



Northeast Site Solutions
Denise Sabo
420 Main Street, Sturbridge MA 01566
860-209-4690
denise@northeastsitesolutions.com

May 10, 2018

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

RE: Exempt Modification Application
15 Old Hartford, Colchester CT 06415
Latitude: 42.79666667
Longitude: -72.86944444
T-Mobile Site#: CT11249A-MWAAV

Dear Ms. Bachman:

T-Mobile is requesting to file an exempt modification for an existing 168-foot monopole tower located at 15 Old Hartford, Colchester CT 06415. T-Mobile currently has approval for three (3) antennas at the 95-foot level of the existing 100-foot tower. The tower and property are owned by CT State Police – Troop K. T-Mobile now intends to install one (1) IBR1300 Dish. The new dish would be installed at the 95-foot and level of the tower.

Planned Modifications:

Remove:
NONE

Remove and Replace:
NONE

Install New:
(1)IBR1300 Dish
(1)Fiber line
(2)CAT6 Cables

Existing to Remain:
(6) 1-1/4" Coax
(3) TMA
(3) APX18 Antenna – 1900-2100 Mhz

This facility was first approved by the Connecticut Siting Council. Docket No. 160 – Approved in 1998 to erect telecommunication equipment to existing tower. This have been the only record available for this tower approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-SOj-73, a copy of this letter is being sent to First Selectman Art Shilosky, Elected Official and Randal Benson, Planning Director for the Town of Colchester, as well as the property owner and the tower owner.

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

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

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

Sincerely,

Denise Sabo
Mobile: 860-209-4690
Fax: 413-521-0558
Office: 4 Angela's Way, Burlington CT 06013
Email: denise@northeastsitesolutions.com

Attachments

cc: Art Shilosky, First Selectman- as elected official
Randal Benson -Zoning Enforcement Officer
Brian Benito - as property& tower owner

Exhibit A



Town of Colchester, CT

Property Listing Report

Map Block Lot

15-00/045-000

Account

C0518400

PID

5623

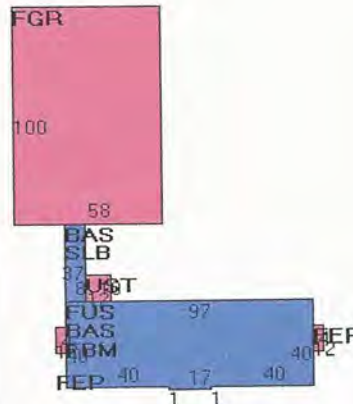
Property Information

Property Location	15 OLD HARTFORD RD
Owner	CONNECTICUT STATE OF
Co-Owner	STATE POLICE BARRACKS
Mailing Address	15 OLD HARTFORD RD COLCHESTER CT 06415
Land Use	9010 State MDL-96
Land Class	E
Zoning Code	R30
Census Tract	
Sub Lot	
Neighborhood	3000
Acreage	2.8
Utilities	Public Water,Public Sewer
Lot Setting/Desc	Bus. District Level
Survey Map	
Additional Info	

Photo



Sketch



Primary Construction Details

Year Built	1932
Stories	2
Building Style	Other State
Building Use	Commercial
Building Condition	B+
Floors	Carpet
Total Rooms	

Bedrooms	
Full Bathrooms	0
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	Gable
Roof Cover	Asphalt

Exterior Walls	Brick/Masonry
Interior Walls	Plywood Panel
Heating Type	Hot Water
Heating Fuel	Oil
AC Type	Central
Gross Bldg Area	18003
Total Living Area	8090



Town of Colchester, CT

Property Listing Report

Map Block Lot

15-00/045-000

Account

C0518400

Valuation Summary (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	1035500	724900
Extras	0	0
Outbuildings	255000	178500
Land	411600	288100
Total	1702100	1191500

Outbuilding and Extra Items

Type	Description
Cell Tower	1.00 SITES
Paving Asphalt	24000.00 S.F.

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Upper Story, Finished	3897	3897
Slab	0	0
Utility, Storage, Unfinished	120	0
First Floor	4193	4193
Enclosed Porch	96	0
Basement, Finished	3897	0
Garage	5800	0
Total Area	18003	8090

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
CONNECTICUT STATE OF	0059/0087		0



Town of Colchester, CT

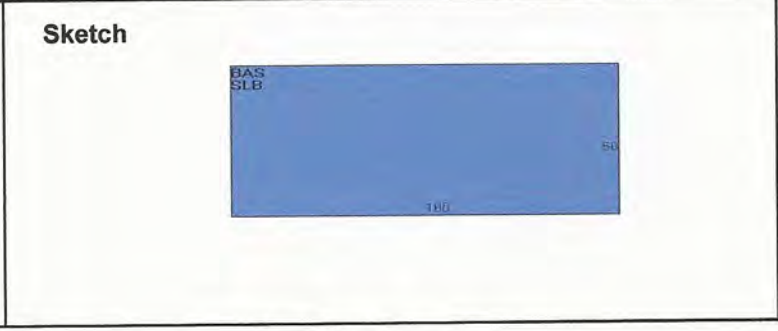
Property Listing Report

Map Block Lot

15-00/045-000

Account

C0518400



Primary Construction Details

Year Built	1990
Stories	1
Building Style	Service Shop
Building Use	Serv Station
Building Condition	B+
Floors	Concrete Slab
Total Rooms	
Bedrooms	
Bathrooms	0
Bath Style	
Half Bath	

Kitchen Style	
Roof Style	Flat
Roof Cover	T&G/Rubber
Exterior Walls	Concr/Cinder
Interior Walls	Minimum
Heating Type	Forced Air-Duc
Heating Fuel	Oil
AC Type	None
Gross Bldg Area	
Total Living Area	

Sub Areas

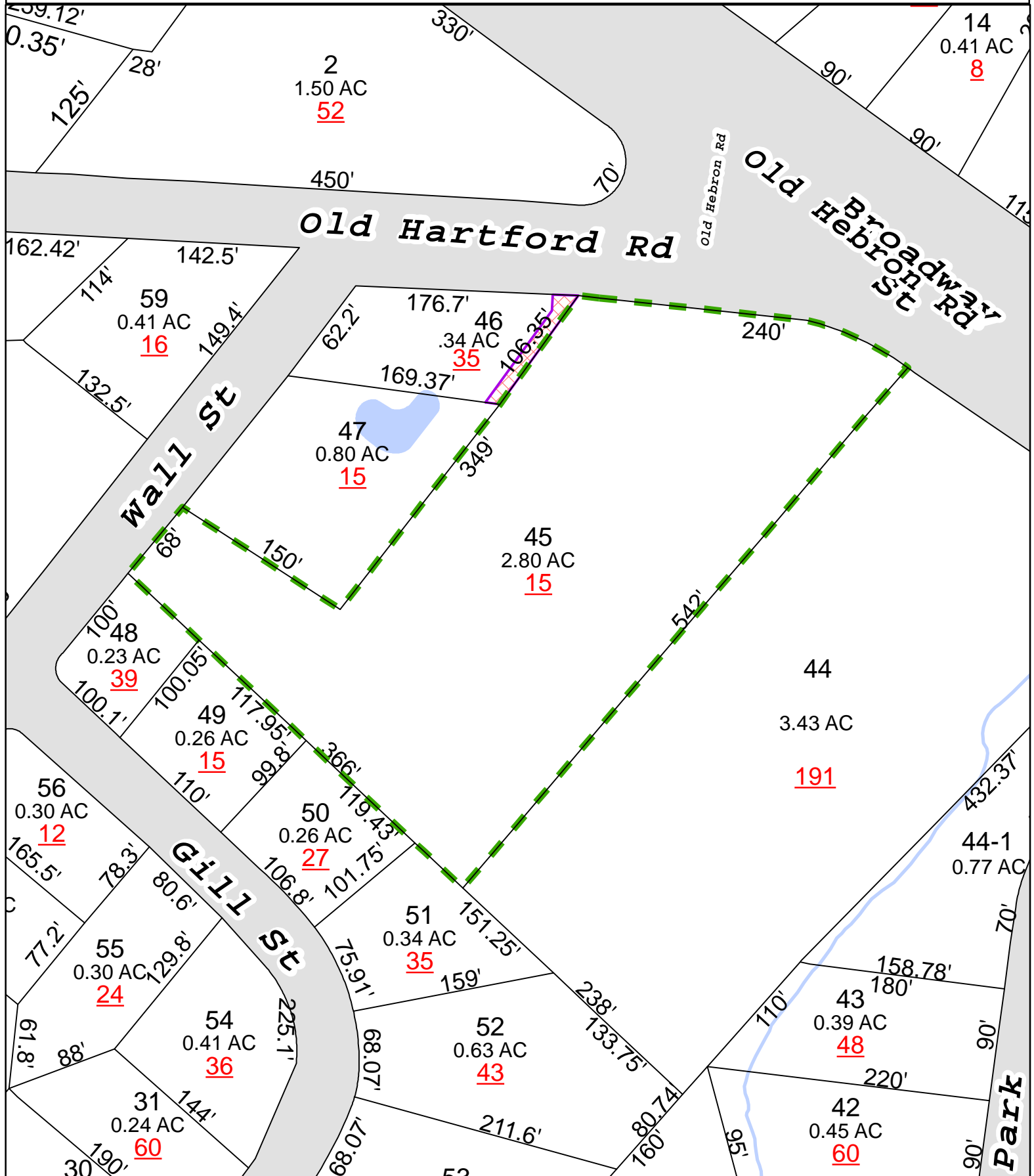
Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	5000	5000
Slab	5000	0
Total Area		



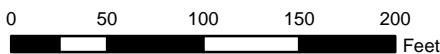
Town of Colchester, Connecticut - Assessment Parcel Map

Parcel: 15-00-045-000

Address: 15 OLD HARTFORD RD



Approximate Scale: 1 inch = 100 feet



Map Produced: July 2017 / Grand List: 2016

Disclaimer: This map is for informational purposes only. All information is subject to verification by any user. The Town of Colchester and its mapping contractors assume no legal responsibility for the information contained herein.

