COHEN and WOLF P.C.
ATTORNEYS AT LAW

JULIE D. KOHLER

PLEASE REPLY TO: Bridgeport
WRITER'S DIRECT DIAL: (203) 337-4157
E-Mail Address: jkohler@cohenandwolf.com

September 4, 2014

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

Re: Notice of Exempt Modification
Town of Portland/T-Mobile co-location
Site ID CTHA242A
95 High Street, Portland 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 Portland ("Portland" or the "Town") owns the existing telecommunications tower and related facility at 95 High Street, Portland Connecticut (latitude 41.581115 / longitude -72.62222). T-Mobile intends to add three antennas and related equipment at this existing telecommunications facility in Portland ("Portland 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 First Selectwoman Susan Bransfield. The Town of Portland is also the property owner.

The existing Portland Facility consists of a 120 foot tall lattice tower.[1] T-Mobile plans to add three antennas and three remote radio units ("RRU") on sector mounts at an elevation of 110 feet. (See the plans revised to August 28, 2014 attached hereto as Exhibit A). The existing Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated August 27, 2104 and attached hereto as Exhibit B.

[1] The online Connecticut Siting Council database does not include a docket or petition number for the approval of this structure (although this site is addressed in Petition No. 965 for the modification of the facility) but does include several notice of intent, the most recent being EM-T-MOBILE-113-130523 and EM-T-MOBILE-113-090515.

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

1. The proposed modification will not increase the height of the tower. T-Mobile's antennas and equipment will be installed at the 110 foot level. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. T-Mobile does not propose any changes to the equipment in the existing compound. Therefore, as reflected on the attached site plan at Sheet 2, no extension of the site boundaries is required.

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 replacement antennas 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 September 4, 2014 T-Mobile's operations would add 8.45% 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 16.46% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit C.

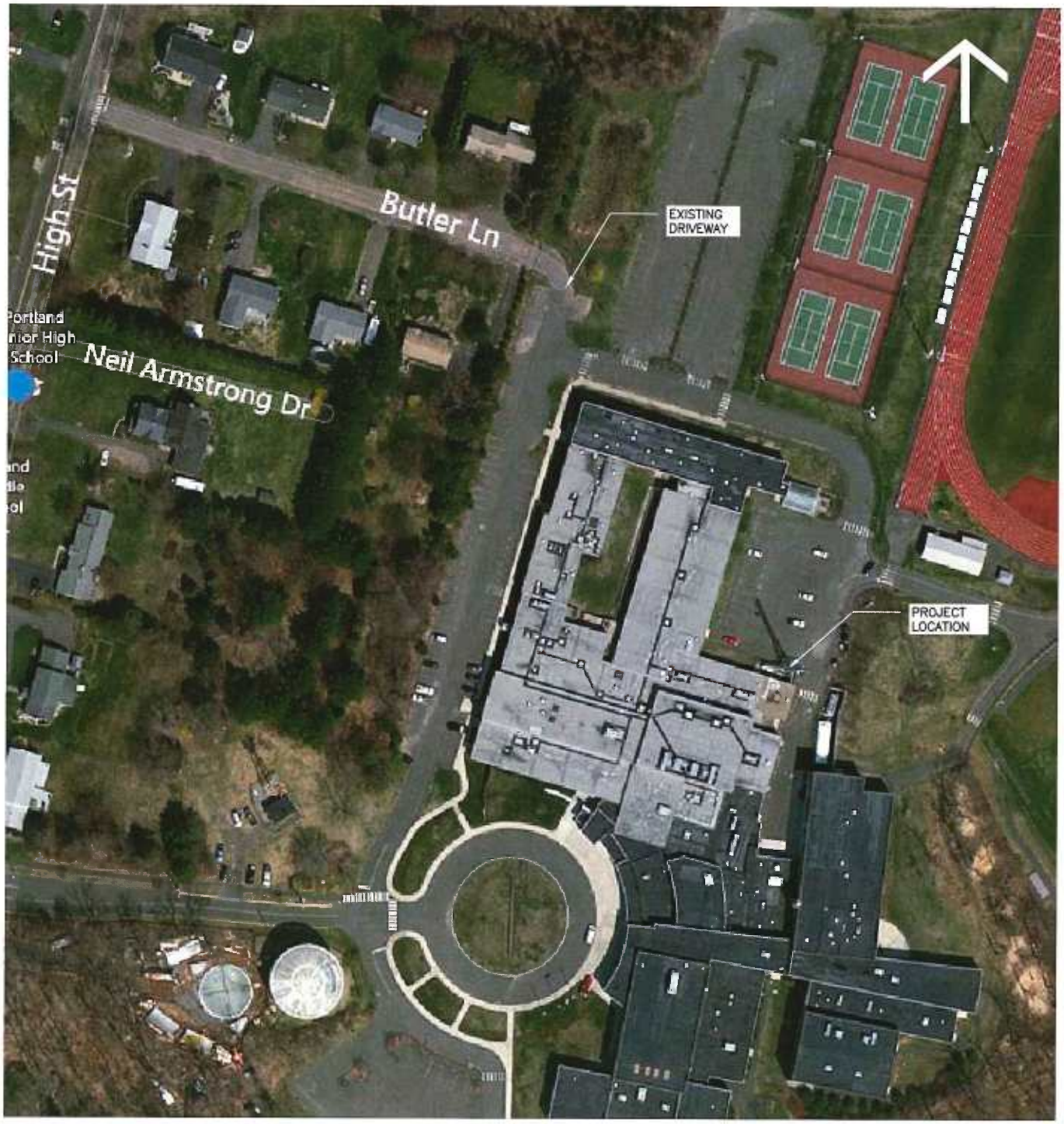
For the foregoing reasons, T-Mobile respectfully submits that the proposed replacement antennas and equipment at the Portland Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Julie D. Kohler, Esq.

cc: Town of Portland, First Selectwoman Susan Bransfield
Sheldon Freincle, NSS

EXHIBIT A



KEY PLAN

N.T.S.

CONFIGURATION

702CC

SUBMITTALS	
LE REV A	07.31.14
LE REV 0	08.28.14

ATLANTIS GROUP
1340 Centre Street
Suite 212
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT

SITE NUMBER:
CTHA242A

SITE NAME:
HA242/PORTLANDHS_SST

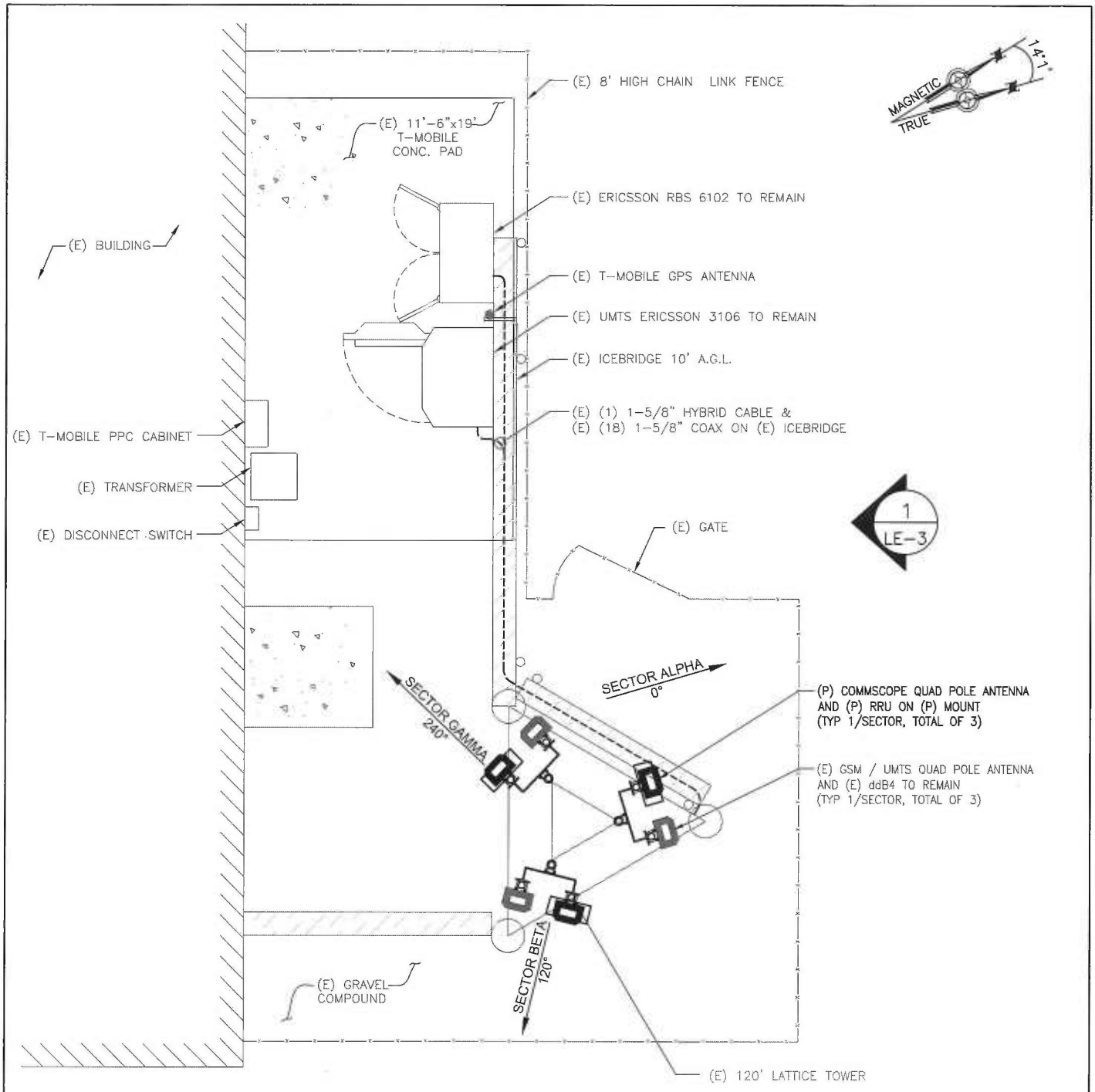
SITE ADDRESS:
95 HIGH ST
PORTLAND, CT 06480

NORTHEAST SITE SOLUTIONS
54 MAIN STREET, UNIT 3
STURBRIDGE, MA 01566
(508) 434-5237

FOR

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159

DRAWN BY: EB | CHECKED BY:SM



ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

SITE PLAN

N.T.S.

