COHEN and WOLF P.C.
ATTORNEYS AT LAW

RACHEL A. SCHWARTZMAN

Please Reply To: Bridgeport
Writer's Direct Dial: (203) 337-4110
E-Mail: rschwartzman@cohenandwolf.com

March 3, 2015

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06501

Re: Notice of Exempt Modification
Town of New London/T-Mobile Equipment Upgrade
Site ID CT NL041A
25 Lower Boulevard, New London, CT

Dear Attorney Bachman:

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, the Town of New London owns the existing self-supporting telecommunications tower and related facility at 25 Lower Boulevard, New London, CT (-72.0937/41.32248). T-Mobile intends to add three (3) new antennas, relocate three (3) existing antennas, and install related equipment at this existing telecommunications facility in New London ("New London Facility"). Please accept this letter as notification, pursuant to R.C.S.A. §16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the mayor, Daryl J. Finizio, and the property owner, the Town of New London.

The existing New London Facility consists of a 60-foot self-supporting tower.[1] T-Mobile plans to add three (3) new antennas on proposed sector frame mounts at a centerline of 59 feet, with proposed remote radio units (RRUs) mounted behind each new antenna (three (3) total). T-Mobile also plans to relocate three (3) existing antennas and three (3) tower-mounted amplifiers ("TMAs") on proposed sector frame mounts at the 59-foot centerline (See the plans dated February 26, 2015, attached hereto as **Exhibit A**). The existing New London Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated February 13, 2015, and attached hereto as **Exhibit B**.

The planned modifications to the New London Facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

[1] While the online docket for the Connecticut Siting Council does not provide a docket or petition number for approval of this structure, it does reference this structure in connection with a notices of intent captioned TS-T-MOBILE-095-060929, EM-T-MOBILE-095-081218, and EM-T-MOBILE-095-120622.

1. The proposed modification will not increase the height of the tower. T-Mobile's existing antennas are at a centerline of 59 feet; the additional and relocated antennas will be installed at the same 59-foot level. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The proposed modifications will not require an extension on the site boundaries or lease area, as depicted on Sheet LE-1 of Exhibit A. T-Mobile's equipment will be located entirely within the existing compound area.

3. The proposed modification to the Facility will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the additional and relocated antennas and equipment will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated February 26, 2015, T-Mobile's operations would be 41.50% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 41.50% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as **Exhibit C.**

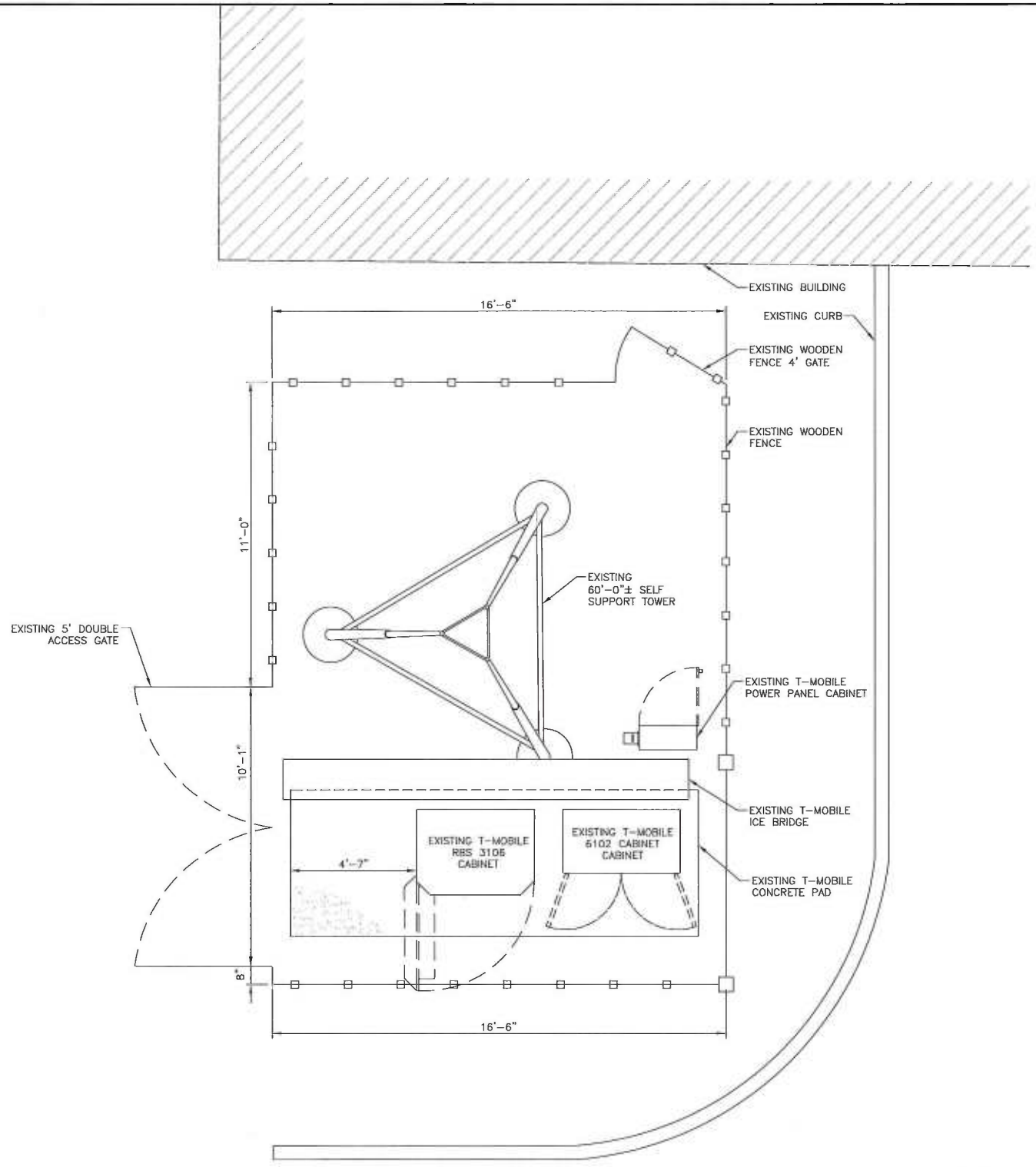
For the foregoing reasons, T-Mobile respectfully submits that the proposed additional and relocated antennas, as well as the new equipment at the New London Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement of this exempt modification, T-Mobile shall commence construction approximately sixty days from the receipt of the Council's decision.

Sincerely,

Rachel Schwartzman, Esq.

cc: Mayor Daryl Finizio, Town of New London
Town of New London
Jamie Ford, EBI Consulting

EXHIBIT A



CONFIGURATION

702CC

APPROX. NORTH

NOTE:
ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE STRUCTURAL AND RF ENGINEERS.

SITE PLAN

SCALE: 3/16" = 1'-0"

PREPARED BY:
EBI Consulting
environmental | engineering | due diligence
21 B Street | Burlington, MA 01803
Tel: (781) 273-2500 | Fax: (781) 273-3311
www.ebiconsulting.com
EBI JOB NO.: 8115000129

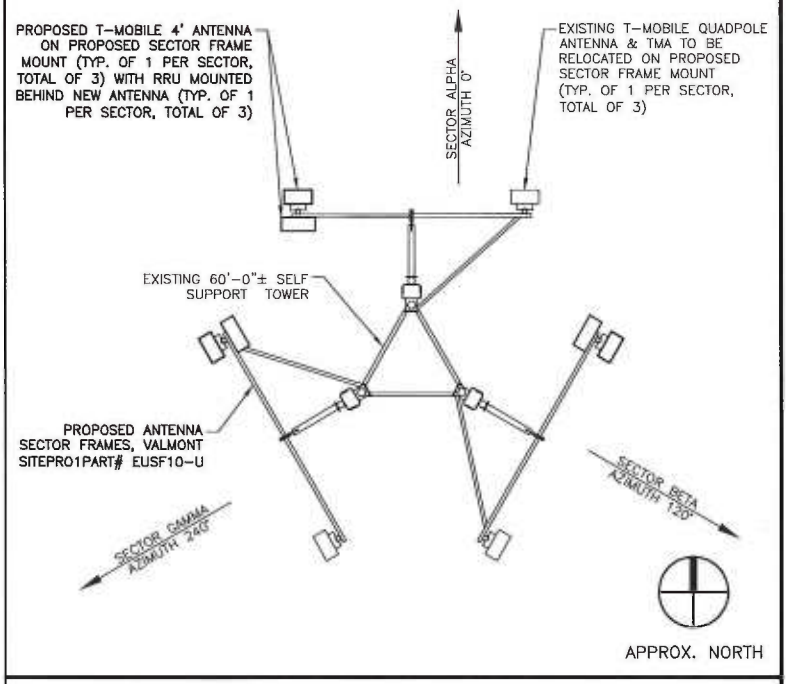
CLIENT:
T-Mobile Northeast, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860.692.7100