Exhibit B

MODIFICATION TO EXISTING WIRELESS TELECOMMUNICATION FACILITY BY

T-Mobile

T-MOBILE NORTHEAST LLC

SITE NUMBER: CT11249A
 SITE NAME:TROOP K
 SITE ADDRESS: 15 OLD HARTFORD ROAD
 COLCHESTER, CT 06415

APPLICANT:

T-Mobile
T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
 BLOOMFIELD, CT 06002
 860-692-7100



PROJECT MANAGER

NSS NORTHEAST
 SITE SOLUTIONS
Turnkey Wireless Development

420 MAIN STREET, BLDG 4
 STURBRIDGE, MA 01566
 203-275-6669

CONSULTANT:

FORESITE LLC

Architects . Engineers . Surveyors

462 WALNUT STREET
 NEWTON, MA 02460
 617-212-3123

PROFESSIONAL SEAL



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REV	DESCRIPTION	DATE
A	PRELIMINARY	04/03/18
B	AZIMUTH REVISED	04/04/18

SITE NUMBER: CT11249A
 ADDRESS: 15 OLD HARTFORD ROAD
 COLCHESTER, CT 06415

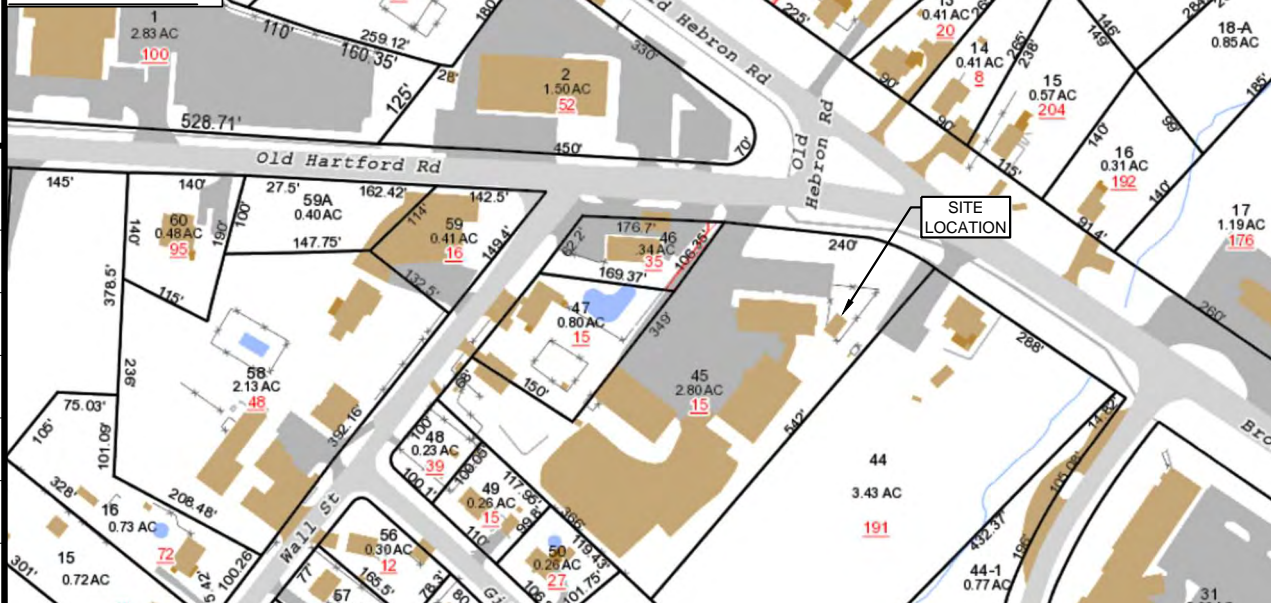
SHEET TITLE:

T-1: TITLE SHEET

SITE IMAGE:



SITE VICINITY:



PROJECT SCOPE:

ADDITION OF A BACKHAUL RADIO, (1) FIBER AND (2) CAT6 CABLES TO EXISTING TOWER.

PROJECT NOTES:

- THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION: HANDICAPPED ACCESS IS NOT REQUIRED. POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED. NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED.
- CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACES THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
- DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES, ORDINANCES AND SPECIFICATIONS.
- PRIOR TO INSTALLATION OF THE PROPOSED EQUIPMENT, A STRUCTURAL EVALUATION SHOULD BE PERFORMED TO CERTIFY THAT THE EXISTING/PROPOSED STRUCTURE AND COMPONENTS HAVE ADEQUATE STRUCTURAL CAPACITY PER ALL THE APPLICABLE CODES AND STANDARDS IN THE PROJECT JURISDICTION. CONTRACTOR SHOULD REVIEW THE REPORT AND ADHERE TO THE REPORT FULLY AND ALL THE RECOMMENDATIONS THEREIN, INCLUDING BUT NOT LIMITED TO ANTENNA PLACEMENT, COAX ROUTING, STRUCTURAL IMPROVEMENTS, ETC.

T-MOBILE APPROVALS:

	DATE
FSA CM	
RF ENGINEER	
FOPS	
T-MOBILE ENGINEERING AND DEVELOPMENT	

PROJECT INFORMATION:

ADDRESS: 15 OLD HARTFORD ROAD
 COLCHESTER, CT 06415
 COORDINATES: N 41°34'44.28" , W -72°20'19.30"
 STRUCTURE TYPE: EXISTING 100' LATTICE TOWER
 JURISDICTION: TOWN OF COLCHESTER, CT
 CURRENT USE: TELECOMMUNICATIONS FACILITY
 PROPOSED USE: TELECOMMUNICATIONS FACILITY

PROJECT TEAM:

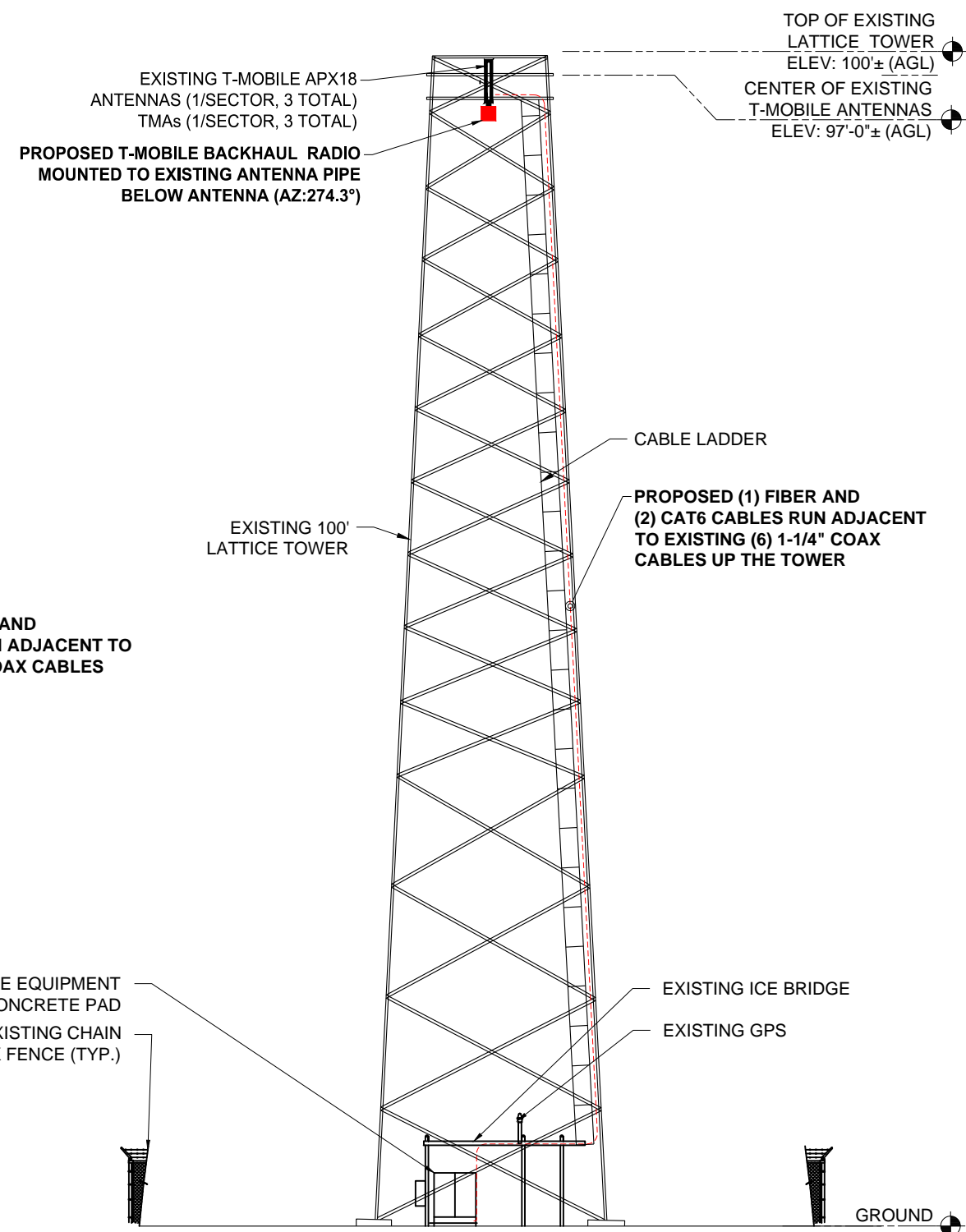
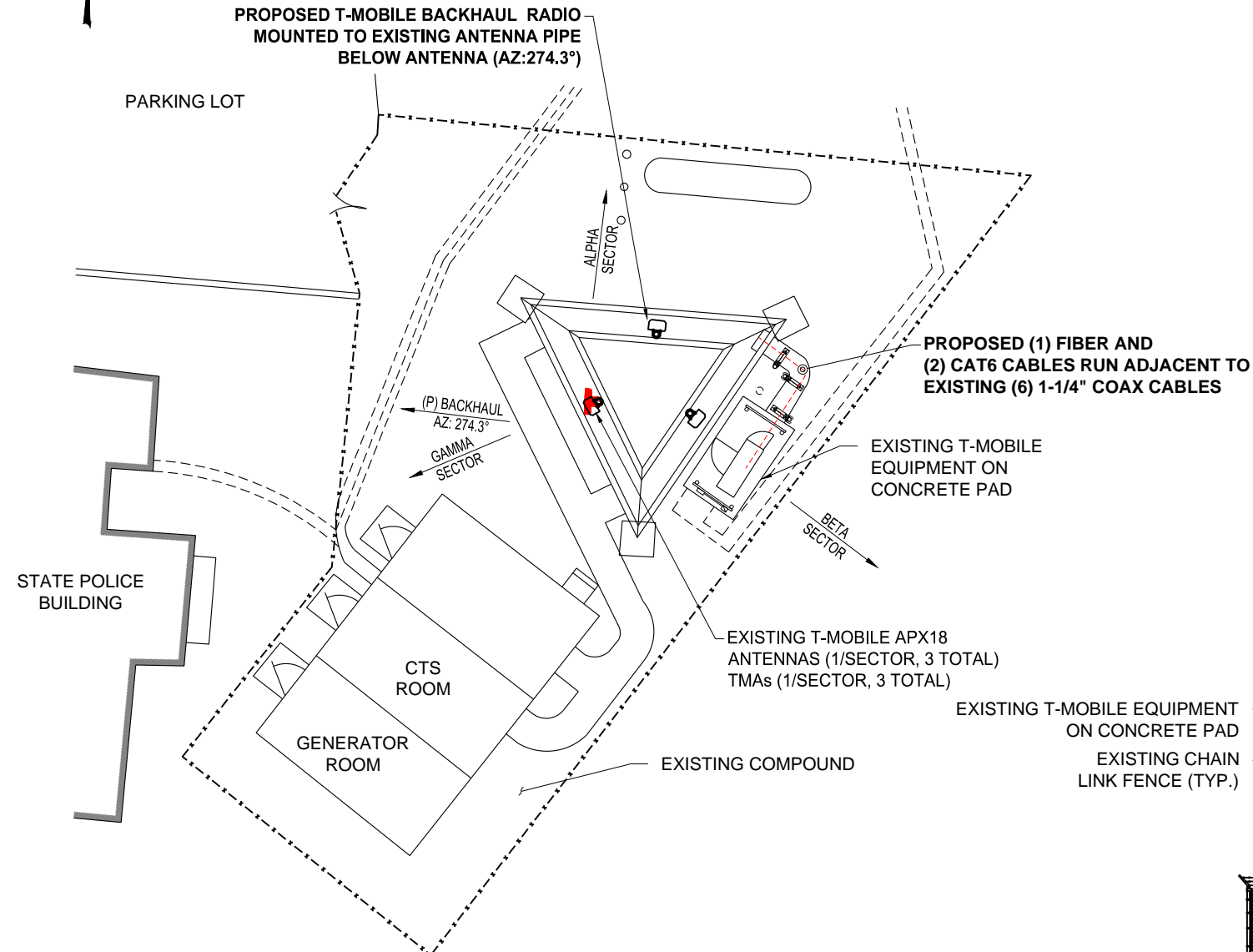
APPLICANT: T-MOBILE NORTHEAST, LLC.
 35 GRIFFIN ROAD SOUTH
 BLOOMFIELD, CT 06002
 860-692-7100
 OWNER : STATE OF CONNECTICUT
 CO-OWNER: STATE POLICE - BARRACKS
 15 OLD HARTFORD ROAD
 COLCHESTER, CT 06415
 PROJECT MANAGER: NORTHEAST SITE SOLUTIONS
 420 MAIN STREET, BLDG 4
 STURBRIDGE, MA 01566
 SHELDON FREINCLE
 SHELDON@NORTHEASTSITESOLUTIONS.COM
 201-776-8521
 CONSULTANTS: FORESITE LLC
 462 WALNUT ST
 NEWTON, MA 02460
 SAEED MOSSAVAT
 SMOSSAVAT@FORESITELLC.COM
 617-212-3123