1
LE-2

CONFIGURATION

702CC

SUBMITTALS	
LE REV A	07.31.14
LE REV 0	08.28.14

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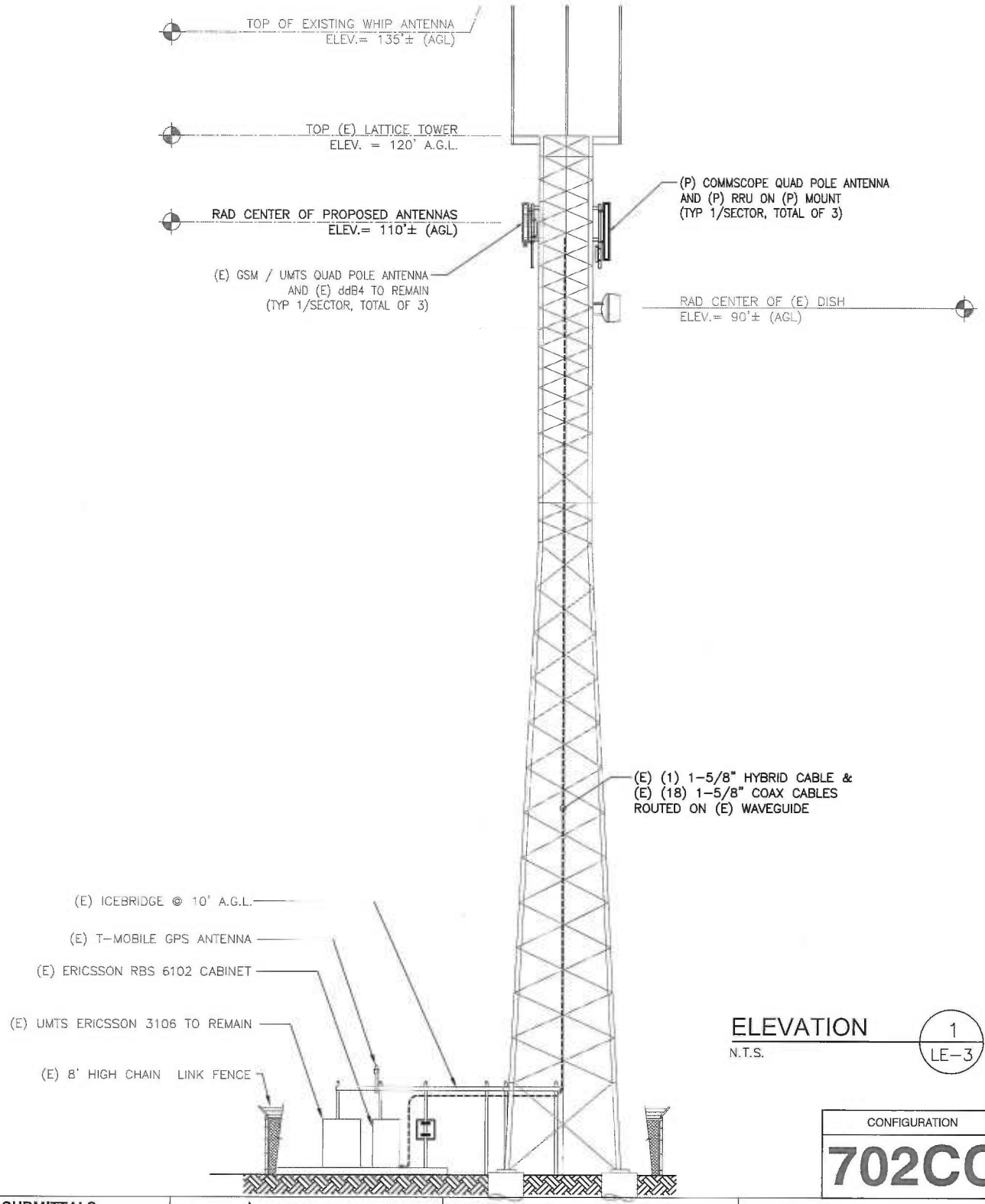

ELEVATION 1
N.T.S. LE-3

CONFIGURATION
702CC

SUBMITTALS	
LE REV A	07.31.14
LE REV 0	08.28.14

ATLANTIS GROUP
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Fax: 617-213-5056

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BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159

DRAWN BY: EB | CHECKED BY:SM

EXHIBIT B

STRUCTURAL ANALYSIS REPORT
SELF SUPPORT TOWER

Prepared For:

T-Mobile

35 Griffin Road South
Bloomfield, CT 06002

Tower Rating

Tower: **Pass (74.1 %)**
Foundation: **Pass**

Sincerely,
Atlantis Group, Inc.
8-27-2014

STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN. 27057
LICENSED
PROFESSIONAL ENGINEER

Ahmet Colakoglu, PE
CT Professional Engineer
License No: 27057

Site ID: CTHA242A
Site Name: HA242/PORTLANDHS_SST
95 High Street,
Portland, CT 06480

August 27, 2014

Prepared By:

Atlantis Group, Inc.
1340 Centre Street, Suite 212
Newton, Massachusetts 02459
Phone: 617-965-0789, Fax: 617-213-5056

CONTENTS

1340 Centre Street, Suite 212
Newton, Massachusetts 02459
Phone: 617-965-0789
Fax: 617-213-5056

1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the existing 120 feet tall self-support tower, located at 95 High Street, Portland, CT 06480 for the additions and alterations proposed by T-Mobile.

The structural analysis of the site is based on the following documents provided to us:

- Lease Exhibit for Site Number CTHA242A prepared by the Atlantis Group, dated July 7, 2014
- Structural Analysis Report prepared by the Atlantis Group for T-Mobile Site ID CTHA242A dated May 13, 2013
- Structural Analysis Report prepared by Velocitel, dated 05/04/2009.
- Existing and proposed antenna information provided by T-Mobile.

1.1 STRUCTURE

The structure is a 120 feet tall, triangular based self-support tower. Truss legs and solid rod legs are X-braced along its elevation. The tower is 4.5 feet wide at the top and 10 feet wide at the bottom. Please refer to the software output in Appendix A, for tower geometry, member sizes and other details.

2.0 PROPOSED CONFIGURATION

Antennas and Appurtenances:

Existing Configuration of T-MOBILE Appurtenances:

SECTOR	RAD CENTER (FT)	ANTENNA & TMA		MOUNT	FEED LINES
ALPHA	110	GSM/UMTS/LTE TMA	(1) AIR21 B2A/B4P (1) dd B4	(1) Leg Mount	(18) 1⅝" + (1) 1⅝" Hybrid Cable
BETA	110	GSM/UMTS/LTE TMA	(1) AIR21 B2A/B4P (1) dd B4	(1) Leg Mount	
GAMMA	110	GSM/UMTS/LTE TMA	(1) AIR21 B2A/B4P (1) dd B4	(1) Leg Mount	

Proposed and Final Configuration of T-MOBILE Appurtenances:

SECTOR	RAD CENTER (FT)	ANTENNA & TMA		MOUNT	FEED LINES
ALPHA	110	GSM/UMTS LTE TMA RRU	(1) AIR21 B2A/B4P (1) AIR21 B4A/B2P-8 (1) dd B4 (1) RRUS11_B12	(1) Sector Mount	(18) 1⅝" + (1) 1⅝" Hybrid Cable
BETA	110	GSM/UMTS LTE TMA RRU	(1) AIR21 B2A/B4P (1) AIR21 B4A/B2P-8 (1) dd B4 (1) RRUS11_B12	(1) Sector Mount	
GAMMA	110	GSM/UMTS LTE TMA RRU	(1) AIR21 B2A/B4P (1) AIR21 B4A/B2P-8 (1) dd B4 (1) RRUS11_B12	(1) Sector Mount	

Existing and Remaining Appurtenances by Others:

RAD CENTER (FT)	ANTENNA & TMA	MOUNT	FEED LINES
120	(3) PD220	(3) Side Arms	(3) ⅞"
100	(1) 6' Dish	(1) Leg Mount	(1) ⅝"
40	(1) GPS Antenna	(1) Side Mount	(1) ½"

3.0 CODES AND LOADING

The tower was analyzed per ANSI/TIA-222-F as referenced by the 2005 Connecticut Building Code with 2013 Amendments, which is the adopted building code in the county. The following wind loading was used in compliance with the standard for Middlesex County, CT.

- Basic wind speed 85 mph (W) without ice.
- Basic wind speed 73.6 mph (W_i) with 1/2" radial and escalating ice.

The following load combinations were used with wind blowing at 0°, 60° and 90° measured from a line normal to the face of the tower.

- D + W
- D + W_i + I

D: Dead Load
W_i: Wind Load with ice
W: Wind Load, without ice
I: Ice Gravity Load

4.0 STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES

The analysis is based on the information provided to Atlantis Group and is assumed to be current and correct. Unless otherwise noted, the structure and the foundation system are assumed to be in good condition, free of defects and can achieve theoretical strength.

It is assumed that the structure has been maintained and shall be maintained during its service. The superstructure and the foundation system are assumed to be designed with proper engineering practice and fabricated, constructed and erected in accordance with the design documents. Atlantis Group will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance. Contractor should inspect the condition of the existing structure, mounts and connections and notify Atlantis Group for any discrepancies and deficiencies before proceeding with the construction.

The analysis does not include a qualification of the mounts attached on the structure or their connections. The analysis is performed to verify the capacity of the main structural members, which is the current practice in the tower industry.

The evaluation results presented in this report are only applicable for the previously mentioned existing and proposed additions and alterations. Any deviation of the proposed equipment and placement, etc., will require Atlantis Group to generate an additional structural evaluation.

5.0 ANALYSIS and ASSUMPTIONS

The tower was analyzed by utilizing tnxTower, a non-linear 3-Dimensional finite element software, a product of Tower Numerics, Inc. Software output for this analysis is provided in Appendix-A of this report.

