED ANTENNA PLAN

SHEET NUMBER
A-2



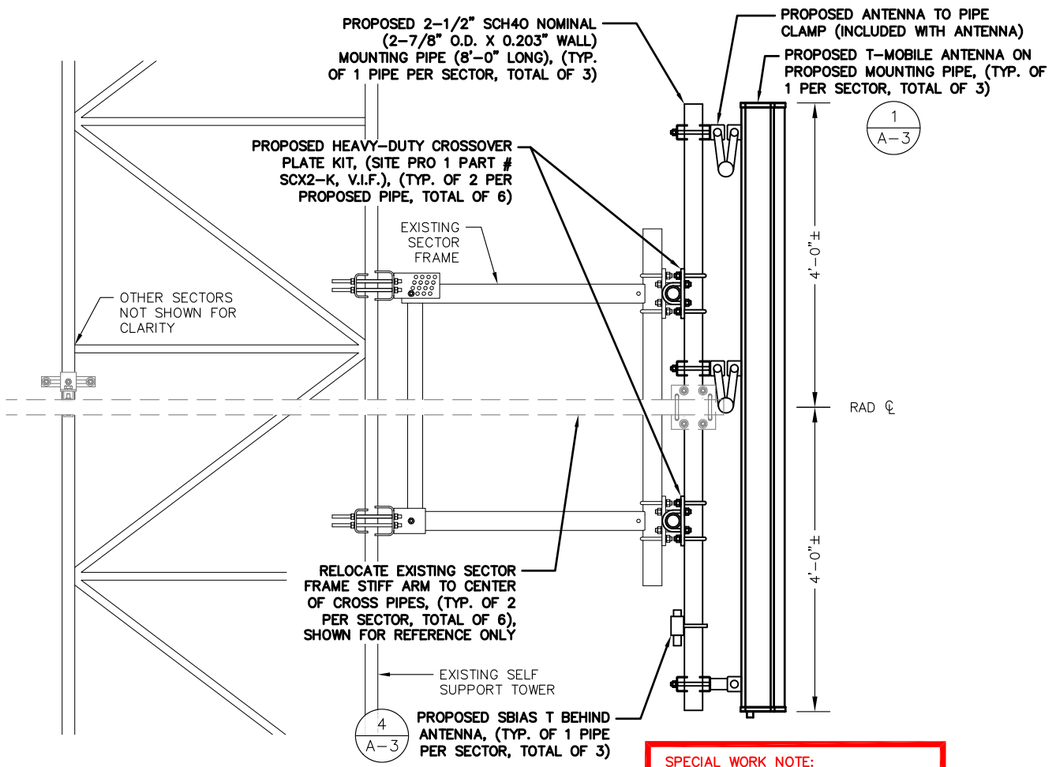
L700 ANTENNA SPECIFICATIONS

MANUF.	COMMSCOPE
MODEL #	LNX-6515DS-VTM
HEIGHT	96.4"
WIDTH	11.9"
DEPTH	7.1"
WEIGHT	50.3± LBS.

L700 ANTENNA DETAIL

SCALE: N.T.S.

1 / A-3



PROPOSED ANTENNA MOUNTING DETAIL

SCALE: N.T.S.

2 / A-3

SPECIAL WORK NOTE:

VERTICALLY CENTER THE PIPE MAST AND THE PROPOSED ANTENNAS ON THE EXISTING MOUNTING RAIL

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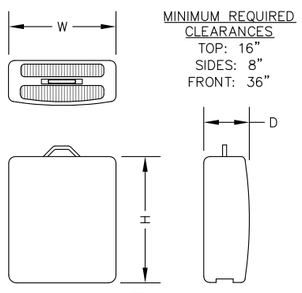
RRU SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	RRUS11 B12
HEIGHT	20"
WIDTH	17"
DEPTH	7"
WEIGHT	50.7 LBS.



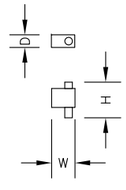
REMOTE RADIO UNIT (RRU)

SCALE: N.T.S.

3 / A-3

SBT SPECIFICATIONS

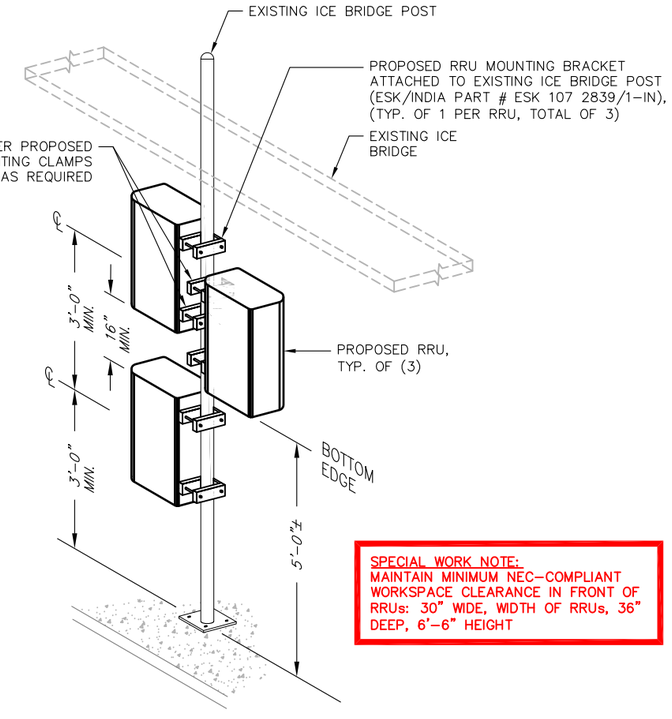
MANUF.	COMMSCOPE
MODEL #	ATSBT-TOP-FM-4G
HEIGHT	5.63"
WIDTH	3.7"
DEPTH	2.0"
WEIGHT	1.8 LBS.



SMART BIAS TEE (SBT)

SCALE: N.T.S.

4 / A-3



SPECIAL WORK NOTE:

MAINTAIN MINIMUM NEC-COMPLIANT WORKSPACE CLEARANCE IN FRONT OF RRUs: 30" WIDE, WIDTH OF RRUs, 36" DEEP, 6'-6" HEIGHT

RRU MOUNTING DETAIL

SCALE: N.T.S.

5 / A-3

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

SBA COMMUNICATIONS CORP.
33 BOSTON POST ROAD WEST, SUITE 320
MARLBOROUGH, MA 01752 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
JESSE M. MORENO
No. 24389
LICENSED PROFESSIONAL ENGINEER
10/5/15

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	10/05/15	CONSTRUCTION REVISED	JEB
0	09/28/15	ISSUED FOR CONSTRUCTION	BLM

SITE NUMBER:
CTNL808B
SITE NAME:
AMTRAK_WATERFORD2

SITE ADDRESS:
51 DANIELS AVENUE
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE
DETAILS

SHEET NUMBER
A-3