SHEET INDEX:

T-1: TITLE SHEET
 LE-1: PLANS AND ELEVATIONS
 LE-2: DETAILS

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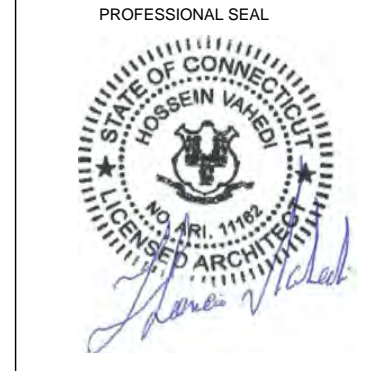
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APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
 35 GRIFFIN ROAD SOUTH
 BLOOMFIELD, CT 06002
 860-692-7100

PROJECT MANAGER
NSS NORTHEAST
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 420 MAIN STREET, BLDG 4
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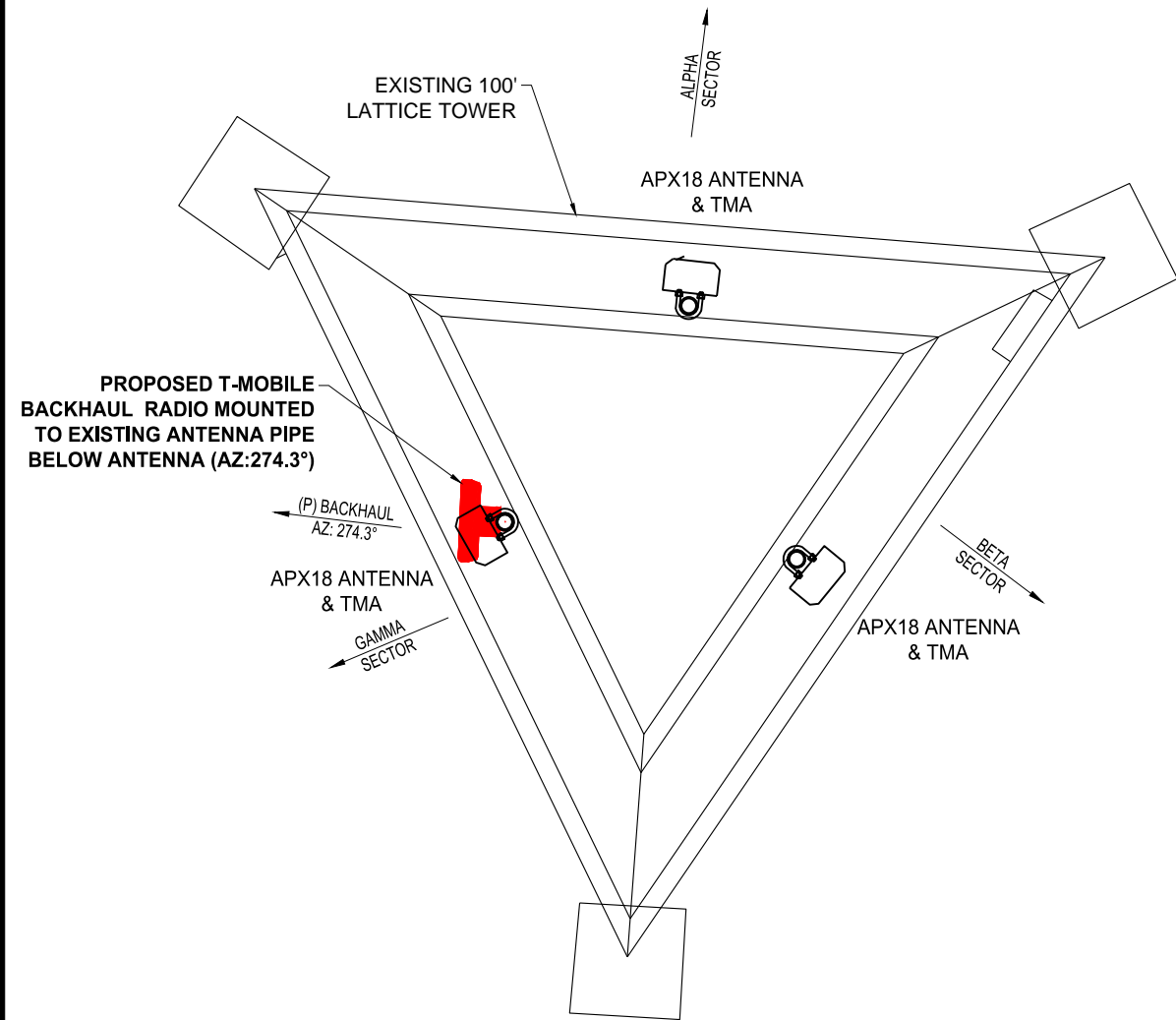
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REV	DESCRIPTION	DATE
A	PRELIMINARY	04/03/18
B	AZIMUTH REVISED	04/04/18

SITE NUMBER: CT11249A
 ADDRESS: 15 OLD HARTFORD ROAD
 COLCHESTER, CT 06415

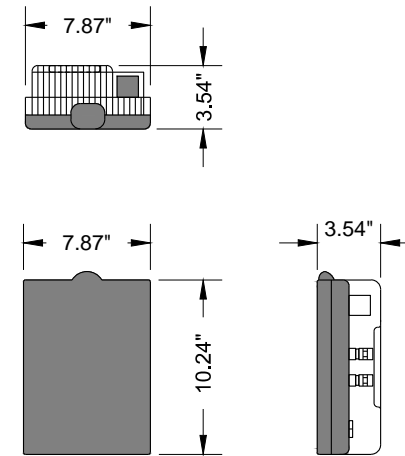
SHEET TITLE:
 LE-1: PLAN AND ELEVATION

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ANTENNA PLAN
N.T.S

1
LE-2

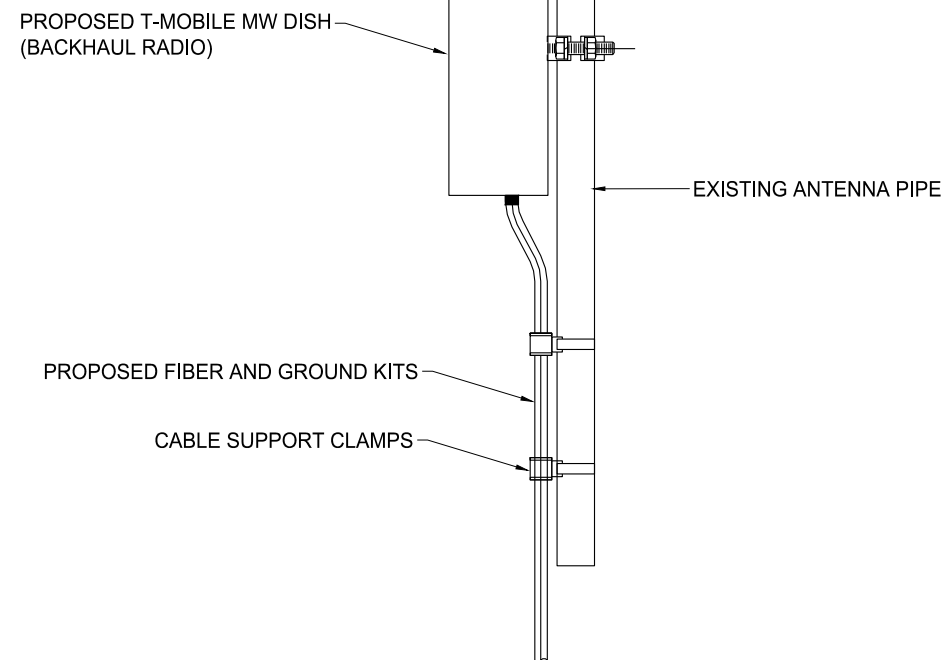


MANUFACTURER: FASTBACK
MODEL: IBR 1300
FOOTPRINT: 10.24"HX7.87"WX3.54"D
WEIGHT: 8.82 LBS

BACKHAUL RADIO SPECIFICATIONS

N.T.S

2
LE-2



BACKHAUL RADIO MOUNTING DETAIL

N.T.S

3
LE-2

APPLICANT:

T-Mobile
T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100



PROJECT MANAGER

NSS NORTHEAST
SITE SOLUTIONS
Turnkey Wireless Development

420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:

FORESITE LLC

Architects . Engineers . Surveyors

462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL



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REV	DESCRIPTION	DATE
A	PRELIMINARY	04/03/18
B	AZIMUTH REVISED	04/04/18

SITE NUMBER: CT11249A
ADDRESS: 15 OLD HARTFORD ROAD
COLCHESTER, CT 06415

SHEET TITLE:
LE-2: ANTENNA PLAN AND DETAILS

Exhibit C

**STRUCTURAL ANALYSIS REPORT
SELF-SUPPORT TOWER**



Prepared For:



**T-Mobile Northeast, LLC
35 Griffin Road South
Bloomfield, CT 06002**



Structure Rating

Self-support tower: Pass (69.1%)

Sincerely,
Destek Engineering, LLC
License No: PEC0001429



Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057

**Site ID: CT11249A
Site Name: Colchester-2-State PD_1
15 Old Hartford Rd
Colchester, CT 06415**

CONTENTS

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1.1 – STRUCTURE

2.0 – EXISTING AND PROPOSED APPURTENANCES

3.0 - CODES AND LOADING

4.0 - STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING
STRUCTURES

5.0 - ANALYSIS AND ASSUMPTIONS

6.0 – RESULTS AND CONCLUSION

APPENDIX

A –CALCULATIONS

1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the wireless telecommunication installation on the existing self-support tower located at 15 Old Hartford Road, Colchester, CT 06415 for additions and alterations proposed by T-Mobile.

The structural analysis is based on the following documentation provided to Destek Engineering, LLC (Destek):

- Existing and proposed equipment information (E-mail) provided by Foresite ,LLC ., dated 04/04/2018.
- Structural Analysis Report prepared by Techstar Communications, Inc, dated 10/06/1998.
- Tower Inspection report by Northeast Towers ,Inc., dated 06/15/1998.

1.1 STRUCTURE

The structure is a triangular based, 100 feet high self-support tower. It is formed by five 20 feet sections. HSS Legs are X-braced with angle members from the ground level to the tower top. The tower is 23.9 feet wide at the base and 15 feet wide at the top. Please refer to the software output in Appendix A, for tower geometry, member sizes and other details.