6.0 RESULTS and CONCLUSION

Tower: The existing tower is found to have **adequate** structural capacity for the proposed loading by T-mobile. For the aforementioned load combinations and as a maximum, the tower legs between 40-50 feet AGL will be stressed to **73.4%** of its capacity. Maximum usage of tower bracing is 44.6%.

Based on the stress level of the legs and assuming the foundation system was designed to have at least the capacity of the superstructure, tower foundation system is considered to have adequate structural strength.

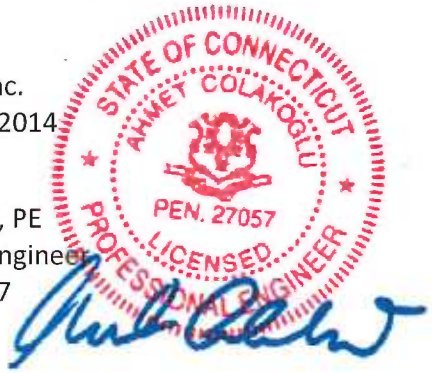
Reactions:

Maximums	Atlantis Analysis	Previous Atlantis Analysis	Velocitel Structural Analysis
Leg Compression (kips)	119.8	104	144.3
Leg Uplift (kip)	95.1	82.2	128.4
Leg Shear (kips)	94.8	8.6	13.5
Total Moment (kip*ft)	968.3	699.7	1062

Therefore, the proposed additions and alterations by T-Mobile can be implemented as intended with the conditions outlined in this report.

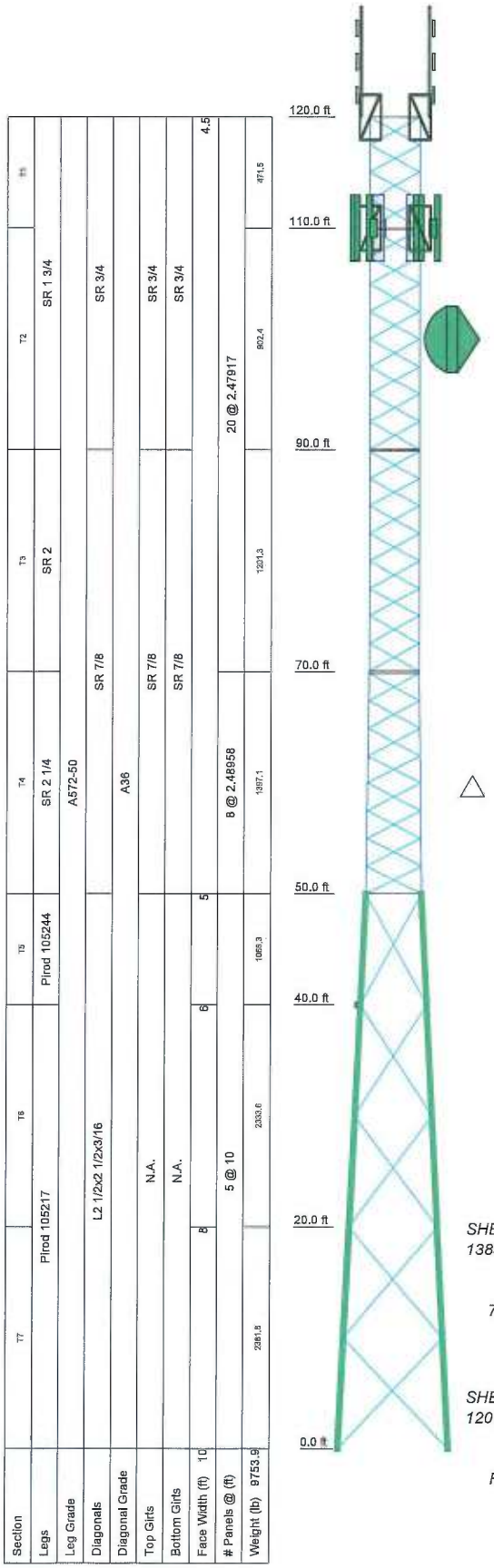
Should you have any questions or need any clarifications about this report, please contact Ahmet Colakoglu at (617) 965-0789.

Sincerely,
Atlantis Group, Inc.
08-27-2014



Ahmet Colakoglu, PE
CT Professional Engineer
License No: 27057

APPENDIX A
CALCULATIONS



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PD220	125	dd B4 TMA (T-Mobile)	110
PD220	125	AIR 21 B4A B12P B5P w/3.5 pipe (T-Mobile)	110
PD220	125	AIR 21 B4A B12P B5P w/3.5 pipe (T-Mobile)	110
Pirod 4' Side Mount Standoff (1)	120	AIR 21 B4A B12P B5P w/3.5 pipe (T-Mobile)	110
Pirod 4' Side Mount Standoff (1)	120	RRUS 11 (T-Mobile)	110
Pirod 4' Side Mount Standoff (1)	120	RRUS 11 (T-Mobile)	110
Pirod 4' Side Mount Standoff (1) (dish mount)	120 - 100	RRUS 11 (T-Mobile)	110
7'x2 1/2" Pipe Mount (T-Mobile)	110	Side Arm Mount [SO 101-1] (T-Mobile)	110
7'x2 1/2" Pipe Mount (T-Mobile)	110	Side Arm Mount [SO 101-1] (T-Mobile)	110
7'x2 1/2" Pipe Mount (T-Mobile)	110	Side Arm Mount [SO 101-1] (T-Mobile)	110
AIR21 B2A/B4P with pipe (T-Mobile)	110	Andrew 6' w/Radome	100
AIR21 B2A/B4P with pipe (T-Mobile)	110	GPS	40
AIR21 B2A/B4P with pipe (T-Mobile)	110		
dd B4 TMA (T-Mobile)	110		
dd B4 TMA (T-Mobile)	110		

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 Middlesex 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: 74.1%

MAX. CORNER REACTIONS AT BASE:
DOWN: 119821 lb
UPLIFT: -95102 lb
SHEAR: 9477 lb

AXIAL
24039 lb

SHEAR
13839 lb

MOMENT
968294 lb-ft

TORQUE 4560 lb-ft
74 mph WIND - 0.5000 in ICE

AXIAL
13492 lb

SHEAR
12076 lb

MOMENT
849697 lb-ft

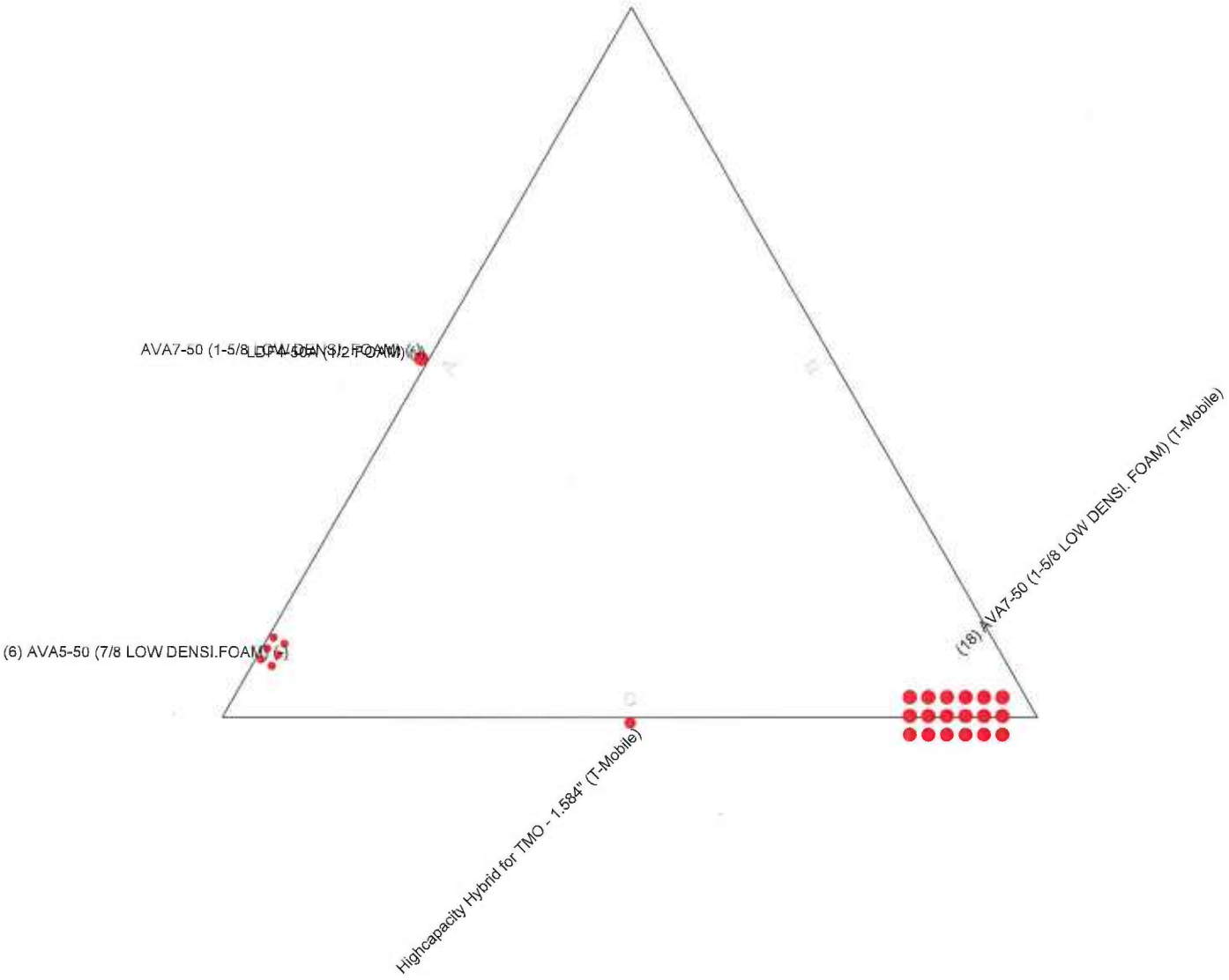
TORQUE 5865 lb-ft
REACTIONS - 85 mph WIND

Atlantis Group
1340 Centre Street, Suite:212
Newton, MA 02459
Phone: 617-965-0789
FAX: 617-213-5056