SITE INFO:
CTNL041A
CTNL041A
25 LOWER BLVD
NEW LONDON, CT 06230

SUBMITTALS			
NO.	DATE	DESCRIPTION	BY
A	2/26/15	FOR REVIEW	MK

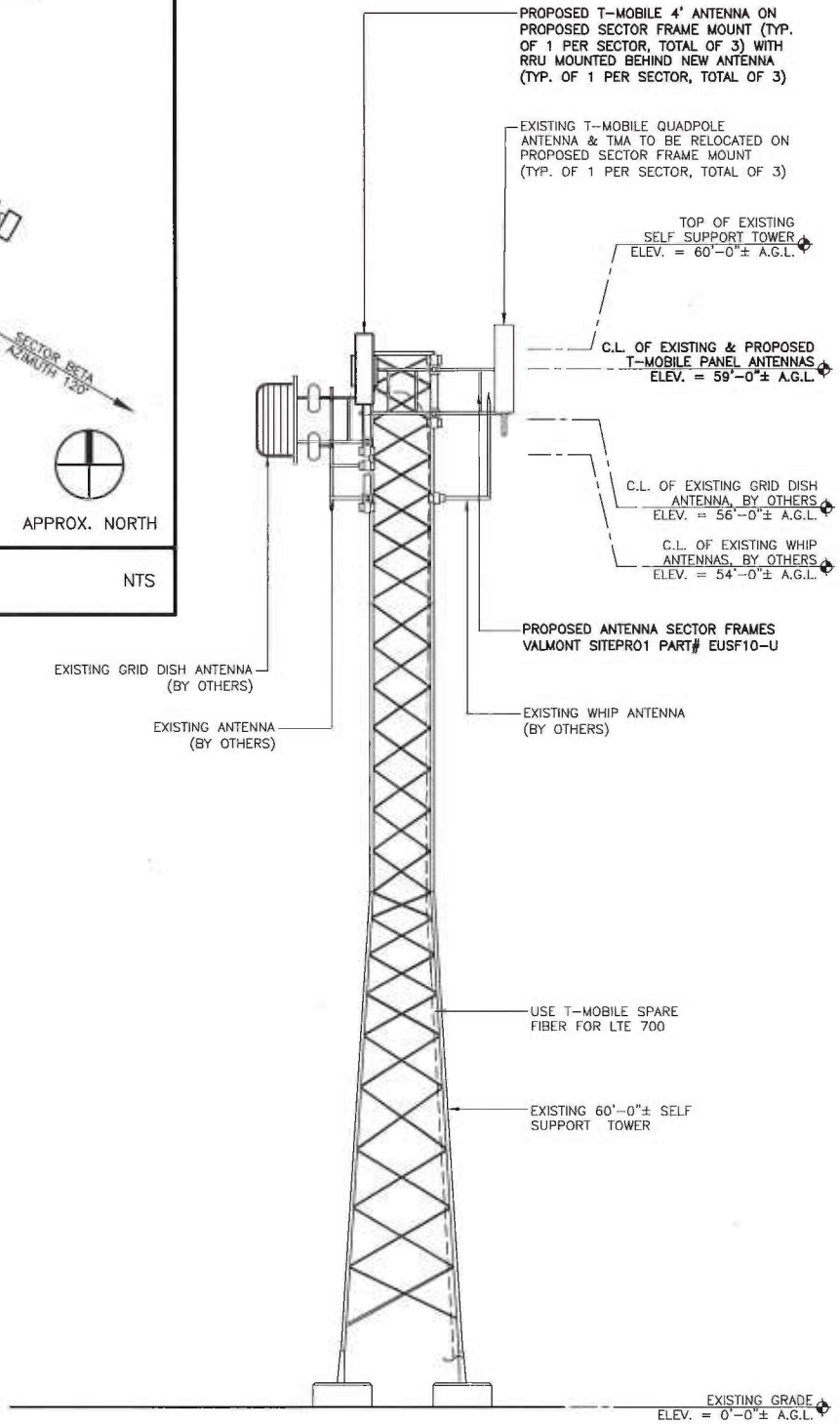
DRAWN BY: MK
CHECKED BY: BB
DATE: 2/20/15

SHEET NO: LE-1



ANTENNA CONFIGURATION

NTS



CONFIGURATION

702CC

NOTE:
ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE STRUCTURAL AND RF ENGINEERS.

TOWER ELEVATION

SCALE: 3/32" = 1'-0"

PREPARED BY:
EBI Consulting
environmental | engineering | due diligence
21 B Street | Burlington, MA 01803
Tel: (781) 273-2500 | Fax: (781) 273-3311
www.ebiconsulting.com
EBI JOB NO.: 8115000129

CLIENT:
T-Mobile Northeast, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860.692.7100

SITE INFO:
CTNL041A
CTNL041A
25 LOWER BLVD
NEW LONDON, CT 06230

SUBMITTALS				DRAWN BY:	SHEET NO:
NO.	DATE	DESCRIPTION	BY	MK	LE-2
A	2/26/15	FOR REVIEW	MK	CHECKED BY: BB	
				DATE: 2/20/15	

EXHIBIT B

EBI Consulting
environmental | engineering | due diligence

21 B Street
Burlington, MA 01803
Tel: (781) 273- 2500
Fax: (781) 273- 3311
www.ebiconsulting.com

TOWER STRUCTURAL ANALYSIS REPORT

February 13, 2015

T-Mobile, USA
35 Griffin Road South
Bloomfield, CT 06002
Attention: Mark Richard

Subject: 700 MHz Upgrade Project
Site #: CTNL041A
EBI Reference #: 81150129
Site Name: NL041/Gardner – New London
Address: 25 Lower Boulevard, New London, CT 06320

Dear Mr. Richard,

This report is to confirm EBI's structural analysis of the existing self-supporting tower at the above listed site for its ability to support the proposed T-Mobile equipment upgrade. The intent of this analysis is to determine if the proposed modification of antennas and related equipment will exceed the structural capacity of the existing tower.

EBI Consulting has prepared this structural analysis report of the 60.0 foot self-supporting tower for the additional loads imposed by the proposed antenna configuration by T-Mobile. This analysis has been performed in accordance with the 2005 CT State Building Code (including 2009, 2011, and 2013 Amendments) and ANSI/TIA/EIA-222 Revision F, with a 85 mph fastest-mile wind speed without ice, and a 73.6 mph fastest-mile wind speed with 0.5" radial ice. Information from the following sources was utilized in our analysis:

- Existing Structural Analysis Report prepared by Atlantis Group, Inc., Job No. 010170080-085, dated June 5, 2012
- Photographs taken by EBI personnel on January 14, 2015
- T-Mobile RFDS dated October 10, 2013

By engineering analysis, the existing tower is capable of supporting the existing and proposed equipment, listed herein, without tower modifications. The tower under this configuration has a maximum usage of 99.9%. This analysis did not provide for any future equipment or tower extensions.

The analysis provided herein by EBI Consulting includes the following existing and proposed equipment:

EBI Consulting
environmental | engineering | due diligence

21 B Street
Burlington, MA 01803
Tel: (781) 273- 2500
Fax: (781) 273- 3311
www.ebiconsulting.com

Existing + Proposed equipment configuration:

Carrier	Elevation	Manufacturer	Model/Description	Quantity	Mount type	Coax
T-Mobile	59'	Ericsson	AIR21 B2A/B4P	3	**(3) 10' Sector Frames**	(12) 7/8" (1) 1 ¼" Hybriflex
		Commscope	ddB4 TMA	3		
		Ericsson	**AIR21 B4A/B12P-4**	**3**		
		---	**RRUS11 B12**	**3**		
---	56'	---	26T-2400 (4' Grid Dish)	1	(1) Stand-off	(1) 7/8"
---	54'	---	7' Omni	1	(2) Stand-off	(2) 7/8"
		---	6' Dipole	1		

Note: Proposed equipment shown in bold.

Summary of Results: (Refer to attached TNX Tower Analysis for detailed analysis results)

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	60 - 40	Leg	P2x.154	3	-13.891	28.298	49.1	Pass
		Diagonal	L2x2x1/8	11	-2.142	8.037	26.7	Pass
		Top Girt	L2x2x1/8	4	-0.245	4.589	5.3	Pass
T2	40 - 20	Leg	P2x.218	31	-36.451	38.112	95.6	Pass
		Diagonal	L2x2x1/8	42	-2.784	8.037	34.6	Pass
		Top Girt	L2x2x1/8	34	-0.210	4.589	4.6	Pass
T3	20 - 0	Leg	P2.5x.203	61	-50.210	50.251	99.9	Pass
		Diagonal	L2x2x1/8	77	-1.574	6.496	24.2	Pass
		Top Girt	L2x2x1/8	64	-0.119	4.589	2.6	Pass
							Summary	
						Leg (T3)	99.9	Pass
						Diagonal (T2)	34.6	Pass
						Top Girt (T1)	5.3	Pass
						RATING =	**99.9**	**Pass**

21 B Street
Burlington, MA 01803
Tel: (781) 273- 2500
Fax: (781) 273- 3311
www.ebiconsulting.com

The maximum stress under the proposed conditions and configurations is 99.9% of the tower capacity, governed by stresses in the tower legs. Therefore, **the tower HAS adequate structural capacity** to support the proposed equipment configurations.

Foundation:

The reactions at the base are as follows:

Reaction Type	Current analysis reactions (TIA-222-F)
Compression(k)	51
Uplift (k)	45
Moment (k-ft)	296

Detailed foundation and soils information was not available at the time of this analysis. Thus, rigorous evaluation of those elements was unable to be performed for determining their adequacy. EBI makes no claim on the foundation and soil adequacy for supporting the existing and proposed installations, neither written nor implied.

Limitations and Assumptions:

This report is based on the following assumptions:

1. Tower is properly installed and maintained.
2. All members are as specified in the original design documents and are in good condition.
3. All required members are in place.
4. All bolts are in place and are tightly fastened.
5. Tower is in plumb condition.
6. All member protective coatings are in good condition.
7. All tower members were properly designed, detailed, fabricated, and installed, and have been properly maintained since erection.

EBI is not responsible for any modifications prior to or hereafter in which EBI is not or was not directly involved. Modifications include but are not limited to:

1. Adding antennas
2. Removing/replacing antennas
3. Adding or moving coaxial cables
4. Extending the height of the tower

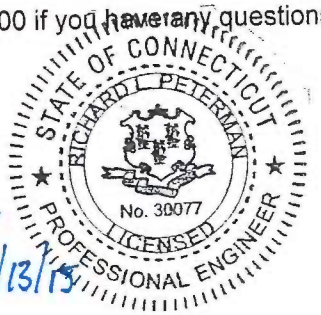
EBI Consulting
environmental | engineering | due diligence

21 B Street
Burlington, MA 01803
Tel: (781) 273-2500
Fax: (781) 273-3311
www.ebiconsulting.com

EBI hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, you should disregard this report and immediately contact EBI. EBI disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Please contact us at 781-273-2500 if you have any questions.