2.0 EXISTING AND PROPOSED APPURTENANCES

Existing Configuration of T-Mobile Appurtenances:

RAD CENTER (FT)	ANTENNA & TMA	COAX	MOUNT
95	(3) APX18 (3) d B2 TMA	(6) 1-1/4	(3) Pipe Mounts

Proposed and Final Configuration of T-Mobile Appurtenances:

RAD CENTER (FT)	ANTENNA & TMA	COAX*	MOUNT
95	(3) APX18 (3) d B2 TMA (1) Backhaul Radio	(6) 1-1/4 (1) Fiber (2) Cat6	(3) Pipe Mounts

Existing and Reserved Appurtenances by Others:

CARRIER	RAD CENTER (FT)	ANTENNA & TMA	COAX	MOUNT
Unknown	100	(4) 22' Whip (1) 14' Whip (2) 10' Whip (1) 12' Whip	(3) 7/8" (4) 1/2"	(8) Pipe Mounts
Unknown	99	(4) 2' Corner Reflector	(4) 7/8"	-
Unknown	95	(1) 2' Dish with Radome	(1) 2" EW-63	-
Unknown	94	(1) 6' Grid Dish	(1) 7/8"	(1) Pipe Mount
Unknown	86	(1) 9' Dipole	(1) 7/8"	(1) Standoff Mount
Unknown	85	(1) 12' Two Dipole Array	(1) 1/2"	(1) Standoff Mount
Unknown	83	(1) 8' Whip	(1) 1/2"	-
Unknown	70	(1) 12' Dipole	(1) 7/8"	-
Unknown	60	(1) 12' Whip (1) 22' Four Dipole Array	(1) 7/8" (1) 1/2"	(2) Standoff Mounts
Unknown	58	(1) 20' Whip	(1) 1/2"	-

3.0 **CODES AND LOADING**

The self-support tower was analyzed per *TIA/EIA-222-G* as referenced by the *2016 Connecticut State Building Code* with all of the adopted Addendums and Supplements. The following wind loading was used in compliance with the standard for Colchester, CT:

- Basic wind speed 108 mph without ice (W_0 , Equivalent to 101mph including $I_w=1.15$)
- Basic wind speed 50 mph with 0.75" escalating ice (W_i)
- Exposure Category C
- Topographic Category 1
- Structure Class III

The following load combinations were used with wind blowing at 0°, 30°, 45°, 60°, and 90° measured from a line normal to the face of the self-support tower.

- $1.2 D + 1.6 W_0$
- $0.9 D + 1.6 W_0$
- $1.2 D + 1.0 D_i + 1.0 W_i$

D: Dead Load of structure and appurtenances

W_0 : Wind Load, without ice

W_i : Wind Load, with ice

D_i : Weight of Ice

4.0 **STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES**

The analysis is based on the information provided to Destek 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. Destek will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance.

The analysis 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 Destek to generate an additional structural analysis.

5.0 ANALYSIS AND ASSUMPTIONS

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

Steel grade for tower legs, diagonals and bolts is assumed as A500-42, A36 and A325 respectively.

Anchor bolt information was not available. These bolts are assumed to be of adequate strength to support the maximum loading of the attached leg sections.

6.0 RESULTS AND CONCLUSION

Based on analysis, per TIA-222-G, the existing self-support tower **has adequate** structural capacity for the proposed changes by T-Mobile. As a maximum, the self-support tower diagonals are stressed to **69.1%** of their capacity. The tower legs are stressed to **28.5%** of their capacity.

Information regarding the tower base foundation was not available at the time of this analysis, thus a qualification of the foundations could not be completed.

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 about this report, please contact us at (770) 693-0835.

APPENDIX A
CALCULATIONS

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) 6'-P2x0.154	100	d B2 TMA	95
(2) 6'-P2x0.154	100	d B2 TMA	95
(2) 6'-P2x0.154	100	(2) 20'-P3x0.216 H	95
6'-P2x0.154	100	(2) 20'-P3x0.216 H	95
6'-P2x0.154	100	2' Dish	95
22' Whip 3" Dia. w/3"D x 36"L pipe	100	(2) 20'-P3x0.216 H	95
14' Whip 3" Dia w/3"D x 36"L pipe	100	APX18-209015-CT2 w/ Mount Pipe	95
10'x2.5"dia Whip	100	6'-P2x0.154	94
22' Whip 3" Dia. w/3"D x 36"L pipe	100	6' Grid Dish	94
22' Whip 3" Dia. w/3"D x 36"L pipe	100	4 FT DISH	90
22' Whip 3" Dia. w/3"D x 36"L pipe	100	9' Dipole AF	86
12' Whip 3" Dia w/3"D x 36"L pipe	100	12' Dipole IK	85
10'x2.5"dia Whip	100	8'x2.5" Whip -Ak	83
Reflector Dish	99	Side Arm Mount [SO 311-1]	80
Reflector Dish	99	Side Arm Mount [SO 311-1]	80
Reflector Dish	99	12' Dipole IK	70
Reflector Dish	99	Side Arm Mount [SO 311-1]	60
APX18-209015-CT2 w/ Mount Pipe	95	Side Arm Mount [SO 311-1]	60
APX18-209015-CT2 w/ Mount Pipe	95	12' Whip 3"Dia w/3"D x 36"L pipe	60
IBR 1300 Series	95	22' 4-Bay Dipole	60
d B2 TMA	95	20'x3.5" Whip	58

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-42	42 ksi	58 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

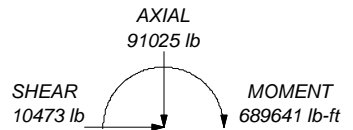
1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class III.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 69.1%

ALL REACTIONS
ARE FACTORED

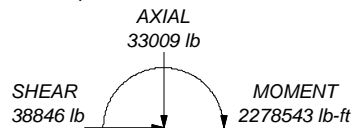
MAX. CORNER REACTIONS AT BASE:

DOWN: 121074 lb
SHEAR: 22319 lb

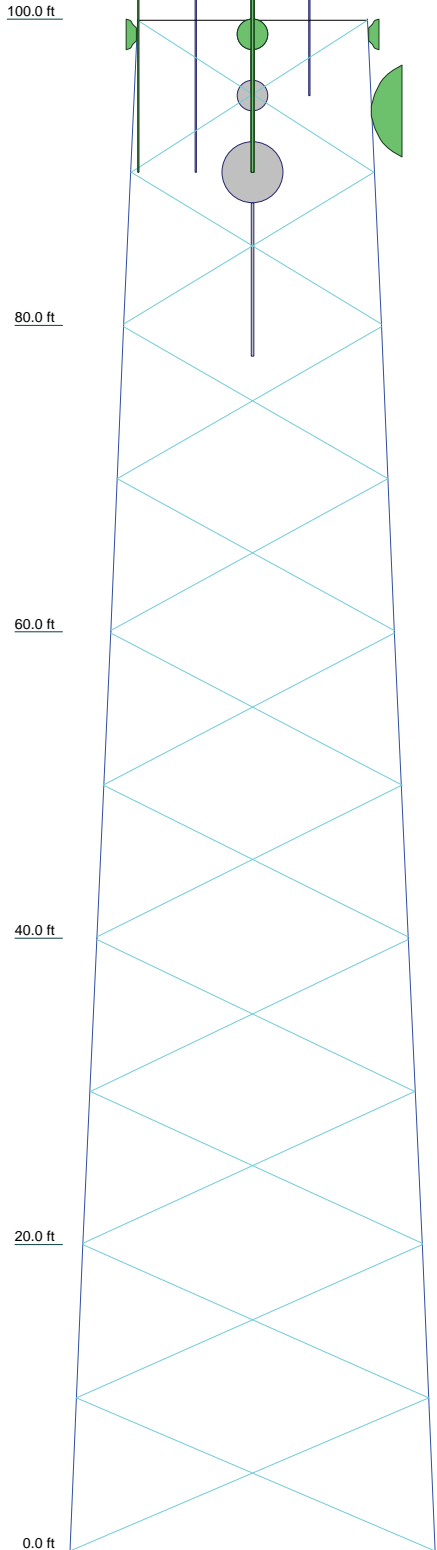
UPLIFT: -95197 lb
SHEAR: 18881 lb



TORQUE 5368 lb-ft
50 mph WIND - 0.7500 in ICE



TORQUE 12217 lb-ft
REACTIONS - 101 mph WIND



Section	T1	T2	T3	T4	T5
Legs		PE.625x0.3125			P10x.375
Leg Grade			A500-42		
Diagonals			L4x4x1/4	L4x4x5/16	L5x5x5/16
Diagonal Grade			A36		
Top Chords				N.A.	
Face Width (ft)	15	16.78	18.56	20.34	22.12
# Panels @ (ft)			8 @ 9.91667		2 @ 10
Weight (lb)	3381.1	3200.2	3567.9	4846.4	5693.7

	Destek Engineering, LLC		Job: CT11249A
	1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: (770) 693-0835 FAX:		Project: 1875009
	Client: T-Mobile	Drawn by: Ahmet Colakoglu	App'd:
	Code: TIA-222-G	Date: 04/13/18	Scale: NTS
	Path: Z:\Projects\2018\75 - ForeSite LLC\1875009 - CT11249A\Invt\CT11249A.en		Dwg No. E-1

<i>tnxTower</i> <i>Destek Engineering, LLC</i> <i>1281 Kennestone Circle, Suite 100</i> <i>Marietta, GA 30066</i> <i>Phone: (770) 693-0835</i> <i>FAX:</i>	Job CT11249A	Page 1 of 21
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Tower Input Data

The main tower is a 3x free standing tower with an overall height of 100.00 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 15.00 ft at the top and 23.90 ft at the base.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in New London County, Connecticut.

Basic wind speed of 101 mph.

Structure Class III.