Job: ***CTHA242A***			
Project: ***CTHA242A***			
Client: T-Mobile	Drawn by:	App'd:	
Code: TIA/EIA-222-F	Date: 08/27/14	Scale: NTS	
Path:		Dwg No. E-1	

Feedline Plan

Round Flat App In Face App Out Face Truss-Leg



Atlantis Group 1340 Centre Street, Suite:212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056	Job: ***CTHA242A***		
	Project: ***CTHA242A***		
	Client: T-Mobile	Drawn by:	App'd:
	Code: TIA/EIA-222-F	Date: 08/27/14	Scale: NTS
	Path:		Dwg No. E-7

tnxTower	Job	Page
	CTHA242A	1 of 22
Atlantis Group 1340 Centre Street, Suite:212 Newton, MA 02459 Phone: 617-965-0789 FAX: 617-213-5056	Project CTHA242A	Date 15:00:26 08/27/14
	Client T-Mobile	Designed by

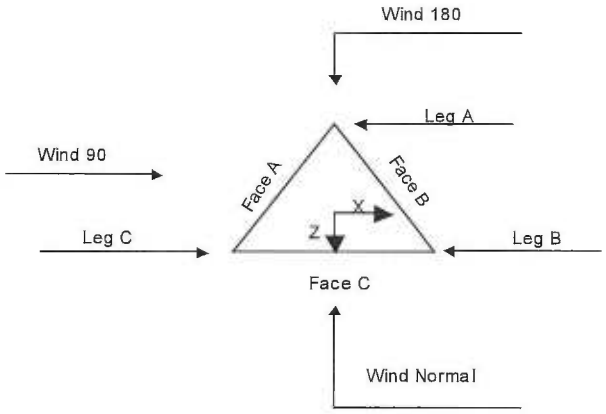
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 120.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.50 ft at the top and 10.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Middlesex 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, feedline 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		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	120.00-110.00			4.50	1	10.00
T2	110.00-90.00			4.50	1	20.00
T3	90.00-70.00			4.50	1	20.00
T4	70.00-50.00			4.50	1	20.00
T5	50.00-40.00			5.00	1	10.00
T6	40.00-20.00			6.00	1	20.00
T7	20.00-0.00			8.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	120.00-110.00	2.48	X Brace	No	No	0.0000	1.0000
T2	110.00-90.00	2.48	X Brace	No	No	1.0000	1.0000
T3	90.00-70.00	2.48	X Brace	No	No	1.0000	1.0000
T4	70.00-50.00	2.49	X Brace	No	No	1.0000	0.0000
T5	50.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T6	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T7	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 120.00-110.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T2 110.00-90.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T3 90.00-70.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T4 70.00-50.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T5 50.00-40.00	Truss Leg	Pirod 105244	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 40.00-20.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 20.00-0.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	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 120.00-110.00	Solid Round	3/4	A36 (36 ksi)	Solid Round	3/4	A36 (36 ksi)
T2 110.00-90.00	Solid Round	3/4	A36 (36 ksi)	Solid Round	3/4	A36 (36 ksi)
T3 90.00-70.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T4 70.00-50.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	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 120.00-110.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 110.00-90.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 90.00-70.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 70.00-50.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 50.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
T6 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000
T7 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation	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
ft															
T1	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
120.00-110.00				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
110.00-90.00				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
90.00-70.00				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
70.00-50.00				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
50.00-40.00				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
40.00-20.00				1	1	1	1	1	1	1	1	1	1	1	1
T7 20.00-0.00	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	Truss-Leg K Factors: Truss-Legs Used As Leg Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals
ft						
T5	1	1	1	1	0.5	0.85
50.00-40.00						
T6	1	1	1	1	0.5	0.85
40.00-20.00						
T7 20.00-0.00	1	1	1	1	0.5	0.85

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 120.00-110.00	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 110.00-90.00	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
T3 90.00-70.00	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 70.00-50.00	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 50.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 120.00-110.00	Sleeve DS	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 110.00-90.00	Sleeve DS	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 90.00-70.00	Sleeve DS	0.7500 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 70.00-50.00	Flange	1.0000 A325N	0	1.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 50.00-40.00	Flange	1.0000 A325N	0	1.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 40.00-20.00	Flange	1.0000 A325N	0	1.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 20.00-0.00	Flange	1.0000 A325N	6	1.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
AVA5-50 (7/8 LOW DENSI.FOAM) (-) ***	A	Yes	Ar (CfAe)	120.00 - 0.00	-2.0000	-0.4	6	3	0.7500	1.1000		0.30
AVA7-50 (1-5/8 LOW DENSI. FOAM) (T-Mobile)	C	Yes	Ar (CfAe)	110.00 - 0.00	-2.0000	-0.4	18	6	0.7500	1.9800		0.72

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
***												
AVA7-50 (1-5/8 LOW DENSI. FOAM) (-)	A	Yes	Ar (CfAe)	100.00 - 0.00	0.0000	0	1	1	1.9800	1.9800		0.72
***												
LDF4-50A (1/2 FOAM) (-)	A	Yes	Ar (CfAe)	40.00 - 0.00	0.0000	0	1	1	0.6300	0.6300		0.15
***												
PROPOSED												
***												
Highcapacity Hybrid for TMO - 1.584" (T-Mobile)	C	Yes	Ar (CfAe)	110.00 - 0.00	0.0000	0	1	1	1.5840	1.5840		1.61

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
***							
PROPOSED							

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 lb
T1	120.00-110.00	A	2.750	0.000	0.000	0.000	18.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	110.00-90.00	A	7.150	0.000	0.000	0.000	43.20
		B	0.000	0.000	0.000	0.000	0.00
		C	22.440	0.000	0.000	0.000	291.48
T3	90.00-70.00	A	8.800	0.000	0.000	0.000	50.40
		B	0.000	0.000	0.000	0.000	0.00
		C	22.440	0.000	0.000	0.000	291.48
T4	70.00-50.00	A	8.800	0.000	0.000	0.000	50.40
		B	0.000	0.000	0.000	0.000	0.00
		C	22.440	0.000	0.000	0.000	291.48
T5	50.00-40.00	A	4.400	0.000	0.000	0.000	25.20
		B	0.000	0.000	0.000	0.000	0.00
		C	11.220	0.000	0.000	0.000	145.74
T6	40.00-20.00	A	9.850	0.000	0.000	0.000	53.40
		B	0.000	0.000	0.000	0.000	0.00
		C	22.440	0.000	0.000	0.000	291.48
T7	20.00-0.00	A	9.850	0.000	0.000	0.000	53.40
		B	0.000	0.000	0.000	0.000	0.00
		C	22.440	0.000	0.000	0.000	291.48

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 lb
T1	120.00-110.00	A	0.500	1.750	3.083	0.000	0.000	81.24
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	110.00-90.00	A	0.500	5.983	6.167	0.000	0.000	184.83
		B		0.000	0.000	0.000	0.000	0.00
		C		9.273	22.750	0.000	0.000	962.71
T3	90.00-70.00	A	0.500	8.467	6.167	0.000	0.000	207.18
		B		0.000	0.000	0.000	0.000	0.00
		C		9.273	22.750	0.000	0.000	962.71
T4	70.00-50.00	A	0.500	8.467	6.167	0.000	0.000	207.18
		B		0.000	0.000	0.000	0.000	0.00
		C		9.273	22.750	0.000	0.000	962.71
T5	50.00-40.00	A	0.500	4.233	3.083	0.000	0.000	103.59
		B		0.000	0.000	0.000	0.000	0.00
		C		4.637	11.375	0.000	0.000	481.36
T6	40.00-20.00	A	0.500	11.183	6.167	0.000	0.000	223.98
		B		0.000	0.000	0.000	0.000	0.00
		C		9.273	22.750	0.000	0.000	962.71
T7	20.00-0.00	A	0.500	11.183	6.167	0.000	0.000	223.98
		B		0.000	0.000	0.000	0.000	0.00
		C		9.273	22.750	0.000	0.000	962.71

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	120.00-110.00	A	0.191	0.785	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	110.00-90.00	A	0.453	1.796	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	1.421	4.733	0.000	0.000
T3	90.00-70.00	A	0.650	2.317	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	1.658	5.071	0.000	0.000
T4	70.00-50.00	A	0.644	2.294	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	1.642	5.021	0.000	0.000
T5	50.00-40.00	A	0.000	0.253	0.380	0.632
		B	0.000	0.000	0.000	0.000
		C	0.000	0.553	0.969	1.383
T6	40.00-20.00	A	0.000	0.506	0.718	1.265
		B	0.000	0.000	0.000	0.000
		C	0.000	0.934	1.636	2.335
T7	20.00-0.00	A	0.000	0.433	0.615	1.083
		B	0.000	0.000	0.000	0.000
		C	0.000	0.799	1.400	1.998

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	120.00-110.00	-2.8715	1.4706	-1.3490	0.6909
T2	110.00-90.00	4.2173	6.0292	2.5452	3.7017
T3	90.00-70.00	3.4573	5.2171	2.0868	3.2646
T4	70.00-50.00	3.4779	5.2537	2.1225	3.3241
T5	50.00-40.00	2.2567	3.4178	1.4982	2.3704
T6	40.00-20.00	2.6390	4.1607	1.6295	2.8544
T7	20.00-0.00	3.3180	5.2464	2.0687	3.6427

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft ft ft	°	ft		ft^2	ft^2	lb
PD220	A	From Leg	1.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	3.56 7.13	3.56 7.13	23.00 46.00
PD220	B	From Leg	1.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	3.56 7.13	3.56 7.13	23.00 46.00
PD220	C	From Leg	1.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	3.56 7.13	3.56 7.13	23.00 46.00
Pirod 4' Side Mount Standoff (1)	A	From Leg	0.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	50.00 89.00
Pirod 4' Side Mount Standoff (1)	B	From Leg	0.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	50.00 89.00
Pirod 4' Side Mount Standoff (1)	C	From Leg	0.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	50.00 89.00
***									
7'x2 1/2" Pipe Mount (T-Mobile)	A	From Leg	0.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	2.01 2.59	2.01 2.59	40.50 55.31
7'x2 1/2" Pipe Mount (T-Mobile)	B	From Leg	0.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	2.01 2.59	2.01 2.59	40.50 55.31
7'x2 1/2" Pipe Mount (T-Mobile)	C	From Leg	0.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	2.01 2.59	2.01 2.59	40.50 55.31
***									
Pirod 4' Side Mount Standoff (1) (dish mount)	B	From Leg	0.00 0.00 0.00	0.0000	100.00 - 120.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	50.00 89.00
***									
GPS	C	From Leg	0.50 0.00	0.0000	40.00	No Ice 1/2" Ice	0.34 0.51	0.34 0.51	6.08 11.08