Sincerely yours,
EBI Consulting
February 13, 2015



2/13/15

Richard L. Peterman, P.E.
Professional Engineer

EBI Consulting
environmental | engineering | due diligence

21 B Street
Burlington, MA 01803
Tel: (781) 273- 2500
Fax: (781) 273- 3311
www.ebiconsulting.com

PHOTOGRAPH/ DOCUMENT LOG

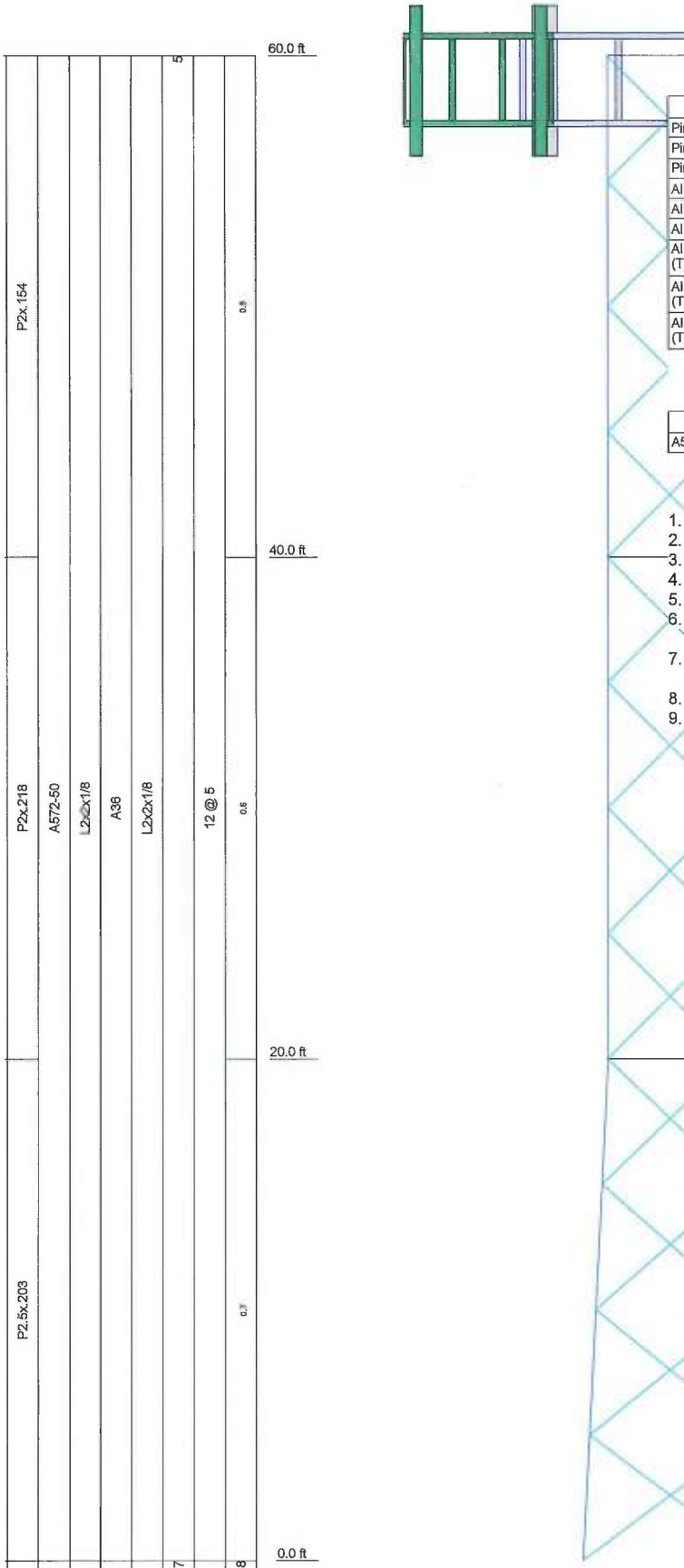
Photo 1: Overall view of the existing self-supporting tower.	
Photo 2: Close-up of the existing T-Mobile antenna installation.	

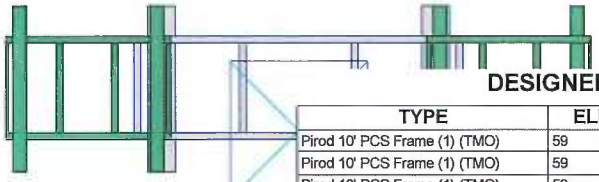
EBI Consulting
environmental | engineering | due diligence

21 B Street
Burlington, MA 01803
Tel: (781) 273- 2500
Fax: (781) 273- 3311
www.ebiconsulting.com

STRUCTURAL DESIGN PARAMETERS

BUILDING CODE:	2003 IBC WITH CT 2005, 2009, 2011, and 2013 AMENDMENTS ASCE7-05 TIA- 222-F	
OCCUPANCY CATEGORY:	II	
WIND LOADS:		
BASIC WIND SPEED (fastest mile), V:	85 MPH	(TIA-222 Rev F)
IMPORTANCE FACTOR, I:	1.0	
ICE LOADS:		
ICE THICKNESS	0.5 INCH	
BASIC WIND SPEED WITH ICE, Vi	73.6 MPH	





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Pirod 10' PCS Frame (1) (TMO)	59	RRUS11 B12 (TMO)	59
Pirod 10' PCS Frame (1) (TMO)	59	RRUS11 B12 (TMO)	59
Pirod 10' PCS Frame (1) (TMO)	59	RRUS11 B12 (TMO)	59
AIR21 B2A/B4P w/ pipe mast (TMO)	59	ddB4 TMA (TMO)	59
AIR21 B2A/B4P w/ pipe mast (TMO)	59	ddB4 TMA (TMO)	59
AIR21 B2A/B4P w/ pipe mast (TMO)	59	ddB4 TMA (TMO)	59
AIR21 B4A/B12P-4 w/ pipe mast (TMO)	59	Sabre 3' Stand-off	56
		26T-2400	56
AIR21 B4A/B12P-4 w/ pipe mast (TMO)	59	6' Dipole	54
		7' Whip	54
AIR21 B4A/B12P-4 w/ pipe mast (TMO)	59	Sabre 3' Stand-off	54
		Sabre 3' Stand-off	54

MATERIAL STRENGTH

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

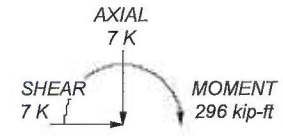
TOWER DESIGN NOTES

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. Weld together tower sections have flange connections.
6. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 99.9%

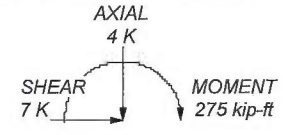
△

MAX. CORNER REACTIONS AT BASE:
DOWN: 51 K
SHEAR: 4 K

UPLIFT: -45 K
SHEAR: 5 K



TORQUE 1 kip-ft
74 mph WIND - 0.500 in ICE

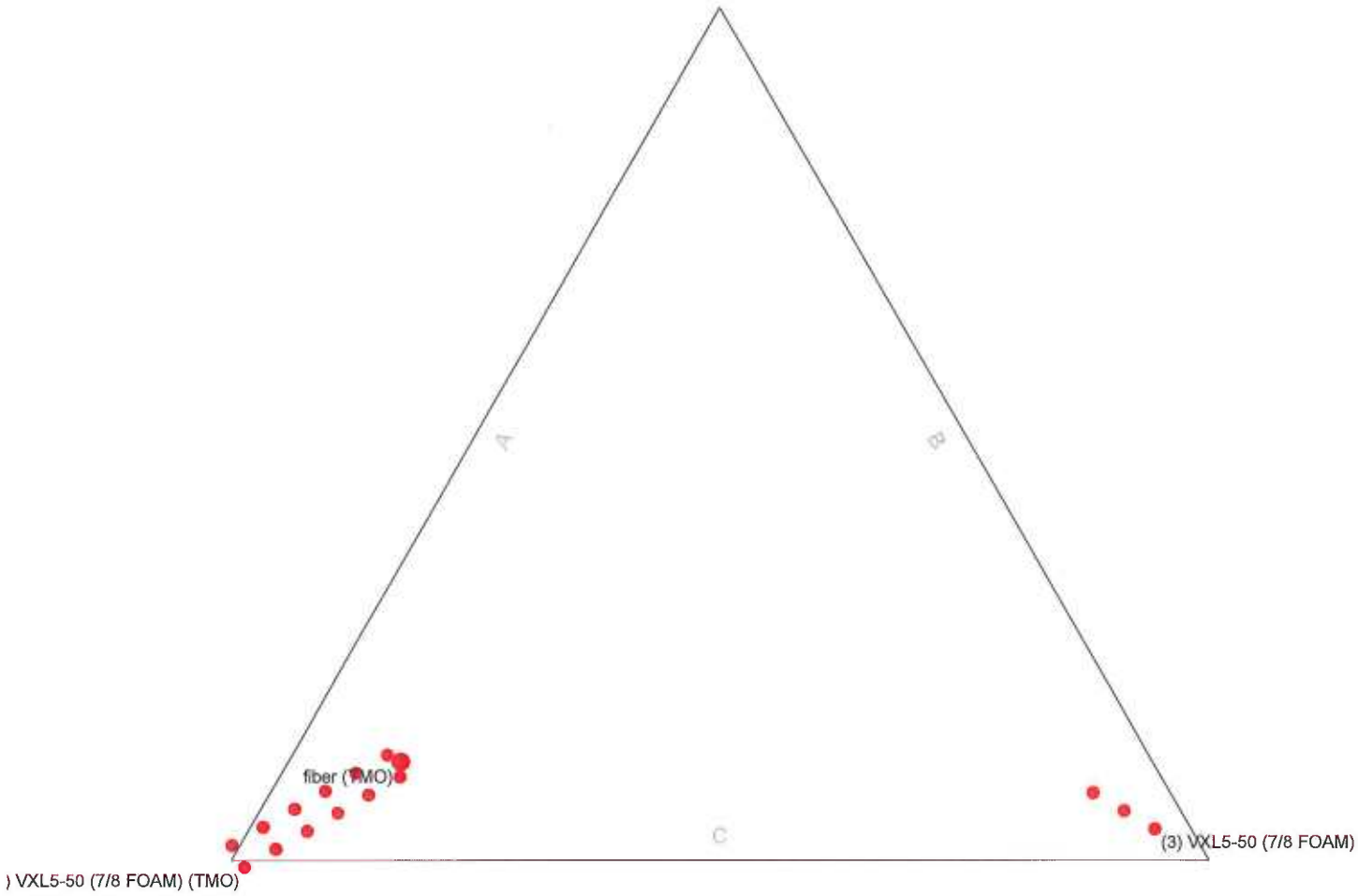


TORQUE 2 kip-ft
REACTIONS - 85 mph WIND

EBI Consulting
21 B Street
Burlington, MA 01803
Phone: (781) 425-5100
FAX: (781) 425-5141