Exposure Category C.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

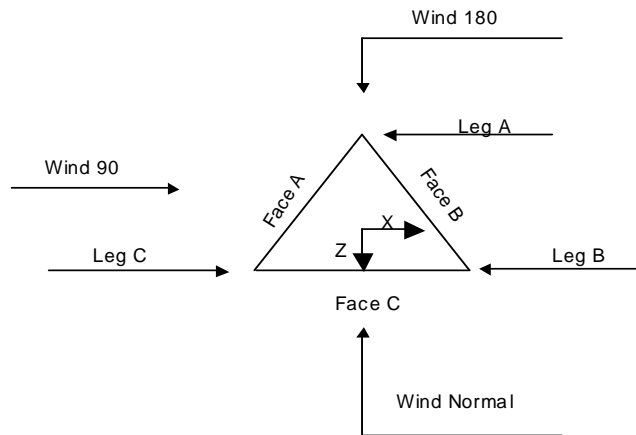
Stress ratio used in tower member design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|--|--|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile √ Include Bolts In Member Capacity √ Leg Bolts Are At Top Of Section √ Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) √ SR Members Have Cut Ends SR Members Are Concentric | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area √ Use Clear Spans For KL/r √ Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. √ Autocalc Torque Arm Areas Add IBC .6D+W Combination √ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder | <ul style="list-style-type: none"> Use ASCE 10 X-Brace Ly Rules √ Calculate Redundant Bracing Forces Ignore Redundant Members in FEA √ SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption <li style="background-color: #e0e0e0;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|--|

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Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	100.00-80.00			15.00	1	20.00
T2	80.00-60.00			16.78	1	20.00
T3	60.00-40.00			18.56	1	20.00
T4	40.00-20.00			20.34	1	20.00
T5	20.00-0.00			22.12	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	100.00-80.00	9.92	X Brace	No	No	1.0000	1.0000
T2	80.00-60.00	9.92	X Brace	No	No	1.0000	1.0000
T3	60.00-40.00	9.92	X Brace	No	No	1.0000	1.0000
T4	40.00-20.00	9.92	X Brace	No	No	1.0000	1.0000
T5	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry (cont'd)

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Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors ¹								
			Legs	X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace	
			X Y	X Y	X Y	X Y	X Y	X Y	X Y	X Y	
T2 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T3 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T4 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1	1
T5 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1

¹Note: 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 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 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
T5 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 Bolt Size in	Leg No.	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.
T1 100.00-80.00	Flange	1.2500	0	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T2 80.00-60.00	Flange	1.2500	6	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T3 60.00-40.00	Flange	1.2500	6	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T4 40.00-20.00	Flange	1.2500	6	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
T5 20.00-0.00	Flange	1.2500	6	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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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
LDF5-50A(7/8")	C	No	Ar (CaAa)	60.00 - 6.00	0.0000	-0.35	13	13	1.0000 1.0900	1.0900		0.33
LDF5-50A(7/8")	C	No	Ar (CaAa)	70.00 - 60.00	0.0000	-0.35	12	12	1.0000 1.0900	1.0900		0.33
LDF5-50A(7/8")	C	No	Ar (CaAa)	86.00 - 70.00	0.0000	-0.35	11	11	1.0000 1.0900	1.0900		0.33
LDF5-50A(7/8")	C	No	Ar (CaAa)	90.00 - 86.00	0.0000	-0.35	10	10	1.0000 1.0900	1.0900		0.33
LDF5-50A(7/8")	C	No	Ar (CaAa)	94.00 - 90.00	0.0000	-0.35	9	9	1.0000 1.0900	1.0900		0.33
LDF5-50A(7/8")	C	No	Ar (CaAa)	99.00 - 94.00	0.0000	-0.35	8	8	1.0000 1.0900	1.0900		0.33
LDF5-50A(7/8")	C	No	Ar (CaAa)	100.00 - 99.00	0.0000	-0.35	4	4	1.0000 1.0900	1.0900		0.33
LDF4-50A(1/2)	C	No	Ar (CaAa)	58.00 - 6.00	0.0000	0.35	8	8	1.0000 0.6250	0.6250		0.15
LDF4-50A(1/2)	C	No	Ar (CaAa)	60.00 - 58.00	0.0000	0.35	7	7	1.0000 0.6250	0.6250		0.15
LDF4-50A(1/2)	C	No	Ar (CaAa)	83.00 - 60.00	0.0000	0.35	6	6	1.0000 0.6250	0.6250		0.15
LDF4-50A(1/2)	C	No	Ar (CaAa)	85.00 - 83.00	0.0000	0.35	5	5	1.0000 0.6250	0.6250		0.15
LDF4-50A(1/2)	C	No	Ar (CaAa)	100.00 - 85.00	0.0000	0.35	4	4	1.0000 0.6250	0.6250		0.15
EW63	C	No	Ar (CaAa)	95.00 - 6.00	0.0000	0.35	1	1	1.0000 1.5742	1.5742		0.51
LDF6-50A(1-1/4")	A	No	Ar (CaAa)	95.00 - 6.00	0.0000	0	6	6	1.0000 1.5500	1.5500		0.66
Feedline Ladder (Rail)	A	No	Af (CaAa)	100.00 - 6.00	0.0000	0	2	2	24.0000 0.2500	1.2500		3.00
Feedline Ladder (horiz)	A	No	Af (CaAa)	100.00 - 6.00	0.0000	0	1	1	0.0000	1.0000		3.40
Feedline Ladder (Rail)	C	No	Af (CaAa)	100.00 - 6.00	0.0000	-0.35	2	2	24.0000 0.2500	1.2500		3.00
Feedline Ladder (horiz)	C	No	Af (CaAa)	100.00 - 6.00	0.0000	-0.35	1	1	0.0000	1.0000		3.40
Feedline Ladder (Rail)	C	No	Af (CaAa)	100.00 - 6.00	0.0000	0.35	2	2	24.0000 0.2500	1.2500		3.00
Feedline Ladder (horiz)	C	No	Af (CaAa)	100.00 - 6.00	0.0000	0.35	1	1	0.0000	1.0000		3.40

CAT6(1/4) fiber	A	No	Ar (CaAa)	95.00 - 6.00	0.0000	0	2	2	0.2500	0.2400		0.05
	A	No	Ar (CaAa)	95.00 - 6.00	0.0000	0	1	1	1.0000 1.9800	1.9800		0.82

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight lb
T1	100.00-80.00	A	0.000	0.000	29.307	0.000	261.20
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	51.356	0.000	458.23
T2	80.00-60.00	A	0.000	0.000	35.187	0.000	285.60
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	59.052	0.000	480.10

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Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight lb
T3	60.00-40.00	A	0.000	0.000	35.187	0.000	285.60
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	64.697	0.000	495.70
T4	40.00-20.00	A	0.000	0.000	35.187	0.000	285.60
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	64.822	0.000	496.00
T5	20.00-0.00	A	0.000	0.000	24.631	0.000	199.92
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	45.375	0.000	347.20

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} In Face ft ²	C_{AA} Out Face ft ²	Weight lb
T1	100.00-80.00	A	2.073	0.000	0.000	94.223	0.000	1602.55
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	168.057	0.000	2898.80
T2	80.00-60.00	A	2.021	0.000	0.000	111.943	0.000	1826.01
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	186.028	0.000	3139.93
T3	60.00-40.00	A	1.955	0.000	0.000	109.984	0.000	1756.59
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	198.406	0.000	3254.75
T4	40.00-20.00	A	1.857	0.000	0.000	107.134	0.000	1658.14
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	194.911	0.000	3085.86
T5	20.00-0.00	A	1.664	0.000	0.000	71.040	0.000	1030.25
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	131.050	0.000	1927.18

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
T1	100.00-80.00	-1.8326	2.6548	-2.6170	4.3441
T2	80.00-60.00	-2.3638	2.9568	-3.0589	4.7479
T3	60.00-40.00	-2.3299	3.5437	-3.1607	5.5039
T4	40.00-20.00	-2.4439	3.7117	-3.3477	5.8852
T5	20.00-0.00	-2.0557	3.1245	-2.9948	5.4017

Shielding Factor K_a

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	3	LDF5-50A(7/8")	80.00 - 86.00	0.6000	0.6000
T1	4	LDF5-50A(7/8")	86.00 - 90.00	0.6000	0.6000

tnxTower

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	5	LDF5-50A(7/8")	90.00 - 94.00	0.6000	0.6000
T1	6	LDF5-50A(7/8")	94.00 - 99.00	0.6000	0.6000
T1	7	LDF5-50A(7/8")	99.00 - 100.00	0.6000	0.6000
T1	10	LDF4-50A(1/2)	80.00 - 83.00	0.6000	0.6000
T1	11	LDF4-50A(1/2)	83.00 - 85.00	0.6000	0.6000
T1	12	LDF4-50A(1/2)	85.00 - 100.00	0.6000	0.6000
T1	13	EW63	80.00 - 95.00	0.6000	0.6000
T1	14	LDF6-50A(1-1/4")	80.00 - 95.00	1.0000	1.0000
T1	15	Feedline Ladder (Rail)	80.00 - 100.00	0.6000	0.6000
T1	16	Feedline Ladder (horiz)	80.00 - 100.00	0.6000	0.6000
T1	17	Feedline Ladder (Rail)	80.00 - 100.00	0.6000	0.6000
T1	18	Feedline Ladder (horiz)	80.00 - 100.00	0.6000	0.6000
T1	19	Feedline Ladder (Rail)	80.00 - 100.00	0.6000	0.6000
T1	20	Feedline Ladder (horiz)	80.00 - 100.00	0.6000	0.6000
T1	22	CAT6(1/4)	80.00 - 95.00	1.0000	1.0000
T1	23	fiber	80.00 - 95.00	1.0000	1.0000
T2	2	LDF5-50A(7/8")	60.00 - 70.00	0.6000	0.6000
T2	3	LDF5-50A(7/8")	70.00 - 80.00	0.6000	0.6000
T2	10	LDF4-50A(1/2)	60.00 - 80.00	0.6000	0.6000
T2	13	EW63	60.00 - 80.00	0.6000	0.6000
T2	14	LDF6-50A(1-1/4")	60.00 - 80.00	1.0000	1.0000
T2	15	Feedline Ladder (Rail)	60.00 - 80.00	0.6000	0.6000
T2	16	Feedline Ladder (horiz)	60.00 - 80.00	0.6000	0.6000
T2	17	Feedline Ladder (Rail)	60.00 - 80.00	0.6000	0.6000
T2	18	Feedline Ladder (horiz)	60.00 - 80.00	0.6000	0.6000
T2	19	Feedline Ladder (Rail)	60.00 - 80.00	0.6000	0.6000
T2	20	Feedline Ladder (horiz)	60.00 - 80.00	0.6000	0.6000
T2	22	CAT6(1/4)	60.00 - 80.00	1.0000	1.0000
T2	23	fiber	60.00 - 80.00	1.0000	1.0000
T3	1	LDF5-50A(7/8")	40.00 - 60.00	0.6000	0.6000
T3	8	LDF4-50A(1/2)	40.00 - 58.00	0.6000	0.6000
T3	9	LDF4-50A(1/2)	58.00 - 60.00	0.6000	0.6000
T3	13	EW63	40.00 - 60.00	0.6000	0.6000
T3	14	LDF6-50A(1-1/4")	40.00 - 60.00	1.0000	1.0000
T3	15	Feedline Ladder (Rail)	40.00 - 60.00	0.6000	0.6000
T3	16	Feedline Ladder (horiz)	40.00 - 60.00	0.6000	0.6000
T3	17	Feedline Ladder (Rail)	40.00 - 60.00	0.6000	0.6000
T3	18	Feedline Ladder (horiz)	40.00 - 60.00	0.6000	0.6000
T3	19	Feedline Ladder (Rail)	40.00 - 60.00	0.6000	0.6000
T3	20	Feedline Ladder (horiz)	40.00 - 60.00	0.6000	0.6000
T3	22	CAT6(1/4)	40.00 - 60.00	1.0000	1.0000
T3	23	fiber	40.00 - 60.00	1.0000	1.0000
T4	1	LDF5-50A(7/8")	20.00 - 40.00	0.6000	0.6000
T4	8	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T4	13	EW63	20.00 - 40.00	0.6000	0.6000
T4	14	LDF6-50A(1-1/4")	20.00 - 40.00	1.0000	1.0000
T4	15	Feedline Ladder (Rail)	20.00 - 40.00	0.6000	0.6000
T4	16	Feedline Ladder (horiz)	20.00 - 40.00	0.6000	0.6000
T4	17	Feedline Ladder (Rail)	20.00 - 40.00	0.6000	0.6000
T4	18	Feedline Ladder (horiz)	20.00 - 40.00	0.6000	0.6000
T4	19	Feedline Ladder (Rail)	20.00 - 40.00	0.6000	0.6000
T4	20	Feedline Ladder (horiz)	20.00 - 40.00	0.6000	0.6000
T4	22	CAT6(1/4)	20.00 - 40.00	1.0000	1.0000
T4	23	fiber	20.00 - 40.00	1.0000	1.0000
T5	1	LDF5-50A(7/8")	6.00 - 20.00	0.6000	0.6000
T5	8	LDF4-50A(1/2)	6.00 - 20.00	0.6000	0.6000
T5	13	EW63	6.00 - 20.00	0.6000	0.6000
T5	14	LDF6-50A(1-1/4")	6.00 - 20.00	1.0000	1.0000
T5	15	Feedline Ladder (Rail)	6.00 - 20.00	0.6000	0.6000
T5	16	Feedline Ladder (horiz)	6.00 - 20.00	0.6000	0.6000
T5	17	Feedline Ladder (Rail)	6.00 - 20.00	0.6000	0.6000
T5	18	Feedline Ladder (horiz)	6.00 - 20.00	0.6000	0.6000