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 lb
			0.00						
*** ***PREVIOUS*** ***									
AIR21 B2A/B4P with pipe (T-Mobile)	A	From Leg	1.00 1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	6.87 7.38	6.29 7.05	134.62 203.81
AIR21 B2A/B4P with pipe (T-Mobile)	B	From Leg	1.00 1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	6.87 7.38	6.29 7.05	134.62 203.81
AIR21 B2A/B4P with pipe (T-Mobile)	C	From Leg	1.00 1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	6.87 7.38	6.29 7.05	134.62 203.81
dd B4 TMA (T-Mobile)	A	From Leg	0.50 1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	0.64 0.82	0.52 0.71	22.43 31.59
dd B4 TMA (T-Mobile)	B	From Leg	0.50 1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	0.64 0.82	0.52 0.71	22.43 31.59
dd B4 TMA (T-Mobile)	C	From Leg	0.50 1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	0.64 0.82	0.52 0.71	22.43 31.59
PROPOSED									
AIR 21 B4A B12P B5P w/3.5 pipe (T-Mobile)	A	From Leg	1.00 -1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	11.50 12.12	9.08 9.75	63.07 138.58
AIR 21 B4A B12P B5P w/3.5 pipe (T-Mobile)	B	From Leg	1.00 -1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	11.50 12.12	9.08 9.75	63.07 138.58
AIR 21 B4A B12P B5P w/3.5 pipe (T-Mobile)	C	From Leg	1.00 -1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	11.50 12.12	9.08 9.75	63.07 138.58
RRUS 11 (T-Mobile)	A	From Leg	0.50 -1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	3.25 3.49	1.37 1.55	50.70 71.50
RRUS 11 (T-Mobile)	B	From Leg	0.50 -1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	3.25 3.49	1.37 1.55	50.70 71.50
RRUS 11 (T-Mobile)	C	From Leg	0.50 -1.50 0.00	0.0000	110.00	No Ice 1/2" Ice	3.25 3.49	1.37 1.55	50.70 71.50
Side Arm Mount [SO 101-1] (T-Mobile)	A	From Leg	0.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	3.75 4.45	1.28 1.39	84.00 111.00
Side Arm Mount [SO 101-1] (T-Mobile)	B	From Leg	0.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	3.75 4.45	1.28 1.39	84.00 111.00
Side Arm Mount [SO 101-1] (T-Mobile)	C	From Leg	0.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	3.75 4.45	1.28 1.39	84.00 111.00

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 ft²	Weight lb
Andrew 6' w/Radome	B	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	0.0000		100.00	6.00	No Ice 1/2" Ice	28.27 29.07	380.00 450.00

Truss-Leg Properties

Section Designation	Area in²	Area Ice in²	Self Weight lb	Ice Weight lb	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in²
Pirod 105244	1026.8606	1727.9786	562.76	211.31	7.1310	11.9999	3.6816
Pirod 105217	2130.7479	3520.4599	619.35	443.34	7.3984	12.2238	5.3014
Pirod 105217	2130.7479	3520.4599	619.35	443.34	7.3984	12.2238	5.3014

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	6757.76					
Bracing Weight	2996.14					
Total Member Self-Weight	9753.91			3575.68	-3816.97	
Total Weight	13492.09			3575.68	-3816.97	
Wind 0 deg - No Ice		-92.34	-12031.22	-830155.38	5416.81	3566.60
Wind 30 deg - No Ice		5754.52	-10186.16	-704322.03	-399875.13	5506.05
Wind 60 deg - No Ice		10061.93	-5839.49	-402746.71	-702352.14	5822.11
Wind 90 deg - No Ice		11847.50	18.94	5469.24	-829779.88	4468.40
Wind 120 deg - No Ice		10454.63	6035.98	422478.49	-729377.91	1942.55
Wind 150 deg - No Ice		5940.15	10250.77	717933.77	-418438.29	-1153.39
Wind 180 deg - No Ice		-26.18	11633.63	811686.08	-1199.04	-3917.73
Wind 210 deg - No Ice		-5944.22	10076.64	700520.96	411211.36	-5506.05
Wind 240 deg - No Ice		-10465.51	5935.64	412444.53	722832.19	-5509.14
Wind 270 deg - No Ice		-12076.84	-21.16	1460.15	845079.56	-4027.19
Wind 300 deg - No Ice		-10417.94	-6014.80	-420278.26	730319.58	-1904.38
Wind 330 deg - No Ice		-6056.74	-10448.27	-730532.51	422463.40	712.18
Member Ice	4967.98					
Total Weight Ice	24039.29			10743.20	-10285.80	
Wind 0 deg - Ice		-71.21	-13808.64	-931746.31	-3164.48	2828.80
Wind 30 deg - Ice		6374.11	-11209.21	-759602.92	-445291.82	4233.54
Wind 60 deg - Ice		10923.54	-6330.02	-425448.34	-761753.68	4423.95
Wind 90 deg - Ice		13009.25	14.60	12203.56	-906401.19	3454.26
Wind 120 deg - Ice		11985.85	6920.03	483559.16	-829227.05	1607.67
Wind 150 deg - Ice		6517.27	11259.04	786071.72	-459608.20	-868.55
Wind 180 deg - Ice		-20.19	12625.07	879629.25	-8266.78	-2969.35
Wind 210 deg - Ice		-6520.41	11124.74	772642.53	439350.50	-4233.54
Wind 240 deg - Ice		-11994.24	6842.65	475820.72	809494.73	-4436.47
Wind 270 deg - Ice		-13186.12	-16.32	9111.65	903516.57	-3113.99
Wind 300 deg - Ice		-11198.10	-6465.23	-438969.10	768638.76	-1454.59
Wind 330 deg - Ice		-6607.19	-11411.35	-779817.08	448028.36	528.27

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Total Weight	13492.09			3575.68	-3816.97	
Wind 0 deg - Service		-31.95	-4163.05	-287822.62	2083.91	1234.12
Wind 30 deg - Service		1991.18	-3524.62	-244281.67	-138155.52	1905.21
Wind 60 deg - Service		3481.64	-2020.58	-139930.35	-242818.84	2014.57
Wind 90 deg - Service		4099.48	6.55	1320.85	-286911.49	1546.16
Wind 120 deg - Service		3617.52	2088.57	145614.70	-252170.32	672.16
Wind 150 deg - Service		2055.41	3546.98	247848.37	-144578.76	-399.10
Wind 180 deg - Service		-9.06	4025.48	280288.61	-205.31	-1355.62
Wind 210 deg - Service		-2056.82	3486.73	241823.17	142497.25	-1905.21
Wind 240 deg - Service		-3621.28	2053.86	142142.75	250324.53	-1906.28
Wind 270 deg - Service		-4178.84	-7.32	-66.38	292624.65	-1393.49
Wind 300 deg - Service		-3604.82	-2081.25	-145996.63	252915.32	-658.96
Wind 330 deg - Service		-2095.76	-3615.32	-253351.04	146390.69	246.43

Load Combinations

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

Comb. No.	Description
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
T1	120 - 110	Leg	Max Tension	21	3253.53	-0.72	95.83
			Max. Compression	23	-4042.66	-22.78	15.38
			Max. Mx	24	-3531.30	-84.80	21.52
			Max. My	15	-3976.84	0.62	-97.78
			Max. Vy	23	-739.03	-22.78	15.38
			Max. Vx	15	-843.81	1.24	-27.49
		Diagonal	Max Tension	24	586.14	0.00	0.00
			Max. Compression	24	-588.77	0.00	0.00
			Max. Mx	19	17.09	-1.98	-0.16
			Max. My	18	-304.78	-1.79	0.16
			Max. Vy	19	-3.32	-1.98	-0.16
			Max. Vx	19	0.08	0.00	0.00
		Top Girt	Max Tension	23	148.11	0.00	0.00
			Max. Compression	25	-168.50	0.00	0.00
			Max. Mx	14	-6.79	5.74	0.00
			Max. My	22	2.39	0.00	-0.00
			Max. Vy	14	-5.10	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
		Bottom Girt	Max Tension	6	133.91	0.00	0.00
			Max. Compression	12	-141.73	0.00	0.00
			Max. Mx	14	1.96	5.74	0.00
			Max. My	22	1.21	0.00	-0.00
			Max. Vy	14	-5.10	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
T2	110 - 90	Leg	Max Tension	21	23906.27	-6.27	-70.13
			Max. Compression	19	-29207.85	-71.66	-39.13
			Max. Mx	23	-27985.59	-129.52	58.00
			Max. My	15	-27674.77	-12.61	-141.42
			Max. Vy	23	-2435.75	73.43	-33.05
			Max. Vx	15	-2654.79	6.16	79.79
		Diagonal	Max Tension	24	2286.29	0.00	0.00
			Max. Compression	24	-2308.79	0.00	0.00
			Max. Mx	19	1893.96	-2.53	0.10
			Max. My	11	-1953.88	-0.79	-0.85
			Max. Vy	19	3.56	-2.53	0.10
			Max. Vx	11	0.33	-0.79	-0.85
		Top Girt	Max Tension	6	303.48	0.00	0.00
			Max. Compression	12	-319.81	0.00	0.00
			Max. Mx	14	-1.39	5.74	0.00
			Max. My	22	-3.17	0.00	-0.00
			Max. Vy	14	-5.10	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
		Bottom Girt	Max Tension	21	177.95	0.00	0.00
			Max. Compression	19	-199.87	0.00	0.00
			Max. Mx	14	3.24	5.74	0.00
			Max. My	22	12.89	0.00	-0.00
			Max. Vy	14	-5.10	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
T3	90 - 70	Leg	Max Tension	25	53623.14	-118.51	-64.50
			Max. Compression	19	-63315.31	-148.96	-82.79
			Max. Mx	23	-27986.60	276.32	-124.03
			Max. My	15	-27673.75	24.92	300.93