Job: 81150129			
Project: CTNL041A - 60' SST			
Client: T-Mobile	Drawn by: Rich Peterman		App'd:
Code: TIA/EIA-222-F	Date: 02/13/15		Scale:
Path: C:\Users\rpeterman\Desktop\Temporary\TMO CT Turnkey\Phase 2\CTNL041A\Structural\CTNL041A Tower.tnl			Dwg N

Round Flat App In Face App Out Face



EBI Consulting
21 B Street
Burlington, MA 01803
Phone: (781) 425-5100
FAX: (781) 425-5141

Job: **81150129**			
Project: **CTNL041A - 60' SST**			
Client: T-Mobile	Drawn by: Rich Peterman		App'd:
Code: TIA/EIA-222-F	Date: 02/13/15		Scale:
Path: C:\Users\rpeterman\Desktop\Temporary\TMO CT Turnkey\Phase 2\CTNL041A\Structural\CTNL041A Tower.dwl			Dwg N

tnxTower

EBI Consulting
21 B Street
Burlington, MA 01803
Phone: (781) 425-5100
FAX: (781) 425-5141

Job	Page
81150129	1 of 20
Project	**Date**
CTNL041A - 60' SST	11:01:26 02/13/15
Client	**Designed by**
T-Mobile	Rich Peterman

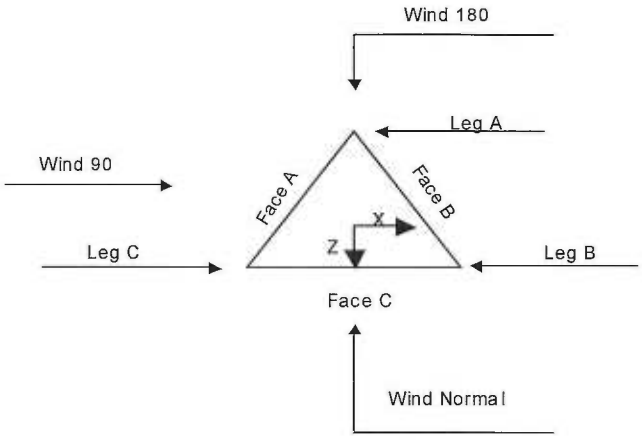
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 60.000 ft above the ground line.
The base of the tower is set at an elevation of 0.000 ft above the ground line.
The face width of the tower is 5.000 ft at the top and 7.000 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 0.500 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.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
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	60.000-40.000			5.000	1	20.000
T2	40.000-20.000			5.000	1	20.000
T3	20.000-0.000			5.000	1	20.000

Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation*	*Diagonal Spacing*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset*	*Bottom Girt Offset*
	ft	*ft*				*in*	*in*
T1	60.000-40.000	5.000	X Brace	No	Yes	0.000	0.000
T2	40.000-20.000	5.000	X Brace	No	Yes	0.000	0.000
T3	20.000-0.000	5.000	X Brace	No	Yes	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 60.000-40.000	Pipe	P2x.154	A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T2 40.000-20.000	Pipe	P2x.218	A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T3 20.000-0.000	Pipe	P2.5x.203	A572-50 (50 ksi)	Equal Angle	L2x2x1/8	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 60.000-40.000	Equal Angle	L2x2x1/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T2 40.000-20.000	Equal Angle	L2x2x1/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T3 20.000-0.000	Equal Angle	L2x2x1/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 60.000-40.000	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T2 40.000-20.000	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T3 20.000-0.000	0.000	0.000	A36 (36 ksi)	1	1	1	36.000	36.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 60.000-40.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 40.000-20.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 20.000-0.000	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 60.000-40.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 40.000-20.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 20.000-0.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
VXL5-50 (7/8 FOAM) (TMO)	C	No	Ar (Leg)	60.000 - 0.000	0.000	0.1	12	6	2.000 1.080	1.080		0.290
VXL5-50 (7/8 FOAM)	B	No	Ar (Leg)	56.000 - 0.000	0.000	0.1	3	3	2.000 1.080	1.080		0.290
fiber (TMO)	C	No	Ar (Leg)	60.000 - 0.000	0.000	0.2	1	1	1.550	1.550		1.070

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	60.000-40.000	A	13.383	0.000	0.000	0.000	0.000
		B	4.320	0.000	0.000	0.000	0.014
		C	17.703	0.000	0.000	0.000	0.091
T2	40.000-20.000	A	13.383	0.000	0.000	0.000	0.000
		B	5.400	0.000	0.000	0.000	0.017
		C	18.783	0.000	0.000	0.000	0.091
T3	20.000-0.000	A	13.383	0.000	0.000	0.000	0.000
		B	5.400	0.000	0.000	0.000	0.017
		C	18.783	0.000	0.000	0.000	0.091

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	60.000-40.000	A	0.500	25.050	0.000	0.000	0.000	0.000
		B		8.320	0.000	0.000	0.000	0.060
		C		33.370	0.000	0.000	0.000	0.348
T2	40.000-20.000	A	0.500	25.050	0.000	0.000	0.000	0.000
		B		10.400	0.000	0.000	0.000	0.075
		C		35.450	0.000	0.000	0.000	0.348
T3	20.000-0.000	A	0.500	25.050	0.000	0.000	0.000	0.000
		B		10.400	0.000	0.000	0.000	0.075
		C		35.450	0.000	0.000	0.000	0.348

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	60.000-40.000	-2.383	2.770	-2.713	3.211
T2	40.000-20.000	-2.031	2.874	-2.291	3.322
T3	20.000-0.000	-2.242	3.172	-2.586	3.749

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
Pirod 10' PCS Frame (1)	A	From Leg	1.000 0.000 0.000	0.000	59.000	No Ice 1/2" Ice	9.000 13.200	9.000 13.200	0.250 0.350
Pirod 10' PCS Frame (1) (TMO)	B	From Leg	1.000 0.000 0.000	0.000	59.000	No Ice 1/2" Ice	9.000 13.200	9.000 13.200	0.250 0.350
Pirod 10' PCS Frame (1) (TMO)	C	From Leg	1.000 0.000 0.000	0.000	59.000	No Ice 1/2" Ice	9.000 13.200	9.000 13.200	0.250 0.350
AIR21 B2A/B4P w/ pipe mast (TMO)	A	From Leg	1.000 3.000 0.000	0.000	59.000	No Ice 1/2" Ice	6.904 7.461	5.735 6.645	0.118 0.176
AIR21 B2A/B4P w/ pipe mast (TMO)	B	From Leg	1.000 3.000 0.000	0.000	59.000	No Ice 1/2" Ice	6.904 7.461	5.735 6.645	0.118 0.176
AIR21 B2A/B4P w/ pipe mast (TMO)	C	From Leg	1.000 3.000 0.000	0.000	59.000	No Ice 1/2" Ice	6.904 7.461	5.735 6.645	0.118 0.176
AIR21 B4A/B12P-4 w/ pipe mast (TMO)	A	From Leg	1.000 -3.000 0.000	0.000	59.000	No Ice 1/2" Ice	8.747 9.320	6.846 7.794	0.146 0.215
AIR21 B4A/B12P-4 w/ pipe mast (TMO)	A	From Leg	1.000 -3.000 0.000	0.000	59.000	No Ice 1/2" Ice	8.747 9.320	6.846 7.794	0.146 0.215

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
AIR21 B4A/B12P-4 w/ pipe mast (TMO)	A	From Leg	1.000 -3.000 0.000	0.000	59.000	No Ice 1/2" Ice	8.747 9.320	6.846 7.794	0.146 0.215
Sabre 3' Stand-off	B	From Leg	1.000 0.000 0.000	0.000	56.000	No Ice 1/2" Ice	1.300 1.850	6.300 8.600	0.053 0.067
Sabre 3' Stand-off	B	From Leg	1.000 0.000 0.000	0.000	54.000	No Ice 1/2" Ice	1.300 1.850	6.300 8.600	0.053 0.067
Sabre 3' Stand-off	A	From Leg	1.000 0.000 0.000	0.000	54.000	No Ice 1/2" Ice	1.300 1.850	6.300 8.600	0.053 0.067
6' Dipole	B	From Leg	1.000 0.000 0.000	0.000	54.000	No Ice 1/2" Ice	1.200 1.800	1.200 1.800	0.017 0.030
7' Whip	A	From Leg	1.000 0.000 0.000	0.000	54.000	No Ice 1/2" Ice	1.740 2.600	1.740 2.600	0.037 0.053
RRUS11 B12 (TMO)	A	From Leg	1.000 -3.000 0.000	0.000	59.000	No Ice 1/2" Ice	3.256 3.498	1.379 1.558	0.051 0.072
RRUS11 B12 (TMO)	B	From Leg	1.000 -3.000 0.000	0.000	59.000	No Ice 1/2" Ice	3.256 3.498	1.379 1.558	0.051 0.072
RRUS11 B12 (TMO)	C	From Leg	1.000 -3.000 0.000	0.000	59.000	No Ice 1/2" Ice	3.256 3.498	1.379 1.558	0.051 0.072
ddB4 TMA (TMO)	A	From Leg	1.000 3.000 0.000	0.000	59.000	No Ice 1/2" Ice	1.400 1.560	0.467 0.575	0.010 0.019
ddB4 TMA (TMO)	B	From Leg	1.000 3.000 0.000	0.000	59.000	No Ice 1/2" Ice	1.400 1.560	0.467 0.575	0.010 0.019
ddB4 TMA (TMO)	C	From Leg	1.000 3.000 0.000	0.000	59.000	No Ice 1/2" Ice	1.400 1.560	0.467 0.575	0.010 0.019