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	Client	T-Mobile	Designed by	Ahmet Colakoglu

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T5	19	Feedline Ladder (Rail)	6.00 - 20.00	0.6000	0.6000
T5	20	Feedline Ladder (horiz)	6.00 - 20.00	0.6000	0.6000
T5	22	CAT6(1/4)	6.00 - 20.00	1.0000	1.0000
T5	23	fiber	6.00 - 20.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment °	Placement ft	C _{AA} Front	C _{AA} Side	Weight lb
			ft ft ft			ft ²	ft ²	

(2) 6'-P2x0.154	C	From Face	0.00 2.50 0.00	0.0000	100.00	No Ice 1.43 1/2" Ice 1.92 1" Ice 2.29	1.43 1.92 2.29	21.96 32.79 47.67
(2) 6'-P2x0.154	C	None		0.0000	100.00	No Ice 1.43 1/2" Ice 1.92 1" Ice 2.29	1.43 1.92 2.29	21.96 32.79 47.67
(2) 6'-P2x0.154	B	From Face	0.00 2.50 0.00	0.0000	100.00	No Ice 1.43 1/2" Ice 1.92 1" Ice 2.29	1.43 1.92 2.29	21.96 32.79 47.67
6'-P2x0.154	A	From Face	0.00 2.50 0.00	0.0000	100.00	No Ice 1.43 1/2" Ice 1.92 1" Ice 2.29	1.43 1.92 2.29	21.96 32.79 47.67
6'-P2x0.154	A	None		0.0000	100.00	No Ice 1.43 1/2" Ice 1.92 1" Ice 2.29	1.43 1.92 2.29	21.96 32.79 47.67
22' Whip 3" Dia. w/3"D x 36"L pipe	C	None		0.0000	100.00	No Ice 7.32 1/2" Ice 9.79 1" Ice 12.24	7.32 9.79 12.24	160.74 219.74 294.59
14' Whip 3" Dia w/3"D x 36"L pipe	A	None		0.0000	100.00	No Ice 4.92 1/2" Ice 6.59 1" Ice 8.24	4.92 6.59 8.24	110.74 152.64 205.49
10'x2.5"dia Whip	C	From Face	0.00 0.00 0.00	0.0000	100.00	No Ice 2.50 1/2" Ice 3.53 1" Ice 4.58	2.50 3.53 4.58	30.00 48.64 73.79
22' Whip 3" Dia. w/3"D x 36"L pipe	C	None		0.0000	100.00	No Ice 7.32 1/2" Ice 9.79 1" Ice 12.24	7.32 9.79 12.24	160.74 219.74 294.59
22' Whip 3" Dia. w/3"D x 36"L pipe	C	From Face	0.00 0.00 0.00	0.0000	100.00	No Ice 7.32 1/2" Ice 9.79 1" Ice 12.24	7.32 9.79 12.24	160.74 219.74 294.59
22' Whip 3" Dia. w/3"D x 36"L pipe	C	From Leg	0.00 0.00 0.00	0.0000	100.00	No Ice 7.32 1/2" Ice 9.79 1" Ice 12.24	7.32 9.79 12.24	160.74 219.74 294.59
12' Whip 3"Dia w/3"D x 36"L pipe	A	From Face	0.00 0.00 0.00	0.0000	100.00	No Ice 4.62 1/2" Ice 6.19 1" Ice 7.74	4.62 6.19 7.74	97.74 137.50 187.61
10'x2.5"dia Whip	B	From Face	0.00 0.00 0.00	0.0000	100.00	No Ice 2.50 1/2" Ice 3.53 1" Ice 4.58	2.50 3.53 4.58	30.00 48.64 73.79

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft ²	ft ²	lb

(2) 20'-P3x0.216 H	A	From Face	0.00	0.0000	95.00	No Ice	7.00	0.03	151.60
			0.00			1/2" Ice	9.04	0.17	200.98
			0.00			1" Ice	11.09	0.32	263.10
(2) 20'-P3x0.216 H	B	From Face	0.00	0.0000	95.00	No Ice	7.00	0.03	151.60
			0.00			1/2" Ice	9.04	0.17	200.98
			0.00			1" Ice	11.09	0.32	263.10
(2) 20'-P3x0.216 H	C	From Face	0.00	0.0000	95.00	No Ice	7.00	0.03	151.60
			0.00			1/2" Ice	9.04	0.17	200.98
			0.00			1" Ice	11.09	0.32	263.10
APX18-209015-CT2 w/ Mount Pipe	A	From Face	0.00	0.0000	95.00	No Ice	5.46	4.75	46.02
			3.00			1/2" Ice	6.02	5.92	91.48
			0.00			1" Ice	6.55	6.81	144.38
APX18-209015-CT2 w/ Mount Pipe	B	From Face	0.00	0.0000	95.00	No Ice	5.46	4.75	46.02
			3.00			1/2" Ice	6.02	5.92	91.48
			0.00			1" Ice	6.55	6.81	144.38
APX18-209015-CT2 w/ Mount Pipe	C	From Face	0.00	0.0000	95.00	No Ice	5.46	4.75	46.02
			0.00			1/2" Ice	6.02	5.92	91.48
			0.00			1" Ice	6.55	6.81	144.38
IBR 1300 Series	C	From Face	0.00	0.0000	95.00	No Ice	0.67	0.23	8.81
			3.00			1/2" Ice	0.78	0.30	14.23
			0.00			1" Ice	0.89	0.37	21.25
d B2 TMA	A	From Face	0.00	0.0000	95.00	No Ice	0.89	0.60	24.90
			3.00			1/2" Ice	1.07	0.81	36.67
			0.00			1" Ice	1.25	1.02	51.41
d B2 TMA	B	From Face	0.00	0.0000	95.00	No Ice	0.89	0.60	24.90
			3.00			1/2" Ice	1.07	0.81	36.67
			0.00			1" Ice	1.25	1.02	51.41
d B2 TMA	C	From Face	0.00	0.0000	95.00	No Ice	0.89	0.60	24.90
			3.00			1/2" Ice	1.07	0.81	36.67
			0.00			1" Ice	1.25	1.02	51.41

6'-P2x0.154	B	None		0.0000	94.00	No Ice	1.43	1.43	21.96
						1/2" Ice	1.92	1.92	32.79
						1" Ice	2.29	2.29	47.67

9' Dipole AF	B	From Leg	3.00	0.0000	86.00	No Ice	2.00	2.00	20.00
			0.00			1/2" Ice	3.02	3.02	35.50
			0.00			1" Ice	4.07	4.07	57.47

12' Dipole IK	C	From Leg	3.00	0.0000	85.00	No Ice	2.40	2.40	25.00
			0.00			1/2" Ice	3.63	3.63	43.56
			0.00			1" Ice	4.87	4.87	69.80

8'x2.5" Whip -Ak	A	From Leg	0.00	0.0000	83.00	No Ice	2.00	2.00	30.00
			0.00			1/2" Ice	2.82	2.82	45.00
			0.00			1" Ice	3.64	3.64	60.00
**									
Side Arm Mount [SO 311-1]	B	None		0.0000	80.00	No Ice	2.97	3.51	62.00
						1/2" Ice	4.39	5.33	94.35
						1" Ice	5.81	7.15	126.70
Side Arm Mount [SO 311-1]	A	None		0.0000	80.00	No Ice	2.97	3.51	62.00
						1/2" Ice	4.39	5.33	94.35
						1" Ice	5.81	7.15	126.70

12' Dipole IK	C	From Leg	3.00	0.0000	70.00	No Ice	2.40	2.40	25.00
			0.00			1/2" Ice	3.63	3.63	43.56

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
***			0.00			1" Ice 4.87	4.87	69.80
Side Arm Mount [SO 311-1]	C	None		0.0000	60.00	No Ice 2.97 1/2" Ice 4.39 1" Ice 5.81	3.51 5.33 7.15	62.00 94.35 126.70
Side Arm Mount [SO 311-1]	B	None		0.0000	60.00	No Ice 2.97 1/2" Ice 4.39 1" Ice 5.81	3.51 5.33 7.15	62.00 94.35 126.70
12' Whip 3"Dia w/3"D x 36"L pipe	A	None		0.0000	60.00	No Ice 4.64 1/2" Ice 6.19 1" Ice 7.74	4.64 6.19 7.74	97.74 137.50 187.61
22' 4-Bay Dipole	B	From Leg	3.00 0.00 0.00	0.0000	60.00	No Ice 4.00 1/2" Ice 6.00 1" Ice 8.00	4.00 6.00 8.00	55.00 100.00 145.00

20'x3.5" Whip	A	None		0.0000	58.00	No Ice 4.20 1/2" Ice 6.33 1" Ice 8.47	4.20 6.33 8.47	75.00 107.30 152.78

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight lb
Reflector Dish	C	Passive Reflector	From Face	0.00 0.00 0.00	0.0000		99.00	2.00	No Ice 3.14 1/2" Ice 3.41 1" Ice 3.68	10.00 30.00 50.00
Reflector Dish	A	Passive Reflector	From Leg	0.00 0.00 0.00	0.0000		99.00	2.00	No Ice 3.14 1/2" Ice 3.41 1" Ice 3.68	10.00 30.00 50.00
6' Grid Dish	B	Grid	From Leg	0.00 0.00 0.00	0.0000		94.00	6.00	No Ice 28.27 1/2" Ice 29.07 1" Ice 29.86	148.00 149.20 198.40
4 FT DISH	A	Paraboloid w/Radome	From Leg	0.00 0.00 0.00	0.0000		90.00	4.00	No Ice 12.56 1/2" Ice 13.09 1" Ice 13.62	170.00 237.19 304.38
2' Dish	A	Paraboloid w/Radome	From Leg	0.00 0.00 0.00	0.0000		95.00	2.00	No Ice 3.14 1/2" Ice 3.41 1" Ice 3.68	30.00 47.50 65.00
Reflector Dish	B	Passive Reflector	From Leg	0.00 0.00 0.00	0.0000		99.00	2.00	No Ice 3.14 1/2" Ice 3.41 1" Ice 3.68	10.00 30.00 50.00
Reflector Dish	C	Passive Reflector	From Leg	0.00 0.00 0.00	0.0000		99.00	2.00	No Ice 3.14 1/2" Ice 3.41 1" Ice 3.68	10.00 30.00 50.00