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Vy	23	-3342.22	149.00	-74.99
			Max. Vx	15	-3658.35	6.77	165.47
		Diagonal	Max Tension	24	2934.41	0.00	0.00
			Max. Compression	24	-3004.34	0.00	0.00
			Max. Mx	19	2425.48	-5.03	0.09
			Max. My	4	-2410.63	-0.80	1.37
			Max. Vy	19	5.23	-5.03	0.09
			Max. Vx	4	0.53	0.00	0.00
		Top Girt	Max Tension	15	165.13	0.00	0.00
			Max. Compression	12	-207.48	0.00	0.00
			Max. Mx	14	-2.51	7.31	0.00
			Max. My	22	-4.34	0.00	-0.00
			Max. Vy	14	6.49	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Bottom Girt	Max Tension	25	131.45	0.00	0.00
			Max. Compression	19	-207.05	0.00	0.00
			Max. Mx	14	-1.89	7.31	0.00
			Max. My	22	19.31	0.00	-0.00
			Max. Vy	14	6.49	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
T4	70 - 50	Leg	Max Tension	25	79990.34	0.00	0.00
			Max. Compression	19	-93438.06	580.76	-2.00
			Max. Mx	19	-93438.06	580.76	-2.00
			Max. My	22	-4522.86	32.53	237.72
			Max. Vy	15	-2777.74	396.89	-28.78
			Max. Vx	16	1468.57	4.31	-138.77
		Diagonal	Max Tension	24	2644.75	0.00	0.00
			Max. Compression	24	-2660.63	0.00	0.00
			Max. Mx	19	2129.97	-5.10	-0.06
			Max. My	4	-2256.11	-1.01	1.58
			Max. Vy	19	5.42	-5.10	-0.06
			Max. Vx	4	-0.61	0.00	0.00
		Top Girt	Max Tension	15	138.25	0.00	0.00
			Max. Compression	25	-219.70	0.00	0.00
			Max. Mx	14	-8.30	7.31	0.00
			Max. My	22	-0.22	0.00	-0.00
			Max. Vy	14	6.50	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Bottom Girt	Max Tension	25	1529.97	0.00	0.00
			Max. Compression	19	-1585.55	0.00	0.00
			Max. Mx	14	18.79	9.02	0.00
			Max. My	22	-24.04	0.00	-0.00
			Max. Vy	14	-7.22	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
T5	50 - 40	Leg	Max Tension	25	77868.58	-492.78	4.10
			Max. Compression	19	-91111.81	4694.19	23.05
			Max. Mx	25	77264.69	-5058.53	50.20
			Max. My	20	-3372.45	-378.51	-7740.99
			Max. Vy	25	556.08	-5058.53	50.20
			Max. Vx	20	832.62	-378.51	-7740.99
		Diagonal	Max Tension	23	4885.64	0.00	0.00
			Max. Compression	17	-5250.70	0.00	0.00
			Max. Mx	25	1565.37	87.21	-9.09
			Max. My	23	-3128.04	-72.44	22.41
			Max. Vy	20	-22.72	81.39	13.81
			Max. Vx	23	-4.68	0.00	0.00
T6	40 - 20	Leg	Max Tension	25	86842.43	0.00	0.00
			Max. Compression	19	-105517.06	3843.01	3.51
			Max. Mx	25	86096.09	-5722.58	21.80
			Max. My	20	-4278.75	-378.53	-7740.99
			Max. Vy	25	669.83	-5722.58	21.80

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Vx	20	-851.51	-378.53	-7740.99
		Diagonal	Max Tension	23	3379.17	0.00	0.00
			Max. Compression	17	-3145.86	0.00	0.00
			Max. Mx	19	2498.13	76.48	-7.16
			Max. My	17	831.07	61.13	-10.66
			Max. Vy	19	-22.28	76.48	-7.16
			Max. Vx	17	2.38	0.00	0.00
T7	20 - 0	Leg	Max Tension	25	91230.01	-1243.64	33.76
			Max. Compression	19	-116318.74	0.00	-0.01
			Max. Mx	25	89899.54	-5722.58	21.80
			Max. My	20	-7722.60	1585.47	-5928.48
			Max. Vy	25	-547.93	-5722.58	21.80
			Max. Vx	20	-672.57	1585.47	-5928.48
		Diagonal	Max Tension	17	3694.99	0.00	0.00
			Max. Compression	10	-3255.80	0.00	0.00
			Max. Mx	19	889.43	63.16	-2.61
			Max. My	22	2630.72	41.92	10.25
			Max. Vy	25	21.48	62.49	3.01
			Max. Vx	22	-2.09	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	23	117378.12	8108.55	-4344.43
	Max. H_x	23	117378.12	8108.55	-4344.43
	Max. H_z	17	-93620.00	-8154.47	4447.11
	Min. Vert	17	-93620.00	-8154.47	4447.11
	Min. H_x	17	-93620.00	-8154.47	4447.11
	Min. H_z	23	117378.12	8108.55	-4344.43
Leg B	Max. Vert	19	119820.94	-8081.59	-4544.45
	Max. H_x	25	-95101.97	8244.57	4673.62
	Max. H_z	25	-95101.97	8244.57	4673.62
	Min. Vert	25	-95101.97	8244.57	4673.62
	Min. H_x	19	119820.94	-8081.59	-4544.45
	Min. H_z	19	119820.94	-8081.59	-4544.45
Leg A	Max. Vert	15	116537.20	186.66	9173.38
	Max. H_x	4	51253.28	687.87	4451.54
	Max. H_z	15	116537.20	186.66	9173.38
	Min. Vert	21	-94458.56	-151.23	-9306.71
	Min. H_x	10	-43389.98	-663.20	-3789.15
	Min. H_z	21	-94458.56	-151.23	-9306.71

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	13492.09	-0.07	-0.06	3582.19	-3824.88	0.01
Dead+Wind 0 deg - No Ice	13492.08	-92.33	-12030.49	-834676.86	5425.32	3602.43
Dead+Wind 30 deg - No Ice	13492.08	5754.03	-10185.51	-708149.84	-402073.69	5556.88
Dead+Wind 60 deg - No Ice	13492.08	10061.13	-5839.03	-404918.12	-706195.77	5865.12

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead+Wind 90 deg - No Ice	13492.08	11846.66	19.04	5524.49	-834312.31	4492.62
Dead+Wind 120 deg - No Ice	13492.08	10453.99	6035.61	424789.05	-733357.54	1950.96
Dead+Wind 150 deg - No Ice	13492.08	5939.82	10249.99	721845.46	-420736.47	-1163.12
Dead+Wind 180 deg - No Ice	13492.08	-26.18	11632.71	816107.49	-1225.08	-3952.68
Dead+Wind 210 deg - No Ice	13492.08	-5943.89	10075.89	704348.14	413437.10	-5557.11
Dead+Wind 240 deg - No Ice	13492.08	-10464.88	5935.28	414716.50	726759.31	-5553.54
Dead+Wind 270 deg - No Ice	13492.08	-12075.98	-21.04	1497.90	849695.54	-4052.23
Dead+Wind 300 deg - No Ice	13492.08	-10417.11	-6014.32	-422562.83	734310.46	-1912.97
Dead+Wind 330 deg - No Ice	13492.08	-6056.22	-10447.59	-734527.60	424758.68	722.20
Dead+Ice+Temp	24039.29	-0.07	-0.07	10835.64	-10375.56	-0.28
Dead+Wind 0 deg+Ice+Temp	24039.27	-71.22	-13807.23	-939846.36	-3218.75	2919.51
Dead+Wind 30 deg+Ice+Temp	24039.28	6373.67	-11208.59	-766299.64	-449258.74	4357.78
Dead+Wind 60 deg+Ice+Temp	24039.28	10922.82	-6329.62	-429199.24	-768532.62	4538.98
Dead+Wind 90 deg+Ice+Temp	24039.28	13008.47	14.66	12327.76	-914437.84	3532.96
Dead+Wind 120 deg+Ice+Temp	24039.27	11984.59	6919.30	487778.74	-836459.35	1640.56
Dead+Wind 150 deg+Ice+Temp	24039.28	6516.94	11258.33	793028.40	-463687.08	-892.75
Dead+Wind 180 deg+Ice+Temp	24039.28	-20.20	12624.25	887430.55	-8358.13	-3054.01
Dead+Wind 210 deg+Ice+Temp	24039.28	-6520.09	11124.05	779485.73	443215.00	-4358.45
Dead+Wind 240 deg+Ice+Temp	24039.27	-11993.02	6841.92	479988.96	816528.55	-4560.45
Dead+Wind 270 deg+Ice+Temp	24039.28	-13185.34	-16.26	9216.28	911519.92	-3195.08
Dead+Wind 300 deg+Ice+Temp	24039.28	-11197.38	-6464.82	-442854.96	775468.18	-1486.35
Dead+Wind 330 deg+Ice+Temp	24039.28	-6606.74	-11410.72	-786718.27	451987.25	553.59
Dead+Wind 0 deg - Service	13492.08	-31.95	-4162.78	-286469.79	-633.19	1246.53
Dead+Wind 30 deg - Service	13492.08	1991.03	-3524.39	-242690.42	-141640.48	1920.65
Dead+Wind 60 deg - Service	13492.08	3481.38	-2020.44	-137766.06	-246878.49	2028.99
Dead+Wind 90 deg - Service	13492.08	4099.19	6.56	4260.82	-291210.35	1556.88
Dead+Wind 120 deg - Service	13492.08	3617.27	2088.43	149342.69	-256279.92	675.09
Dead+Wind 150 deg - Service	13492.08	2055.28	3546.72	252137.03	-148100.55	-404.75
Dead+Wind 180 deg - Service	13492.07	-9.00	4025.12	284754.31	-2934.33	-1367.78
Dead+Wind 210 deg - Service	13492.08	-2056.69	3486.47	246078.20	140551.83	-1920.74
Dead+Wind 240 deg - Service	13492.08	-3621.05	2053.71	145853.67	248969.39	-1921.67
Dead+Wind 270 deg - Service	13492.08	-4178.54	-7.31	2867.95	291504.52	-1404.60
Dead+Wind 300 deg - Service	13492.07	-3604.49	-2081.12	-143868.66	251581.01	-661.58
Dead+Wind 330 deg - Service	13492.08	-2095.60	-3615.07	-251815.42	144467.70	252.31