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
26T-2400	B	Grid	From Leg	0.000 3.000 0.000	Worst		56.000	3.270	No Ice 1/2" Ice	2.100 8.830	0.005 0.057

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 ft^2	F K	w plf	Ctrl. Face
T1	0.105	0.524	A	0.3	2.297	0.616	1	1	22.972	1.424	71.220	C
60.000-40.000			B	0.213	2.555	0.593	1	1	17.112			
			C	0.341	2.192	0.629	1	1	25.980			
T2	0.108	0.606	A	0.3	2.297	0.616	1	1	22.972	1.288	64.418	C
40.000-20.000			B	0.223	2.521	0.595	1	1	17.783			
			C	0.352	2.168	0.633	1	1	26.758			
T3	0.108	0.683	A	0.271	2.376	0.607	1	1	24.779	1.426	71.316	C
20.000-0.000			B	0.207	2.573	0.592	1	1	19.696			
			C	0.314	2.259	0.62	1	1	28.425			
Sum Weight:	0.322	1.812						OTM	124.134 kip-ft	4.139		

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	0.105	0.524	A	0.3	2.297	0.616	0.8	1	21.001	1.316	65.817	C
60.000-40.000			B	0.213	2.555	0.593	0.8	1	15.141			
			C	0.341	2.192	0.629	0.8	1	24.009			
T2	0.108	0.606	A	0.3	2.297	0.616	0.8	1	21.001	1.193	59.672	C
40.000-20.000			B	0.223	2.521	0.595	0.8	1	15.812			
			C	0.352	2.168	0.633	0.8	1	24.787			
T3	0.108	0.683	A	0.271	2.376	0.607	0.8	1	22.615	1.318	65.888	C
20.000-0.000			B	0.207	2.573	0.592	0.8	1	17.532			
			C	0.314	2.259	0.62	0.8	1	26.261			
Sum Weight:	0.322	1.812						OTM	114.798 kip-ft	3.828		

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	0.105	0.524	A	0.3	2.297	0.616	0.85	1	21.494	1.343	67.168	C
60.000-40.000			B	0.213	2.555	0.593	0.85	1	15.634			
			C	0.341	2.192	0.629	0.85	1	24.502			
T2	0.108	0.606	A	0.3	2.297	0.616	0.85	1	21.494	1.217	60.859	C
40.000-20.000			B	0.223	2.521	0.595	0.85	1	16.305			
			C	0.352	2.168	0.633	0.85	1	25.280			
T3	0.108	0.683	A	0.271	2.376	0.607	0.85	1	23.156	1.345	67.245	C
20.000-0.000			B	0.207	2.573	0.592	0.85	1	18.073			
			C	0.314	2.259	0.62	0.85	1	26.802			
Sum Weight:	0.322	1.812						OTM	117.132 kip-ft	3.905		

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 ft²	F K	w plf	Ctrl. Face
T1	0.408	0.987	A	0.484	1.922	0.689	1	1	38.273	1.584	79.201	C
60.000-40.000			B	0.325	2.231	0.624	1	1	25.140			
			C	0.562	1.832	0.731	1	1	46.090			
T2	0.423	1.069	A	0.484	1.922	0.689	1	1	38.273	1.458	72.922	C
40.000-20.000			B	0.345	2.183	0.631	1	1	26.617			
			C	0.582	1.816	0.743	1	1	48.204			
T3	0.423	1.199	A	0.429	2.01	0.664	1	1	39.623	1.529	76.426	C
20.000-0.000			B	0.313	2.262	0.62	1	1	28.640			
			C	0.511	1.886	0.703	1	1	48.646			
Sum Weight:	1.254	3.255						OTM	138.239 kip-ft	4.571		

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 ft²	F K	w plf	Ctrl. Face
T1	0.408	0.987	A	0.484	1.922	0.689	0.8	1	36.302	1.516	75.814	C
60.000-40.000			B	0.325	2.231	0.624	0.8	1	23.169			
			C	0.562	1.832	0.731	0.8	1	44.119			
T2	0.423	1.069	A	0.484	1.922	0.689	0.8	1	36.302	1.399	69.940	C
40.000-20.000			B	0.345	2.183	0.631	0.8	1	24.646			
			C	0.582	1.816	0.743	0.8	1	46.233			
T3	0.423	1.199	A	0.429	2.01	0.664	0.8	1	37.459	1.461	73.027	C
20.000-0.000			B	0.313	2.262	0.62	0.8	1	26.476			
			C	0.511	1.886	0.703	0.8	1	46.482			
Sum Weight:	1.254	3.255						OTM	132.383 kip-ft	4.376		

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 ft²	F K	w plf	Ctrl. Face
T1	0.408	0.987	A	0.484	1.922	0.689	0.85	1	36.795	1.533	76.660	C
60.000-40.000			B	0.325	2.231	0.624	0.85	1	23.662			
			C	0.562	1.832	0.731	0.85	1	44.611			
T2	0.423	1.069	A	0.484	1.922	0.689	0.85	1	36.795	1.414	70.686	C
40.000-20.000			B	0.345	2.183	0.631	0.85	1	25.139			
			C	0.582	1.816	0.743	0.85	1	46.726			
T3	0.423	1.199	A	0.429	2.01	0.664	0.85	1	38.000	1.478	73.876	C
20.000-0.000			B	0.313	2.262	0.62	0.85	1	27.017			
			C	0.511	1.886	0.703	0.85	1	47.023			
Sum Weight:	1.254	3.255						OTM	133.847	4.424		

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
									kip-ft			

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 ft²	F K	w plf	Ctrl. Face
T1	0.105	0.524	A	0.3	2.297	0.616	1	1	22.972	0.493	24.644	C
60.000-40.000			B	0.213	2.555	0.593	1	1	17.112			
			C	0.341	2.192	0.629	1	1	25.980			
T2	0.108	0.606	A	0.3	2.297	0.616	1	1	22.972	0.446	22.290	C
40.000-20.000			B	0.223	2.521	0.595	1	1	17.783			
			C	0.352	2.168	0.633	1	1	26.758			
T3	0.108	0.683	A	0.271	2.376	0.607	1	1	24.779	0.494	24.677	C
20.000-0.000			B	0.207	2.573	0.592	1	1	19.696			
			C	0.314	2.259	0.62	1	1	28.425			
Sum Weight:	0.322	1.812						OTM	42.953 kip-ft	1.432		

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 ft²	F K	w plf	Ctrl. Face
T1	0.105	0.524	A	0.3	2.297	0.616	0.8	1	21.001	0.455	22.774	C
60.000-40.000			B	0.213	2.555	0.593	0.8	1	15.141			
			C	0.341	2.192	0.629	0.8	1	24.009			
T2	0.108	0.606	A	0.3	2.297	0.616	0.8	1	21.001	0.413	20.648	C
40.000-20.000			B	0.223	2.521	0.595	0.8	1	15.812			
			C	0.352	2.168	0.633	0.8	1	24.787			
T3	0.108	0.683	A	0.271	2.376	0.607	0.8	1	22.615	0.456	22.799	C
20.000-0.000			B	0.207	2.573	0.592	0.8	1	17.532			
			C	0.314	2.259	0.62	0.8	1	26.261			
Sum Weight:	0.322	1.812						OTM	39.723 kip-ft	1.324		

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 ft²	F K	w plf	Ctrl. Face
T1	0.105	0.524	A	0.3	2.297	0.616	0.85	1	21.494	0.465	23.242	C
60.000-40.000			B	0.213	2.555	0.593	0.85	1	15.634			
			C	0.341	2.192	0.629	0.85	1	24.502			

tnxTower	Job	Page
	81150129	10 of 20
EBI Consulting 21 B Street Burlington, MA 01803 Phone: (781) 425-5100 FAX: (781) 425-5141	Project CTNL041A - 60' SST	Date 11:01:26 02/13/15
	Client T-Mobile	Designed by Rich Peterman

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
T2	0.108	0.606	A	0.3	2.297	0.616	0.85	1	21.494	0.421	21.058	C
40.000-20.000			B	0.223	2.521	0.595	0.85	1	16.305			
			C	0.352	2.168	0.633	0.85	1	25.280			
T3	0.108	0.683	A	0.271	2.376	0.607	0.85	1	23.156	0.465	23.268	C
20.000-0.000			B	0.207	2.573	0.592	0.85	1	18.073			
			C	0.314	2.259	0.62	0.85	1	26.802			
Sum Weight:	0.322	1.812						OTM	40.530 kip-ft	1.351		