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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	10123.46					
Bracing Weight	10584.78					
Total Member Self-Weight	20708.24			9845.08	4682.72	
Total Weight	27507.38			9845.08	4682.72	
Wind 0 deg - No Ice		-47.78	-24171.31	-1402797.88	9173.82	-2330.88
Wind 30 deg - No Ice		10616.03	-18448.01	-1079815.25	-620863.47	1097.03
Wind 60 deg - No Ice		18421.99	-10636.28	-620605.28	-1086358.90	5191.04
Wind 90 deg - No Ice		20486.04	109.21	19968.88	-1213119.61	7227.47
Wind 120 deg - No Ice		20912.13	12244.21	732566.06	-1218653.00	7628.87
Wind 150 deg - No Ice		11792.17	20472.54	1220430.77	-691359.06	4945.12
Wind 180 deg - No Ice		70.01	22402.75	1341393.68	-1898.44	2020.39
Wind 210 deg - No Ice		-10612.76	18603.16	1113853.06	629780.63	-845.36
Wind 240 deg - No Ice		-20089.97	11714.37	698786.14	1178492.09	-5194.82
Wind 270 deg - No Ice		-20486.15	37.75	13252.25	1222495.16	-7420.78
Wind 300 deg - No Ice		-19186.03	-11158.24	-653644.08	1139786.90	-7314.59
Wind 330 deg - No Ice		-11707.19	-20368.46	-1191193.74	692877.80	-5003.49
Member Ice	31655.16					
Total Weight Ice	85523.44			63079.53	26204.77	
Wind 0 deg - Ice		-233.29	-10470.05	-571030.20	48133.81	-2337.59
Wind 30 deg - Ice		4702.45	-8178.26	-434940.09	-259435.67	821.21
Wind 60 deg - Ice		7928.43	-4565.70	-217232.30	-460989.58	3531.69
Wind 90 deg - Ice		9026.28	24.08	65309.80	-529149.07	5092.12
Wind 120 deg - Ice		8778.97	5114.01	375590.11	-507480.55	5354.68
Wind 150 deg - Ice		5128.05	8903.67	604632.62	-285206.16	3803.96
Wind 180 deg - Ice		29.87	10069.48	675755.78	23396.95	1657.47
Wind 210 deg - Ice		-4714.96	8209.66	563995.96	312988.41	-758.72
Wind 240 deg - Ice		-8414.28	4634.08	341648.01	544958.75	-2957.00
Wind 270 deg - Ice		-9109.42	-128.20	50995.29	589374.29	-4254.97
Wind 300 deg - Ice		-8534.88	-4950.33	-242216.16	551056.79	-5249.26
Wind 330 deg - Ice		-5270.39	-8878.88	-476197.61	351028.53	-4703.60
Total Weight	27507.38			9845.08	4682.72	
Wind 0 deg - Service		-14.66	-7417.58	-432709.96	1208.99	-715.29
Wind 30 deg - Service		3257.80	-5661.24	-333594.57	-192133.89	336.65
Wind 60 deg - Service		5653.25	-3264.01	-192674.38	-334982.93	1593.00
Wind 90 deg - Service		6286.66	33.51	3901.99	-373882.66	2217.93
Wind 120 deg - Service		6417.42	3757.45	222580.46	-375580.72	2341.11
Wind 150 deg - Service		3618.73	6282.52	372294.08	-213767.24	1517.54
Wind 180 deg - Service		21.49	6874.85	409414.61	-2188.82	620.01
Wind 210 deg - Service		-3256.79	5708.85	339588.01	191657.88	-259.42
Wind 240 deg - Service		-6165.11	3594.85	212214.23	360043.86	-1594.16
Wind 270 deg - Service		-6286.69	11.59	1840.83	373547.32	-2277.25
Wind 300 deg - Service		-5887.72	-3424.19	-202813.18	348166.20	-2244.67
Wind 330 deg - Service		-3592.65	-6250.58	-367773.88	211020.84	-1535.45

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">Destek Engineering, LLC 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: (770) 693-0835 FAX:</p>	Job	CT11249A	Page	12 of 21
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<i>Comb. No.</i>	<i>Description</i>
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

<i>Section No.</i>	<i>Elevation ft</i>	<i>Component Type</i>	<i>Condition</i>	<i>Gov. Load Comb.</i>	<i>Axial lb</i>	<i>Major Axis Moment lb-ft</i>	<i>Minor Axis Moment lb-ft</i>
T1	100 - 80	Leg	Max Tension	15	9372.03	445.08	-47.79
			Max. Compression	10	-14422.41	53.33	-30.49
			Max. Mx	22	-93.54	1815.61	19.94
			Max. My	16	-1707.38	-30.78	-1961.94
			Max. Vy	10	-6146.57	53.33	-30.49
			Max. Vx	12	1811.72	13.28	-308.87
		Diagonal	Max Tension	12	4223.71	0.00	0.00
			Max. Compression	12	-4272.36	0.00	0.00

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft	
T2	80 - 60	Top Girt	Max. Mx	32	494.38	254.47	29.11	
			Max. My	30	-1401.94	252.96	-30.10	
			Max. Vy	32	130.87	254.47	29.11	
			Max. Vx	30	-6.23	0.00	0.00	
			Max Tension	3	438.65	0.00	0.00	
			Max. Compression	6	-554.59	0.00	0.00	
		Leg	Max. Mx	26	-194.64	-704.45	0.00	
			Max. My	31	-266.15	0.00	18.10	
			Max. Vy	26	187.76	0.00	0.00	
			Max. Vx	31	-4.82	0.00	0.00	
			Max Tension	15	26318.34	227.17	-24.87	
			Max. Compression	10	-35189.82	527.97	-23.48	
			Max. Mx	2	-14194.53	591.64	47.34	
			Max. My	12	-2992.08	25.20	-468.36	
			Max. Vy	10	-8784.36	527.97	-23.48	
Diagonal	Max. Vx	12	2826.54	27.21	-386.76			
	Max Tension	20	6119.80	0.00	0.00			
	Max. Compression	8	-6191.22	0.00	0.00			
	Max. Mx	33	1244.17	294.99	-33.55			
	Max. My	31	-132.57	293.34	-33.89			
	Max. Vy	33	141.33	294.99	-33.55			
T3	60 - 40	Leg	Max. Vx	31	-6.56	0.00	0.00	
			Max Tension	15	47589.30	-89.29	-10.64	
			Max. Compression	10	-61220.87	1146.13	-32.23	
			Max. Mx	29	-6303.87	-1640.79	-16.40	
			Max. My	12	-6776.88	61.23	-673.90	
			Max. Vy	10	-11557.19	1146.13	-32.23	
		Diagonal	Max. Vx	13	3816.55	46.70	-673.72	
			Max Tension	20	8096.44	0.00	0.00	
			Max. Compression	8	-8186.57	0.00	0.00	
			Max. Mx	33	1907.78	367.72	-41.21	
			Max. My	31	53.05	364.09	-41.86	
			Max. Vy	33	167.02	367.72	40.93	
			Max. Vx	31	-7.58	0.00	0.00	
			Max Tension	15	71073.77	-529.31	-9.17	
			Max. Compression	10	-90480.64	1905.98	-42.73	
T4	40 - 20	Leg	Max. Mx	37	-2430.67	-5550.26	25.49	
			Max. My	12	-6781.51	82.17	-992.46	
			Max. Vy	10	-13890.11	1905.98	-42.73	
			Max. Vx	13	4446.54	97.32	-771.39	
			Max Tension	8	9557.67	0.00	0.00	
			Max. Compression	8	-9691.17	0.00	0.00	
		Diagonal	Max. Mx	33	818.75	448.30	49.41	
			Max. My	37	-2668.89	413.88	50.66	
			Max. Vy	33	185.06	412.78	44.52	
			Max. Vx	37	8.46	0.00	0.00	
			Max Tension	15	88955.92	-586.79	-3.20	
			Max. Compression	10	-113144.47	0.00	-0.00	
			Max. Mx	35	-51699.85	5885.04	-15.20	
			Max. My	12	-10045.25	-153.45	-1378.31	
			Max. Vy	29	-1166.69	-5541.51	-16.26	
Diagonal	Max. Vx	12	-295.76	-153.45	-1378.31			
	Max Tension	8	10890.27	0.00	0.00			
	Max. Compression	8	-11068.33	0.00	0.00			
	Max. Mx	33	-1108.56	693.44	-66.91			
	Max. My	37	-5783.84	673.72	70.04			
	Max. Vy	33	231.90	693.44	-66.91			
	Max. Vx	37	10.55	0.00	0.00			
	T5	20 - 0	Leg	Max. Mx	35	-51699.85	5885.04	-15.20
				Max. My	12	-10045.25	-153.45	-1378.31
Max. Vy				29	-1166.69	-5541.51	-16.26	
Max. Vx				12	-295.76	-153.45	-1378.31	
Max Tension				8	10890.27	0.00	0.00	
Max. Compression				8	-11068.33	0.00	0.00	
Diagonal			Max. Mx	33	-1108.56	693.44	-66.91	
			Max. My	37	-5783.84	673.72	70.04	
			Max. Vy	33	231.90	693.44	-66.91	
			Max. Vx	37	10.55	0.00	0.00	

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Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	18	120246.69	19288.28	-10913.44
	Max. H _x	18	120246.69	19288.28	-10913.44
	Max. H _z	5	-82637.52	-13495.81	10330.33
	Min. Vert	7	-92256.94	-16201.28	9125.73
	Min. H _x	7	-92256.94	-16201.28	9125.73
	Min. H _z	16	103343.62	15172.41	-11292.49
Leg B	Max. Vert	10	121074.49	-19469.81	-10912.17
	Max. H _x	23	-93513.16	16341.30	9126.83
	Max. H _z	25	-84248.40	13705.99	10299.85
	Min. Vert	23	-93513.16	16341.30	9126.83
	Min. H _x	10	121074.49	-19469.81	-10912.17
	Min. H _z	12	104501.16	-15424.09	-11253.91
Leg A	Max. Vert	2	119742.88	-87.92	22214.90
	Max. H _x	21	7560.22	4156.36	767.27
	Max. H _z	2	119742.88	-87.92	22214.90
	Min. Vert	15	-95197.39	65.04	-18881.11
	Min. H _x	8	9648.27	-4171.78	969.43
	Min. H _z	15	-95197.39	65.04	-18881.11

Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overtuning Moment, M _x lb-ft	Overtuning Moment, M _z lb-ft	Torque lb-ft
Dead Only	27507.38	-0.00	0.00	9844.89	4682.71	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	33008.86	-76.44	-38685.69	-2250699.76	12814.47	-3734.49
0.9 Dead+1.6 Wind 0 deg - No Ice	24756.64	-76.44	-38685.69	-2253288.78	11407.02	-3733.29
1.2 Dead+1.6 Wind 30 deg - No Ice	33008.31	18584.96	-32288.52	-1882752.68	-1082496.47	1732.73
0.9 Dead+1.6 Wind 30 deg - No Ice	24756.64	18585.75	-32288.28	-1885402.78	-1083726.85	1735.75
1.2 Dead+1.6 Wind 60 deg - No Ice	33008.86	30644.83	-17693.33	-1033201.85	-1802927.83	8310.40
0.9 Dead+1.6 Wind 60 deg - No Ice	24756.64	30644.83	-17693.33	-1035988.66	-1804040.41	8308.91
1.2 Dead+1.6 Wind 90 deg - No Ice	33008.86	37312.86	174.73	28039.18	-2184240.35	11587.24
0.9 Dead+1.6 Wind 90 deg - No Ice	24756.64	37312.86	174.73	25075.92	-2185299.82	11591.84
1.2 Dead+1.6 Wind 120 deg - No Ice	33008.86	33522.76	19627.32	1170162.08	-1955116.37	12216.84
0.9 Dead+1.6 Wind 120 deg - No Ice	24756.64	33522.76	19627.32	1167017.26	-1956203.93	12213.91
1.2 Dead+1.6 Wind 150 deg - No Ice	33008.31	18868.07	32755.50	1950020.25	-1108766.88	7897.95
0.9 Dead+1.6 Wind 150 deg - No Ice	24756.64	18867.47	32756.06	1946749.96	-1109992.45	7899.01
1.2 Dead+1.6 Wind 180 deg - No Ice	33008.86	112.02	35856.00	2144503.69	-4914.34	3236.63
0.9 Dead+1.6 Wind 180 deg - No Ice	24756.64	112.02	35856.00	2141200.75	-6318.54	3235.52