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	-0.00	-13492.09	-0.00	0.07	13492.09	0.06	0.001%
2	-92.34	-13492.09	-12031.22	92.33	13492.08	12030.49	0.004%
3	5754.52	-13492.09	-10186.16	-5754.03	13492.08	10185.51	0.005%
4	10061.93	-13492.09	-5839.49	-10061.13	13492.08	5839.03	0.005%
5	11847.50	-13492.09	18.94	-11846.66	13492.08	-19.04	0.005%
6	10454.62	-13492.09	6035.98	-10453.99	13492.08	-6035.61	0.004%
7	5940.15	-13492.09	10250.77	-5939.82	13492.08	-10249.99	0.005%
8	-26.18	-13492.09	11633.63	26.18	13492.08	-11632.71	0.005%
9	-5944.22	-13492.09	10076.64	5943.89	13492.08	-10075.89	0.005%
10	-10465.51	-13492.09	5935.64	10464.88	13492.08	-5935.28	0.004%
11	-12076.83	-13492.09	-21.16	12075.98	13492.08	21.04	0.005%
12	-10417.94	-13492.09	-6014.80	10417.11	13492.08	6014.32	0.005%
13	-6056.74	-13492.09	-10448.27	6056.22	13492.08	10447.59	0.005%
14	-0.00	-24039.29	-0.00	0.07	24039.29	0.07	0.000%
15	-71.21	-24039.29	-13808.64	71.22	24039.27	13807.23	0.005%
16	6374.11	-24039.29	-11209.21	-6373.67	24039.28	11208.59	0.003%
17	10923.53	-24039.29	-6330.02	-10922.82	24039.28	6329.62	0.003%
18	13009.25	-24039.29	14.60	-13008.47	24039.28	-14.66	0.003%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
19	11985.85	-24039.29	6920.03	-11984.59	24039.27	-6919.30	0.005%
20	6517.27	-24039.29	11259.04	-6516.94	24039.28	-11258.33	0.003%
21	-20.19	-24039.29	12625.07	20.20	24039.28	-12624.25	0.003%
22	-6520.41	-24039.29	11124.74	6520.09	24039.28	-11124.05	0.003%
23	-11994.24	-24039.29	6842.65	11993.02	24039.27	-6841.92	0.005%
24	-13186.12	-24039.29	-16.32	13185.34	24039.28	16.26	0.003%
25	-11198.10	-24039.29	-6465.23	11197.38	24039.28	6464.82	0.003%
26	-6607.19	-24039.29	-11411.35	6606.74	24039.28	11410.72	0.003%
27	-31.95	-13492.09	-4163.05	31.95	13492.08	4162.78	0.002%
28	1991.18	-13492.09	-3524.62	-1991.03	13492.08	3524.39	0.002%
29	3481.64	-13492.09	-2020.58	-3481.38	13492.08	2020.44	0.002%
30	4099.48	-13492.09	6.55	-4099.19	13492.08	-6.56	0.002%
31	3617.52	-13492.09	2088.57	-3617.27	13492.08	-2088.43	0.002%
32	2055.41	-13492.09	3546.98	-2055.28	13492.08	-3546.72	0.002%
33	-9.06	-13492.09	4025.48	9.00	13492.07	-4025.12	0.003%
34	-2056.82	-13492.09	3486.73	2056.69	13492.08	-3486.47	0.002%
35	-3621.28	-13492.09	2053.85	3621.05	13492.08	-2053.71	0.002%
36	-4178.84	-13492.09	-7.32	4178.54	13492.08	7.31	0.002%
37	-3604.82	-13492.09	-2081.25	3604.49	13492.07	2081.12	0.002%
38	-2095.76	-13492.09	-3615.32	2095.60	13492.08	3615.07	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	9	0.00000001	0.00012301
2	Yes	14	0.00000001	0.00008470
3	Yes	14	0.00000001	0.00009822
4	Yes	14	0.00000001	0.00011025
5	Yes	14	0.00000001	0.00009811
6	Yes	14	0.00000001	0.00008428
7	Yes	14	0.00000001	0.00009809
8	Yes	14	0.00000001	0.00011017
9	Yes	14	0.00000001	0.00009821
10	Yes	14	0.00000001	0.00008476
11	Yes	14	0.00000001	0.00009842
12	Yes	14	0.00000001	0.00011075
13	Yes	14	0.00000001	0.00009844
14	Yes	12	0.00000001	0.00011728
15	Yes	14	0.00000001	0.00014892
16	Yes	15	0.00000001	0.00008798
17	Yes	15	0.00000001	0.00009506
18	Yes	15	0.00000001	0.00008733
19	Yes	14	0.00000001	0.00014812
20	Yes	15	0.00000001	0.00008740
21	Yes	15	0.00000001	0.00009498
22	Yes	15	0.00000001	0.00008794
23	Yes	14	0.00000001	0.00014900
24	Yes	15	0.00000001	0.00008753
25	Yes	15	0.00000001	0.00009517
26	Yes	15	0.00000001	0.00008764
27	Yes	14	0.00000001	0.00009245
28	Yes	14	0.00000001	0.00009702
29	Yes	14	0.00000001	0.00010105
30	Yes	14	0.00000001	0.00009647
31	Yes	14	0.00000001	0.00009196

32	Yes	14	0.00000001	0.00009647
33	Yes	14	0.00000001	0.00010098
34	Yes	14	0.00000001	0.00009701
35	Yes	14	0.00000001	0.00009251
36	Yes	14	0.00000001	0.00009685
37	Yes	14	0.00000001	0.00010133
38	Yes	14	0.00000001	0.00009686

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 110	4.736	31	0.3319	0.0781
T2	110 - 90	4.040	31	0.3304	0.0779
T3	90 - 70	2.673	31	0.3017	0.0662
T4	70 - 50	1.506	31	0.2346	0.0476
T5	50 - 40	0.671	31	0.1484	0.0273
T6	40 - 20	0.408	31	0.1012	0.0172
T7	20 - 0	0.100	31	0.0460	0.0062

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.00	PD220	31	4.736	0.3319	0.0781	396147
120.00	Pirod 4' Side Mount Standoff (1)	31	4.736	0.3319	0.0781	396147
115.00	Pirod 4' Side Mount Standoff (1)	31	4.388	0.3317	0.0783	396147
110.00	7'x2 1/2" Pipe Mount	31	4.040	0.3304	0.0779	379030
105.00	Pirod 4' Side Mount Standoff (1)	31	3.690	0.3270	0.0763	122086
100.00	Andrew 6' w/Radome	31	3.344	0.3212	0.0737	47347
40.00	GPS	31	0.408	0.1012	0.0172	16675

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 110	15.154	19	1.0585	0.2257
T2	110 - 90	12.933	19	1.0521	0.2252
T3	90 - 70	8.589	19	0.9609	0.1913
T4	70 - 50	4.866	19	0.7516	0.1377
T5	50 - 40	2.180	19	0.4786	0.0788
T6	40 - 20	1.331	19	0.3277	0.0496
T7	20 - 0	0.327	19	0.1495	0.0179

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.00	PD220	19	15.154	1.0585	0.2257	137016
120.00	Pirod 4' Side Mount Standoff (1)	19	15.154	1.0585	0.2257	137016
115.00	Pirod 4' Side Mount Standoff (1)	19	14.044	1.0570	0.2264	137016
110.00	7'x2 1/2" Pipe Mount	19	12.933	1.0521	0.2252	134228
105.00	Pirod 4' Side Mount Standoff (1)	19	11.822	1.0409	0.2206	32288
100.00	Andrew 6' w/Radome	19	10.720	1.0222	0.2129	14622
40.00	GPS	19	1.331	0.3277	0.0496	5221

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T7	20	Leg	A325N	1.0000	6	14983.30	34557.00	0.434 ✔	1.333	Bolt Tension

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 lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	120 - 110	1 3/4	10.00	2.48	68.0 K=1.00	21.305	2.4053	-4042.66	51245.30	0.079 ✔
T2	110 - 90	1 3/4	20.00	2.48	68.0 K=1.00	21.305	2.4053	-29207.80	51245.30	0.570 ✔
T3	90 - 70	2	20.00	2.48	59.5 K=1.00	22.803	3.1416	-63315.30	71636.70	0.884 ✔
T4	70 - 50	2 1/4	20.00	2.49	53.1 K=1.00	23.858	3.9761	-93438.10	94859.60	0.985 ✔
T5	50 - 40	Pirod 105244	10.02	10.02	45.4 K=1.00	25.051	3.6816	-91111.80	92228.10	0.988 ✔
T6	40 - 20	Pirod 105217	20.03	10.02	37.8 K=1.00	26.132	5.3014	-105517.00	138539.00	0.762 ✔
T7	20 - 0	Pirod 105217	20.03	10.02	37.8 K=1.00	26.132	5.3014	-116319.00	138539.00	0.840 ✔

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V lb	Allow. V_a lb	Stress Ratio
T5	50 - 40	0.5	1.48	142.4	7.364	0.1963	834.12	1618.33	0.515 ✓
T6	40 - 20	0.5	1.47	141.2	7.490	0.1963	853.02	1645.93	0.518 ✓
T7	20 - 0	0.5	1.47	141.2	7.490	0.1963	694.27	1645.93	0.422 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	120 - 110	3/4	5.14	2.49	119.3 K=0.75	10.381	0.4418	-588.77	4586.28	0.128 ✓
T2	110 - 90	3/4	5.14	2.49	119.3 K=0.75	10.381	0.4418	-2308.79	4586.28	0.503 ✓
T3	90 - 70	7/8	5.14	2.47	101.8 K=0.75	12.752	0.6013	-3004.34	7667.87	0.392 ✓
T4	70 - 50	7/8	5.50	2.66	109.6 K=0.75	11.727	0.6013	-2660.63	7051.66	0.377 ✓
T5	50 - 40	L2 1/2x2 1/2x3/16	11.42	5.19	124.5 K=0.99	9.630	0.9020	-5250.70	8686.59	0.604 ✓
T6	40 - 20	L2 1/2x2 1/2x3/16	11.93	5.59	131.9 K=0.97	8.586	0.9020	-3145.86	7744.28	0.406 ✓
T7	20 - 0	L2 1/2x2 1/2x3/16	13.80	6.54	149.3 K=0.94	6.697	0.9020	-3255.80	6040.72	0.539 ✓