Discrete Appurtenance Pressures - No Ice $G_H = 1.201$

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft²	C_AA_C Side ft²
Pirod 10' PCS Frame (1)	0.000	0.250	0.000	-3.887	59.000	1.181	0.022	9.000	9.000
Pirod 10' PCS Frame (1)	120.000	0.250	3.366	1.943	59.000	1.181	0.022	9.000	9.000
Pirod 10' PCS Frame (1)	240.000	0.250	-3.366	1.943	59.000	1.181	0.022	9.000	9.000
AIR21 B2A/B4P w/ pipe mast	0.000	0.118	3.000	-3.887	59.000	1.181	0.022	6.904	5.735
AIR21 B2A/B4P w/ pipe mast	120.000	0.118	1.866	4.541	59.000	1.181	0.022	6.904	5.735
AIR21 B2A/B4P w/ pipe mast	240.000	0.118	-4.866	-0.655	59.000	1.181	0.022	6.904	5.735
AIR21 B4A/B12P-4 w/ pipe mast	0.000	0.146	-3.000	-3.887	59.000	1.181	0.022	8.747	6.846
AIR21 B4A/B12P-4 w/ pipe mast	0.000	0.146	-3.000	-3.887	59.000	1.181	0.022	8.747	6.846
AIR21 B4A/B12P-4 w/ pipe mast	0.000	0.146	-3.000	-3.887	59.000	1.181	0.022	8.747	6.846
Sabre 3' Stand-off	120.000	0.053	3.366	1.943	56.000	1.163	0.022	1.300	6.300
Sabre 3' Stand-off	120.000	0.053	3.366	1.943	54.000	1.151	0.021	1.300	6.300
Sabre 3' Stand-off	0.000	0.053	0.000	-3.887	54.000	1.151	0.021	1.300	6.300
6' Dipole	120.000	0.017	3.366	1.943	54.000	1.151	0.021	1.200	1.200
7' Whip	0.000	0.037	0.000	-3.887	54.000	1.151	0.021	1.740	1.740
RRUS11 B12	0.000	0.051	-3.000	-3.887	59.000	1.181	0.022	3.256	1.379
RRUS11 B12	120.000	0.051	4.866	-0.655	59.000	1.181	0.022	3.256	1.379
RRUS11 B12	240.000	0.051	-1.866	4.541	59.000	1.181	0.022	3.256	1.379
ddB4 TMA	0.000	0.010	3.000	-3.887	59.000	1.181	0.022	1.400	0.467
ddB4 TMA	120.000	0.010	1.866	4.541	59.000	1.181	0.022	1.400	0.467
ddB4 TMA	240.000	0.010	-4.866	-0.655	59.000	1.181	0.022	1.400	0.467
	Sum Weight:	1.938							

Discrete Appurtenance Pressures - With Ice $G_H = 1.201$

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft²	C_AA_C Side ft²	t_z in
Pirod 10' PCS Frame (1)	0.000	0.350	0.000	-3.887	59.000	1.181	0.016	13.200	13.200	0.500
Pirod 10' PCS Frame (1)	120.000	0.350	3.366	1.943	59.000	1.181	0.016	13.200	13.200	0.500
Pirod 10' PCS Frame (1)	240.000	0.350	-3.366	1.943	59.000	1.181	0.016	13.200	13.200	0.500
AIR21 B2A/B4P w/ pipe mast	0.000	0.176	3.000	-3.887	59.000	1.181	0.016	7.461	6.645	0.500

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
AIR21 B2A/B4P w/ pipe mast	120.000	0.176	1.866	4.541	59.000	1.181	0.016	7.461	6.645	0.500
AIR21 B2A/B4P w/ pipe mast	240.000	0.176	-4.866	-0.655	59.000	1.181	0.016	7.461	6.645	0.500
AIR21 B4A/B12P-4 w/ pipe mast	0.000	0.215	-3.000	-3.887	59.000	1.181	0.016	9.320	7.794	0.500
AIR21 B4A/B12P-4 w/ pipe mast	0.000	0.215	-3.000	-3.887	59.000	1.181	0.016	9.320	7.794	0.500
AIR21 B4A/B12P-4 w/ pipe mast	0.000	0.215	-3.000	-3.887	59.000	1.181	0.016	9.320	7.794	0.500
Sabre 3' Stand-off	120.000	0.067	3.366	1.943	56.000	1.163	0.016	1.850	8.600	0.500
Sabre 3' Stand-off	120.000	0.067	3.366	1.943	54.000	1.151	0.016	1.850	8.600	0.500
Sabre 3' Stand-off	0.000	0.067	0.000	-3.887	54.000	1.151	0.016	1.850	8.600	0.500
6' Dipole	120.000	0.030	3.366	1.943	54.000	1.151	0.016	1.800	1.800	0.500
7' Whip	0.000	0.053	0.000	-3.887	54.000	1.151	0.016	2.600	2.600	0.500
RRUS11 B12	0.000	0.072	-3.000	-3.887	59.000	1.181	0.016	3.498	1.558	0.500
RRUS11 B12	120.000	0.072	4.866	-0.655	59.000	1.181	0.016	3.498	1.558	0.500
RRUS11 B12	240.000	0.072	-1.866	4.541	59.000	1.181	0.016	3.498	1.558	0.500
ddB4 TMA	0.000	0.019	3.000	-3.887	59.000	1.181	0.016	1.560	0.575	0.500
ddB4 TMA	120.000	0.019	1.866	4.541	59.000	1.181	0.016	1.560	0.575	0.500
ddB4 TMA	240.000	0.019	-4.866	-0.655	59.000	1.181	0.016	1.560	0.575	0.500
	Sum Weight:	2.779								

Discrete Appurtenance Pressures - Service $G_H = 1.201$

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
Pirod 10' PCS Frame (1)	0.000	0.250	0.000	-3.887	59.000	1.181	0.008	9.000	9.000
Pirod 10' PCS Frame (1)	120.000	0.250	3.366	1.943	59.000	1.181	0.008	9.000	9.000
Pirod 10' PCS Frame (1)	240.000	0.250	-3.366	1.943	59.000	1.181	0.008	9.000	9.000
AIR21 B2A/B4P w/ pipe mast	0.000	0.118	3.000	-3.887	59.000	1.181	0.008	6.904	5.735
AIR21 B2A/B4P w/ pipe mast	120.000	0.118	1.866	4.541	59.000	1.181	0.008	6.904	5.735
AIR21 B2A/B4P w/ pipe mast	240.000	0.118	-4.866	-0.655	59.000	1.181	0.008	6.904	5.735
AIR21 B4A/B12P-4 w/ pipe mast	0.000	0.146	-3.000	-3.887	59.000	1.181	0.008	8.747	6.846
AIR21 B4A/B12P-4 w/ pipe mast	0.000	0.146	-3.000	-3.887	59.000	1.181	0.008	8.747	6.846
AIR21 B4A/B12P-4 w/ pipe mast	0.000	0.146	-3.000	-3.887	59.000	1.181	0.008	8.747	6.846
Sabre 3' Stand-off	120.000	0.053	3.366	1.943	56.000	1.163	0.007	1.300	6.300
Sabre 3' Stand-off	120.000	0.053	3.366	1.943	54.000	1.151	0.007	1.300	6.300
Sabre 3' Stand-off	0.000	0.053	0.000	-3.887	54.000	1.151	0.007	1.300	6.300
6' Dipole	120.000	0.017	3.366	1.943	54.000	1.151	0.007	1.200	1.200
7' Whip	0.000	0.037	0.000	-3.887	54.000	1.151	0.007	1.740	1.740
RRUS11 B12	0.000	0.051	-3.000	-3.887	59.000	1.181	0.008	3.256	1.379
RRUS11 B12	120.000	0.051	4.866	-0.655	59.000	1.181	0.008	3.256	1.379
RRUS11 B12	240.000	0.051	-1.866	4.541	59.000	1.181	0.008	3.256	1.379
ddB4 TMA	0.000	0.010	3.000	-3.887	59.000	1.181	0.008	1.400	0.467
ddB4 TMA	120.000	0.010	1.866	4.541	59.000	1.181	0.008	1.400	0.467
ddB4 TMA	240.000	0.010	-4.866	-0.655	59.000	1.181	0.008	1.400	0.467
	Sum Weight:	1.938							

Dish Pressures - No Ice

Elevation ft	Dish Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	K_z	A_A ft^2	q_z ksf
56.000	26T-2400	120.000	0.005	2.500	1.443	1.163	2.100	0.022
		Sum Weight:	0.005					

Dish Pressures - With Ice

Elevation ft	Dish Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	K_z	A_A ft^2	q_z ksf	t_z in
56.000	26T-2400	120.000	0.057	2.500	1.443	1.163	8.830	0.016	0.500
		Sum Weight:	0.057						

Dish Pressures - Service

Elevation ft	Dish Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	K_z	A_A ft^2	q_z ksf
56.000	26T-2400	120.000	0.005	2.500	1.443	1.163	2.100	0.007
		Sum Weight:	0.005					

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	0.869					
Bracing Weight	0.943					
Total Member Self-Weight	1.812			-1.401	1.361	
Total Weight	4.077			-1.401	1.361	
Wind 0 deg - No Ice		0.111	-6.688	-274.262	-4.761	-1.606
Wind 30 deg - No Ice		3.249	-5.646	-234.702	-132.376	-1.911
Wind 60 deg - No Ice		5.448	-3.285	-138.465	-222.135	-1.757
Wind 90 deg - No Ice		6.304	-0.111	-7.522	-255.509	-1.116
Wind 120 deg - No Ice		5.606	3.248	129.728	-224.099	-0.114
Wind 150 deg - No Ice		3.056	5.534	225.779	-121.773	0.795
Wind 180 deg - No Ice		-0.111	6.377	262.124	7.482	1.548
Wind 210 deg - No Ice		-3.249	5.646	231.901	135.097	1.911
Wind 240 deg - No Ice		-5.718	3.441	140.331	232.941	1.720
Wind 270 deg - No Ice		-6.304	0.111	4.721	258.231	1.116
Wind 300 deg - No Ice		-5.337	-3.092	-127.862	218.735	0.209
Wind 330 deg - No Ice		-3.056	-5.534	-228.581	124.494	-0.795
Member Ice	1.443					
Total Weight Ice	7.345			-0.869	3.098	
Wind 0 deg - Ice		0.113	-7.199	-291.640	-3.100	-1.099