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 lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	120 - 110	3/4	4.50	4.35	195.1 K=0.70	3.925	0.4418	-168.50	1733.79	0.097 ✓
T2	110 - 90	3/4	4.50	4.35	195.1 K=0.70	3.925	0.4418	-319.81	1733.79	0.184 ✓
T3	90 - 70	7/8	4.50	4.33	166.4 K=0.70	5.393	0.6013	-207.48	3243.03	0.064 ✓
T4	70 - 50	7/8	4.50	4.31	165.7 K=0.70	5.440	0.6013	-219.70	3271.27	0.067 ✓

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 lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	120 - 110	3/4	4.50	4.35	195.1 K=0.70	3.925	0.4418	-141.73	1733.79	0.082 ✔
T2	110 - 90	3/4	4.50	4.35	195.1 K=0.70	3.925	0.4418	-199.87	1733.79	0.115 ✔
T3	90 - 70	7/8	4.50	4.33	166.4 K=0.70	5.393	0.6013	-207.05	3243.03	0.064 ✔
T4	70 - 50	7/8	5.00	4.81	184.8 K=0.70	4.373	0.6013	-1585.55	2629.38	0.603 ✔

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 lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	120 - 110	1 3/4	10.00	0.08	2.3	30.000	2.4053	3253.53	72158.50	0.045 ✔
T2	110 - 90	1 3/4	20.00	0.08	2.3	30.000	2.4053	23906.30	72158.50	0.331 ✔
T3	90 - 70	2	20.00	0.08	2.0	30.000	3.1416	53623.10	94247.80	0.569 ✔
T4	70 - 50	2 1/4	20.00	2.49	53.1	30.000	3.9761	79990.30	119282.00	0.671 ✔
T5	50 - 40	Pirod 105244	10.02	10.02	45.4	30.000	3.6816	77868.60	110447.00	0.705 ✔
T6	40 - 20	Pirod 105217	20.03	10.02	37.8	30.000	5.3014	86842.40	159043.00	0.546 ✔
T7	20 - 0	Pirod 105217	20.03	10.02	37.8	30.000	5.3014	91230.00	159043.00	0.574 ✔

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V lb	Allow. V_a lb	Stress Ratio
T5	50 - 40	0.5	1.48	142.4	7.364	0.1963	834.12	1618.33	0.515 ✔
T6	40 - 20	0.5	1.47	141.2	7.490	0.1963	853.02	1645.93	0.518 ✔
T7	20 - 0	0.5	1.47	141.2	7.490	0.1963	694.27	1645.93	0.422 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	120 - 110	3/4	5.14	2.49	159.1	21.600	0.4418	586.15	9542.59	0.061 ✔
T2	110 - 90	3/4	5.14	2.49	159.1	21.600	0.4418	2286.29	9542.59	0.240 ✔
T3	90 - 70	7/8	5.14	2.47	135.7	21.600	0.6013	2934.41	12988.50	0.226 ✔
T4	70 - 50	7/8	5.50	2.66	146.1	21.600	0.6013	2644.75	12988.50	0.204 ✔
T5	50 - 40	L2 1/2x2 1/2x3/16	11.42	5.19	80.1	21.600	0.9020	4885.64	19483.20	0.251 ✔
T6	40 - 20	L2 1/2x2 1/2x3/16	11.93	5.59	86.2	21.600	0.9020	3379.17	19483.20	0.173 ✔
T7	20 - 0	L2 1/2x2 1/2x3/16	13.80	6.54	100.8	21.600	0.9020	3694.99	19483.20	0.190 ✔

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 lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	120 - 110	3/4	4.50	4.35	278.7	21.600	0.4418	148.11	9542.59	0.016 ✔
T2	110 - 90	3/4	4.50	4.35	278.7	21.600	0.4418	303.48	9542.59	0.032 ✔
T3	90 - 70	7/8	4.50	4.33	237.7	21.600	0.6013	165.13	12988.50	0.013 ✔
T4	70 - 50	7/8	4.50	4.31	236.7	21.600	0.6013	138.25	12988.50	0.011 ✔

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 lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	120 - 110	3/4	4.50	4.35	278.7	21.600	0.4418	133.91	9542.59	0.014 ✔
T2	110 - 90	3/4	4.50	4.35	278.7	21.600	0.4418	177.95	9542.59	0.019 ✔
T3	90 - 70	7/8	4.50	4.33	237.7	21.600	0.6013	131.45	12988.50	0.010 ✔
T4	70 - 50	7/8	5.00	4.81	264.0	21.600	0.6013	1529.97	12988.50	0.118 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	120 - 110	Leg	1 3/4	1	-4042.66	68309.98	5.9	Pass
T2	110 - 90	Leg	1 3/4	35	-29207.80	68309.98	42.8	Pass
T3	90 - 70	Leg	2	92	-63315.30	95491.72	66.3	Pass
T4	70 - 50	Leg	2 1/4	149	-93438.10	126447.84	73.9	Pass
T5	50 - 40	Leg	Pirod 105244	206	-91111.80	122940.05	74.1	Pass
T6	40 - 20	Leg	Pirod 105217	215	-105517.00	184672.48	57.1	Pass
T7	20 - 0	Leg	Pirod 105217	230	-116319.00	184672.48	63.0	Pass
T1	120 - 110	Diagonal	3/4	10	-588.77	6113.51	9.6	Pass
T2	110 - 90	Diagonal	3/4	43	-2308.79	6113.51	37.8	Pass
T3	90 - 70	Diagonal	7/8	100	-3004.34	10221.27	29.4	Pass
T4	70 - 50	Diagonal	7/8	163	-2660.63	9399.86	28.3	Pass
T5	50 - 40	Diagonal	L2 1/2x2 1/2x3/16	211	-5250.70	11579.22	45.3	Pass
T6	40 - 20	Diagonal	L2 1/2x2 1/2x3/16	224	-3145.86	10323.12	30.5	Pass
T7	20 - 0	Diagonal	L2 1/2x2 1/2x3/16	232	-3255.80	8052.28	40.4	Pass
T1	120 - 110	Top Girt	3/4	6	-168.50	2311.14	7.3	Pass
T2	110 - 90	Top Girt	3/4	39	-319.81	2311.14	13.8	Pass
T3	90 - 70	Top Girt	7/8	96	-207.48	4322.96	4.8	Pass
T4	70 - 50	Top Girt	7/8	153	-219.70	4360.60	5.0	Pass
T1	120 - 110	Bottom Girt	3/4	9	-141.73	2311.14	6.1	Pass
T2	110 - 90	Bottom Girt	3/4	42	-199.87	2311.14	8.6	Pass
T3	90 - 70	Bottom Girt	7/8	99	-207.05	4322.96	4.8	Pass
T4	70 - 50	Bottom Girt	7/8	156	-1585.55	3504.96	45.2	Pass
							Summary	
						Leg (T5)	74.1	Pass
						Diagonal (T5)	45.3	Pass
						Top Girt (T2)	13.8	Pass
						Bottom Girt (T4)	45.2	Pass
						Bolt Checks	32.5	Pass
						RATING =	**74.1**	**Pass**

EXHIBIT C

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

T-Mobile Existing Facility

Site ID: CTHA242A

Portland HS SST
95 High Street
Portland, CT 06480

September 4, 2014

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	16.46 %

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

EBI Consulting
environmental | engineering | due diligence

September 4, 2014

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

Emissions Analysis for Site: **CTHA242A – Portland HS SST**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **95 High Street, Portland, 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 μW/cm2 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 (μW/cm2). The general population exposure limit for the 700 MHz Band is 467 μW/cm2, and the general population exposure limit for the PCS and AWS bands is 1000 μW/cm2. 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 **95 High Street, Portland, 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 2100 MHz (AWS) channels and 700 MHz 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 700 MHz and **15.9 dBd** at 2100 MHz 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.

8) The antenna mounting height centerline of the proposed antennas is **110 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.

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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):	110	Height (AGL):	110	Height (AGL):	110
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:	90	Total TX Power:	90	# AWS Channels:	90
ERP (W):	2,859.09	ERP (W):	2,859.09	ERP (W):	2,859.09
Antenna A1 MPE%	2.33	Antenna B1 MPE%	2.33	Antenna C1 MPE%	2.33
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B4A/B12P-8	Make / Model:	Ericsson AIR21 B4A/B12P-8	Make / Model:	Ericsson AIR21 B4A/B12P-8
Gain:	15.9dBd / 13.6 dBd	Gain:	15.9dBd / 13.6 dBd	Gain:	15.9dBd / 13.6 dBd
Height (AGL):	110	Height (AGL):	110	Height (AGL):	110
Frequency Bands	2100 MHz(AWS) / 700 Mhz	Frequency Bands	2100 MHz(AWS) / 700 Mhz	Frequency Bands	2100 MHz(AWS) / 700 Mhz
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power:	90	Total TX Power:	90	Total TX Power:	90
ERP (W):	405.54	ERP (W):	405.54	ERP (W):	405.54
Antenna A2MPE%	0.49	Antenna B2 MPE%	0.49	Antenna C2 MPE%	0.49

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**8.45**
Clearwire	1.69 %
Whip Antenna	1.46 %
212-1 dipole	4.86 %
Andrew Dish	0.00 %
Site Total MPE %:	**16.46 %**

T-Mobile Sector 1 Total:	2.82 %
T-Mobile Sector 2 Total:	2.82 %
T-Mobile Sector 3 Total:	2.82 %
Site Total:	**16.46 %**

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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:	2.82 %
Sector 2:	2.82 %
Sector 3 :	2.82 %
T-Mobile Total:	8.45 %
Site Total:	16.46 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **16.46%** 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.

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