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 30 deg - Ice		3.578	-6.164	-251.980	-142.719	-0.673
Wind 60 deg - Ice		6.043	-3.599	-148.694	-241.999	-0.105
Wind 90 deg - Ice		6.962	-0.113	-7.067	-277.801	0.503
Wind 120 deg - Ice		6.100	3.502	139.149	-240.873	1.021
Wind 150 deg - Ice		3.383	6.051	244.044	-131.984	1.176
Wind 180 deg - Ice		-0.113	7.004	284.046	9.296	1.057
Wind 210 deg - Ice		-3.578	6.164	250.242	148.915	0.673
Wind 240 deg - Ice		-6.212	3.697	149.884	253.267	0.077
Wind 270 deg - Ice		-6.962	0.113	5.329	283.998	-0.503
Wind 300 deg - Ice		-5.930	-3.404	-137.959	241.997	-0.952
Wind 330 deg - Ice		-3.383	-6.051	-245.782	138.180	-1.176
Total Weight	4.077			-1.401	1.361	
Wind 0 deg - Service		0.039	-2.314	-96.209	-1.222	-0.556
Wind 30 deg - Service		1.124	-1.953	-82.521	-45.379	-0.661
Wind 60 deg - Service		1.885	-1.137	-49.220	-76.438	-0.608
Wind 90 deg - Service		2.181	-0.039	-3.912	-87.986	-0.386
Wind 120 deg - Service		1.940	1.124	43.580	-77.117	-0.039
Wind 150 deg - Service		1.057	1.915	76.815	-41.711	0.275
Wind 180 deg - Service		-0.039	2.206	89.392	3.014	0.536
Wind 210 deg - Service		-1.124	1.953	78.934	47.172	0.661
Wind 240 deg - Service		-1.978	1.190	47.249	81.028	0.595
Wind 270 deg - Service		-2.181	0.039	0.325	89.779	0.386
Wind 300 deg - Service		-1.847	-1.070	-45.552	76.112	0.072
Wind 330 deg - Service		-1.057	-1.915	-80.402	43.503	-0.275

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

Comb. No.	Description
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum 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	60 - 40	Leg	Max Tension	25	10.756	0.031	0.007
			Max. Compression	15	-13.891	-0.007	0.020
			Max. Mx	5	-0.989	0.680	0.011
			Max. My	2	-0.234	-0.004	-0.704
			Max. Vy	5	-0.682	0.000	0.000
			Max. Vx	2	0.707	0.000	0.000
		Diagonal	Max Tension	9	2.091	0.000	0.000
			Max. Compression	3	-2.142	0.000	0.000
			Max. Mx	15	1.561	0.021	-0.002
			Max. My	11	-1.428	-0.007	-0.005
			Max. Vy	15	-0.010	0.021	-0.002
			Max. Vx	11	0.001	-0.007	-0.005
		Top Girt	Max Tension	2	0.228	0.000	0.000
			Max. Compression	8	-0.245	0.000	0.000
			Max. Mx	14	-0.015	-0.011	0.000
			Max. My	3	-0.018	0.000	-0.000
			Max. Vy	14	0.009	0.000	0.000
			Max. Vx	3	0.000	0.000	0.000
T2	40 - 20	Leg	Max Tension	17	31.741	-0.006	0.007
			Max. Compression	23	-36.451	0.120	-0.065
			Max. Mx	24	-1.359	0.151	-0.005
			Max. My	21	31.509	0.002	-0.142
			Max. Vy	24	0.046	0.151	-0.005
			Max. Vx	26	0.050	0.076	0.142
		Diagonal	Max Tension	16	2.676	0.000	0.000
			Max. Compression	22	-2.784	0.000	0.000
			Max. Mx	16	0.817	0.037	0.004
			Max. My	3	-2.522	-0.016	0.010
			Max. Vy	16	-0.015	0.037	0.004
			Max. Vx	3	-0.003	-0.016	0.010
		Top Girt	Max Tension	17	0.221	0.000	0.000
			Max. Compression	15	-0.210	0.000	0.000
			Max. Mx	14	0.033	-0.011	0.000
			Max. My	3	0.029	0.000	-0.000
			Max. Vy	14	0.009	0.000	0.000
			Max. Vx	3	0.000	0.000	0.000
T3	20 - 0	Leg	Max Tension	17	43.173	0.017	0.004
			Max. Compression	23	-50.210	-0.000	0.000
			Max. Mx	17	41.637	-0.204	-0.005
			Max. My	22	-0.886	0.031	0.259
			Max. Vy	17	-0.059	-0.204	-0.005
			Max. Vx	26	0.084	0.030	0.257

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	16	1.560	0.000	0.000
			Max. Compression	15	-1.667	0.000	0.000
			Max. Mx	21	0.585	0.036	0.002
			Max. My	3	-1.318	-0.017	0.010
			Max. Vy	21	0.014	0.036	0.002
			Max. Vx	22	0.003	0.000	0.000
		Top Girt	Max Tension	23	0.197	0.000	0.000
			Max. Compression	2	-0.119	0.000	0.000
			Max. Mx	14	0.161	-0.011	0.000
			Max. My	21	0.120	0.000	0.000
			Max. Vy	14	0.009	0.000	0.000
			Max. Vx	21	0.000	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	23	51.269	3.632	-2.114
	Max. H_x	23	51.269	3.632	-2.114
	Max. H_z	17	-44.656	-3.965	2.294
	Min. Vert	17	-44.656	-3.965	2.294
	Min. H_x	17	-44.656	-3.965	2.294
	Min. H_z	10	46.375	3.558	-2.225
Leg B	Max. Vert	19	48.595	-3.559	-1.955
	Max. H_x	25	-43.766	3.908	2.167
	Max. H_z	25	-43.766	3.908	2.167
	Min. Vert	25	-43.766	3.908	2.167
	Min. H_x	19	48.595	-3.559	-1.955
	Min. H_z	6	44.227	-3.512	-2.040
Leg A	Max. Vert	15	50.833	-0.102	4.179
	Max. H_x	10	-21.873	0.427	-2.050
	Max. H_z	2	46.767	-0.138	4.208
	Min. Vert	21	-44.674	0.082	-4.567
	Min. H_x	4	24.287	-0.445	2.097
	Min. H_z	21	-44.674	0.082	-4.567

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	4.077	0.000	0.000	-1.408	1.365	-0.000
Dead+Wind 0 deg - No Ice	4.077	0.111	-6.688	-275.269	-4.773	-1.618
Dead+Wind 30 deg - No Ice	4.077	3.249	-5.646	-235.575	-132.855	-1.928
Dead+Wind 60 deg - No Ice	4.077	5.448	-3.285	-138.990	-222.945	-1.776
Dead+Wind 90 deg - No Ice	4.077	6.304	-0.111	-7.566	-256.442	-1.132
Dead+Wind 120 deg - No Ice	4.077	5.606	3.248	130.192	-224.911	-0.121
Dead+Wind 150 deg - No Ice	4.077	3.056	5.534	226.603	-122.211	0.800
Dead+Wind 180 deg - No Ice	4.077	-0.111	6.377	263.085	7.522	1.560
Dead+Wind 210 deg - No Ice	4.077	-3.249	5.646	232.746	135.604	1.928
Dead+Wind 240 deg - No Ice	4.077	-5.718	3.441	140.835	233.798	1.739
Dead+Wind 270 deg - No Ice	4.077	-6.304	0.111	4.729	259.179	1.132

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 300 deg - No Ice	4.077	-5.337	-3.092	-128.338	219.537	0.216
Dead+Wind 330 deg - No Ice	4.077	-3.056	-5.534	-229.423	124.952	-0.799
Dead+Ice+Temp	7.345	0.000	0.000	-0.883	3.121	0.000
Dead+Wind 0 deg+Ice+Temp	7.345	0.113	-7.199	-293.318	-3.112	-1.124
Dead+Wind 30 deg+Ice+Temp	7.345	3.578	-6.164	-253.438	-143.532	-0.701
Dead+Wind 60 deg+Ice+Temp	7.345	6.043	-3.599	-149.564	-243.380	-0.131
Dead+Wind 90 deg+Ice+Temp	7.345	6.962	-0.113	-7.123	-279.383	0.485
Dead+Wind 120 deg+Ice+Temp	7.345	6.100	3.502	139.932	-242.233	1.020
Dead+Wind 150 deg+Ice+Temp	7.345	3.383	6.051	245.433	-132.723	1.192
Dead+Wind 180 deg+Ice+Temp	7.345	-0.113	7.004	285.668	9.365	1.082
Dead+Wind 210 deg+Ice+Temp	7.345	-3.578	6.164	251.668	149.779	0.701
Dead+Wind 240 deg+Ice+Temp	7.345	-6.212	3.697	150.734	254.719	0.104
Dead+Wind 270 deg+Ice+Temp	7.345	-6.962	0.113	5.353	285.629	-0.486
Dead+Wind 300 deg+Ice+Temp	7.345	-5.930	-3.404	-138.757	243.390	-0.951
Dead+Wind 330 deg+Ice+Temp	7.345	-3.383	-6.051	-247.198	138.978	-1.191
Dead+Wind 0 deg - Service	4.077	0.039	-2.314	-96.174	-0.758	-0.560
Dead+Wind 30 deg - Service	4.077	1.124	-1.953	-82.437	-45.077	-0.667
Dead+Wind 60 deg - Service	4.077	1.885	-1.137	-49.016	-76.251	-0.615
Dead+Wind 90 deg - Service	4.077	2.181	-0.039	-3.539	-87.840	-0.391
Dead+Wind 120 deg - Service	4.077	1.940	1.124	44.128	-76.930	-0.042
Dead+Wind 150 deg - Service	4.077	1.057	1.915	77.487	-41.393	0.276
Dead+Wind 180 deg - Service	4.077	-0.039	2.206	90.111	3.496	0.540
Dead+Wind 210 deg - Service	4.077	-1.124	1.953	79.614	47.816	0.667
Dead+Wind 240 deg - Service	4.077	-1.978	1.190	47.811	81.795	0.602
Dead+Wind 270 deg - Service	4.077	-2.181	0.039	0.715	90.577	0.391
Dead+Wind 300 deg - Service	4.077	-1.847	-1.070	-45.331	76.861	0.075
Dead+Wind 330 deg - Service	4.077	-1.057	-1.915	-80.309	44.131	-0.276

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	0.000	-4.077	0.000	0.000	4.077	0.000	0.000%
2	0.111	-4.077	-6.688	-0.111	4.077	6.688	0.000%
3	3.249	-4.077	-5.646	-3.249	4.077	5.646	0.000%
4	5.448	-4.077	-3.285	-5.448	4.077	3.285	0.000%
5	6.304	-4.077	-0.111	-6.304	4.077	0.111	0.000%
6	5.606	-4.077	3.248	-5.606	4.077	-3.248	0.000%
7	3.056	-4.077	5.534	-3.056	4.077	-5.534	0.000%
8	-0.111	-4.077	6.377	0.111	4.077	-6.377	0.000%
9	-3.249	-4.077	5.646	3.249	4.077	-5.646	0.000%
10	-5.718	-4.077	3.441	5.718	4.077	-3.441	0.000%
11	-6.304	-4.077	0.111	6.304	4.077	-0.111	0.000%
12	-5.337	-4.077	-3.092	5.337	4.077	3.092	0.000%
13	-3.056	-4.077	-5.534	3.056	4.077	5.534	0.000%
14	0.000	-7.345	0.000	0.000	7.345	0.000	0.000%
15	0.113	-7.345	-7.199	-0.113	7.345	7.199	0.000%
16	3.578	-7.345	-6.164	-3.578	7.345	6.164	0.000%
17	6.043	-7.345	-3.599	-6.043	7.345	3.599	0.000%
18	6.962	-7.345	-0.113	-6.962	7.345	0.113	0.000%
19	6.100	-7.345	3.502	-6.100	7.345	-3.502	0.000%
20	3.383	-7.345	6.051	-3.383	7.345	-6.051	0.000%
21	-0.113	-7.345	7.004	0.113	7.345	-7.004	0.000%
22	-3.578	-7.345	6.164	3.578	7.345	-6.164	0.000%
23	-6.212	-7.345	3.697	6.212	7.345	-3.697	0.000%
24	-6.962	-7.345	0.113	6.962	7.345	-0.113	0.000%
25	-5.930	-7.345	-3.404	5.930	7.345	3.404	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
26	-3.383	-7.345	-6.051	3.383	7.345	6.051	0.000%
27	0.039	-4.077	-2.314	-0.039	4.077	2.314	0.000%
28	1.124	-4.077	-1.953	-1.124	4.077	1.953	0.000%
29	1.885	-4.077	-1.137	-1.885	4.077	1.137	0.000%
30	2.181	-4.077	-0.039	-2.181	4.077	0.039	0.000%
31	1.940	-4.077	1.124	-1.940	4.077	-1.124	0.000%
32	1.057	-4.077	1.915	-1.057	4.077	-1.915	0.000%
33	-0.039	-4.077	2.206	0.039	4.077	-2.206	0.000%
34	-1.124	-4.077	1.953	1.124	4.077	-1.953	0.000%
35	-1.978	-4.077	1.190	1.978	4.077	-1.190	0.000%
36	-2.181	-4.077	0.039	2.181	4.077	-0.039	0.000%
37	-1.847	-4.077	-1.070	1.847	4.077	1.070	0.000%
38	-1.057	-4.077	-1.915	1.057	4.077	1.915	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	60 - 40	P2x.154	20.000	5.000	76.2 K=1.00	19.756	1.075	-13.891	21.229	0.654 ✔
T2	40 - 20	P2x.218	20.000	5.000	78.3 K=1.00	19.354	1.477	-36.451	28.592	1.275 ✔
T3	20 - 0	P2.5x.203	20.033	5.008	63.4 K=1.00	22.122	1.704	-50.210	37.698	1.332 ✔

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	60 - 40	L2x2x1/8	7.071	3.396	102.5 K=1.00	12.447	0.484	-2.142	6.029	0.355 ✔
T2	40 - 20	L2x2x1/8	7.071	3.396	102.5 K=1.00	12.447	0.484	-2.784	6.029	0.462 ✔
T3	20 - 0	L2x2x1/8	8.005	4.014	121.2 K=1.00	10.061	0.484	-1.574	4.873	0.323 ✔

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	60 - 40	L2x2x1/8	5.000	4.802	145.0 K=1.00	7.107	0.484	-0.245	3.443	0.071 ✔
T2	40 - 20	L2x2x1/8	5.000	4.802	145.0 K=1.00	7.107	0.484	-0.210	3.443	0.061 ✔
T3	20 - 0	L2x2x1/8	5.000	4.802	145.0 K=1.00	7.107	0.484	-0.119	3.443	0.034 ✔

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	60 - 40	P2x.154	20.000	5.000	76.2	30.000	1.075	10.756	32.236	0.334 ✔
T2	40 - 20	P2x.218	20.000	5.000	78.3	30.000	1.477	31.741	44.318	0.716 ✔
T3	20 - 0	P2.5x.203	20.033	5.008	63.4	30.000	1.704	43.173	51.121	0.845 ✔

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	60 - 40	L2x2x1/8	7.071	3.396	65.1	21.600	0.484	2.091	10.463	0.200 ✔
T2	40 - 20	L2x2x1/8	7.071	3.396	65.1	21.600	0.484	2.676	10.463	0.256 ✔
T3	20 - 0	L2x2x1/8	8.401	4.207	80.6	21.600	0.484	1.560	10.463	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	60 - 40	L2x2x1/8	5.000	4.802	92.0	21.600	0.484	0.228	10.463	0.022 ✔
T2	40 - 20	L2x2x1/8	5.000	4.802	92.0	21.600	0.484	0.221	10.463	0.021 ✔
T3	20 - 0	L2x2x1/8	5.000	4.802	92.0	21.600	0.484	0.161	10.463	0.015* ✔

* DL controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	60 - 40	Leg	P2x.154	3	-13.891	28.298	49.1	Pass
		Diagonal	L2x2x1/8	11	-2.142	8.037	26.7	Pass
		Top Girt	L2x2x1/8	4	-0.245	4.589	5.3	Pass
T2	40 - 20	Leg	P2x.218	31	-36.451	38.112	95.6	Pass
		Diagonal	L2x2x1/8	42	-2.784	8.037	34.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
		Top Girt	L2x2x1/8	34	-0.210	4.589	4.6	Pass
T3	20 - 0	Leg	P2.5x.203	61	-50.210	50.251	99.9	Pass
		Diagonal	L2x2x1/8	77	-1.574	6.496	24.2	Pass
		Top Girt	L2x2x1/8	64	-0.119	4.589	2.6	Pass
							Summary	
						Leg (T3)	99.9	Pass
						Diagonal (T2)	34.6	Pass
						Top Girt (T1)	5.3	Pass
						RATING =	**99.9**	**Pass**

EXHIBIT C

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTNL041A

Gardner New London
25 Lower Boulevard
New London, CT 06320

February 26, 2015

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	41.50 %

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

EBI Consulting
environmental | engineering | due diligence

February 26, 2015

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

Emissions Analysis for Site: **CTNL041A – Gardner New London**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **25 Lower Boulevard, New London, 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 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 **25 Lower Boulevard, New London, 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 (AWS Band – 2100 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) 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.

6) 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.

7) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Ericsson AIR21 B4A/B12P-8** for 700 MHz and 2100 MHz (AWS) channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 dBd** at its main lobe. The **Ericsson AIR21 B4A/B12P-8** has a maximum gain of **13.6 dBd** at its main lobe for 700 MHz and **15.9 dBd** at its main lobe for 2100 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antenna mounting height centerline of the proposed antennas is **59 feet** above ground level (AGL).

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

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

EBI Consulting
environmental | engineering | due diligence

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:	13.83 %
Sector 2:	13.83 %
Sector 3 :	13.83 %
T-Mobile Total:	41.50 %
Site Total:	41.50 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **41.50%** 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

EBI Consulting
environmental | engineering | due diligence

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	59	Height (AGL):	59	Height (AGL):	59
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	# PCS Channels:	4
Total TX Power:	180	Total TX Power:	180	# AWS Channels:	180
ERP (W):	7,002.81	ERP (W):	7,002.81	ERP (W):	7,002.81
Antenna A1 MPE%	8.96	Antenna B1 MPE%	8.96	Antenna C1 MPE%	8.96
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B4A/B12P	Make / Model:	Ericsson AIR21 B4A/B12P	Make / Model:	Ericsson AIR21 B4A/B12P
Gain:	13.6 dBd / 15.9 dBd	Gain:	13.6 dBd / 15.9 dBd	Gain:	13.6 dBd / 15.9 dBd
Height (AGL):	59	Height (AGL):	59	Height (AGL):	59
Frequency Bands	700 MHz / 2100 MHz (AWS)	Frequency Bands	700 MHz / 2100 MHz (AWS)	Frequency Bands	700 MHz / 2100 MHz (AWS)
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power:	90	Total TX Power:	90	Total TX Power:	90
ERP (W):	3,021.53	ERP (W):	3,021.53	ERP (W):	3,021.53
Antenna A2 MPE%	4.87	Antenna B2 MPE%	4.87	Antenna C2 MPE%	4.87

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**41.50**
Police (receive only)	0.00 %
Fire (receive only)	0.00 %
Tactical Channel (receive only)	0.00 %
Site Total MPE %:	**41.50 %**

T-Mobile Sector 1 Total:	13.83 %
T-Mobile Sector 2 Total:	13.83 %
T-Mobile Sector 3 Total:	13.83 %
Site Total:	41.50 %