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<i>Load Combination</i>	<i>Vertical</i>	<i>Shear_x</i>	<i>Shear_z</i>	<i>Overturning Moment, M_x</i>	<i>Overturning Moment, M_z</i>	<i>Torque</i>
	<i>lb</i>	<i>lb</i>	<i>lb</i>	<i>lb-ft</i>	<i>lb-ft</i>	<i>lb-ft</i>
1.2 Dead+1.6 Wind 210 deg - No Ice	33009.39	-18579.93	32537.13	1929360.34	1093021.02	-1338.56
0.9 Dead+1.6 Wind 210 deg - No Ice	24756.64	-18580.53	32536.52	1926100.71	1091439.13	-1332.58
1.2 Dead+1.6 Wind 240 deg - No Ice	33008.86	-33313.59	19418.28	1150497.12	1946685.49	-8317.31
0.9 Dead+1.6 Wind 240 deg - No Ice	24756.64	-33313.59	19418.28	1147355.98	1944964.35	-8315.63
1.2 Dead+1.6 Wind 270 deg - No Ice	33008.86	-37313.03	60.41	17284.14	2195501.14	-11896.47
0.9 Dead+1.6 Wind 270 deg - No Ice	24756.64	-37313.03	60.41	14323.00	2193748.32	-11901.12
1.2 Dead+1.6 Wind 300 deg - No Ice	33008.86	-30761.00	-17889.75	-1051678.25	1825100.51	-11712.23
0.9 Dead+1.6 Wind 300 deg - No Ice	24756.64	-30761.00	-17889.75	-1054461.57	1823398.85	-11709.63
1.2 Dead+1.6 Wind 330 deg - No Ice	33008.32	-18730.72	-32589.77	-1911090.41	1107453.52	-7991.68
0.9 Dead+1.6 Wind 330 deg - No Ice	24756.64	-18731.50	-32589.53	-1913735.41	1105869.06	-7992.73
1.2 Dead+1.0 Ice+1.0 Temp	91024.92	0.00	-0.00	65077.01	27148.29	-0.06
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	91024.92	-233.29	-10470.04	-570018.14	49145.35	-2343.45
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	91024.92	5059.68	-8797.01	-467304.90	-278332.45	822.71
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	91024.92	8660.05	-4988.11	-237424.64	-498559.10	3539.64
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	91024.92	10195.86	24.08	67372.97	-591101.14	5104.70
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	91024.92	9032.47	5260.37	385154.96	-519501.34	5368.47
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	91024.92	5128.04	8903.66	607568.93	-284737.79	3815.37
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	91024.92	29.87	10069.48	678807.88	24364.41	1663.90
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	91024.92	-5072.19	8828.41	600481.10	333835.61	-760.23
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	91024.92	-9145.91	5056.48	365954.60	584535.29	-2965.87
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	91024.92	-10279.01	-128.20	53030.40	653288.67	-4268.23
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	91024.92	-8788.38	-5096.69	-247651.84	565002.85	-5262.83
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	91024.92	-5270.38	-8878.87	-475013.65	352535.79	-4715.82
Dead+Wind 0 deg - Service	27507.38	-14.66	-7419.80	-424020.78	6065.34	-716.98
Dead+Wind 30 deg - Service	27507.38	3564.69	-6192.80	-353463.66	-203982.32	331.10
Dead+Wind 60 deg - Service	27507.38	5877.59	-3393.53	-190552.35	-342136.33	1593.46
Dead+Wind 90 deg - Service	27507.38	7156.50	33.51	12954.60	-415256.37	2223.08
Dead+Wind 120 deg - Service	27507.38	6429.57	3764.46	231980.52	-371313.55	2345.23
Dead+Wind 150 deg - Service	27507.38	3618.72	6282.52	381532.15	-209014.33	1512.92
Dead+Wind 180 deg - Service	27507.38	21.49	6877.08	418829.08	2664.14	620.69
Dead+Wind 210 deg - Service	27507.38	-3563.69	6240.41	377571.54	213208.02	-253.60
Dead+Wind 240 deg - Service	27507.38	-6389.45	3724.37	228207.71	376909.92	-1596.09
Dead+Wind 270 deg - Service	27507.38	-7156.53	11.59	10892.53	424629.41	-2282.78
Dead+Wind 300 deg - Service	27507.38	-5899.87	-3431.20	-194095.57	353601.55	-2245.78
Dead+Wind 330 deg - Service	27507.38	-3592.65	-6250.58	-358897.77	215981.65	-1530.73

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Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0.00	-27507.38	-0.00	0.00	27507.38	-0.00	0.000%
2	-76.44	-33008.86	-38685.70	76.44	33008.86	38685.69	0.000%
3	-76.44	-24756.64	-38685.70	76.44	24756.64	38685.69	0.000%
4	18585.76	-33008.86	-32288.28	-18584.96	33008.31	32288.52	0.002%
5	18585.76	-24756.64	-32288.28	-18585.75	24756.64	32288.28	0.000%
6	30644.84	-33008.86	-17693.34	-30644.83	33008.86	17693.33	0.000%
7	30644.84	-24756.64	-17693.34	-30644.83	24756.64	17693.33	0.000%
8	37312.87	-33008.86	174.73	-37312.86	33008.86	-174.73	0.000%
9	37312.87	-24756.64	174.73	-37312.86	24756.64	-174.73	0.000%
10	33522.76	-33008.86	19627.32	-33522.76	33008.86	-19627.32	0.000%
11	33522.76	-24756.64	19627.32	-33522.76	24756.64	-19627.32	0.000%
12	18867.47	-33008.86	32756.06	-18868.07	33008.31	-32755.50	0.002%
13	18867.47	-24756.64	32756.06	-18867.47	24756.64	-32756.06	0.000%
14	112.02	-33008.86	35856.01	-112.02	33008.86	-35856.00	0.000%
15	112.02	-24756.64	35856.01	-112.02	24756.64	-35856.00	0.000%
16	-18580.53	-33008.86	32536.53	18579.93	33009.39	-32537.13	0.002%
17	-18580.53	-24756.64	32536.53	18580.53	24756.64	-32536.52	0.000%
18	-33313.60	-33008.86	19418.28	33313.59	33008.86	-19418.28	0.000%
19	-33313.60	-24756.64	19418.28	33313.59	24756.64	-19418.28	0.000%
20	-37313.04	-33008.86	60.40	37313.03	33008.86	-60.41	0.000%
21	-37313.04	-24756.64	60.40	37313.03	24756.64	-60.41	0.000%
22	-30761.00	-33008.86	-17889.76	30761.00	33008.86	17889.75	0.000%
23	-30761.00	-24756.64	-17889.76	30761.00	24756.64	17889.75	0.000%
24	-18731.51	-33008.86	-32589.53	18730.72	33008.32	32589.77	0.002%
25	-18731.51	-24756.64	-32589.53	18731.50	24756.64	32589.53	0.000%
26	0.00	-91024.92	-0.00	-0.00	91024.92	0.00	0.000%
27	-233.29	-91024.92	-10470.05	233.29	91024.92	10470.04	0.000%
28	5059.69	-91024.92	-8797.02	-5059.68	91024.92	8797.01	0.000%
29	8660.06	-91024.92	-4988.11	-8660.05	91024.92	4988.11	0.000%
30	10195.87	-91024.92	24.08	-10195.86	91024.92	-24.08	0.000%
31	9032.47	-91024.92	5260.37	-9032.47	91024.92	-5260.37	0.000%
32	5128.05	-91024.92	8903.67	-5128.04	91024.92	-8903.66	0.000%
33	29.87	-91024.92	10069.48	-29.87	91024.92	-10069.48	0.000%
34	-5072.20	-91024.92	8828.42	5072.19	91024.92	-8828.41	0.000%
35	-9145.91	-91024.92	5056.49	9145.91	91024.92	-5056.48	0.000%
36	-10279.01	-91024.92	-128.20	10279.01	91024.92	128.20	0.000%
37	-8788.39	-91024.92	-5096.69	8788.38	91024.92	5096.69	0.000%
38	-5270.39	-91024.92	-8878.88	5270.38	91024.92	8878.87	0.000%
39	-14.66	-27507.38	-7419.80	14.66	27507.38	7419.80	0.000%
40	3564.69	-27507.38	-6192.80	-3564.69	27507.38	6192.80	0.000%
41	5877.59	-27507.38	-3393.53	-5877.59	27507.38	3393.53	0.000%
42	7156.50	-27507.38	33.51	-7156.50	27507.38	-33.51	0.000%
43	6429.57	-27507.38	3764.46	-6429.57	27507.38	-3764.46	0.000%
44	3618.73	-27507.38	6282.52	-3618.72	27507.38	-6282.52	0.000%
45	21.49	-27507.38	6877.08	-21.49	27507.38	-6877.08	0.000%
46	-3563.69	-27507.38	6240.41	3563.69	27507.38	-6240.41	0.000%
47	-6389.45	-27507.38	3724.37	6389.45	27507.38	-3724.37	0.000%
48	-7156.53	-27507.38	11.59	7156.53	27507.38	-11.59	0.000%
49	-5899.87	-27507.38	-3431.20	5899.87	27507.38	3431.20	0.000%
50	-3592.65	-27507.38	-6250.58	3592.65	27507.38	6250.58	0.000%

Non-Linear Convergence Results

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Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	6	0.00000001	0.00000414
3	Yes	6	0.00000001	0.00000298
4	Yes	6	0.00000001	0.00000576
5	Yes	6	0.00000001	0.00000357
6	Yes	6	0.00000001	0.00000528
7	Yes	6	0.00000001	0.00000412
8	Yes	6	0.00000001	0.00000497
9	Yes	6	0.00000001	0.00000386
10	Yes	6	0.00000001	0.00000420
11	Yes	6	0.00000001	0.00000307
12	Yes	6	0.00000001	0.00000570
13	Yes	6	0.00000001	0.00000359
14	Yes	6	0.00000001	0.00000532
15	Yes	6	0.00000001	0.00000413
16	Yes	6	0.00000001	0.00000604
17	Yes	6	0.00000001	0.00000362
18	Yes	6	0.00000001	0.00000419
19	Yes	6	0.00000001	0.00000305
20	Yes	6	0.00000001	0.00000500
21	Yes	6	0.00000001	0.00000389
22	Yes	6	0.00000001	0.00000532
23	Yes	6	0.00000001	0.00000415
24	Yes	6	0.00000001	0.00000569
25	Yes	6	0.00000001	0.00000356
26	Yes	6	0.00000001	0.00000001
27	Yes	6	0.00000001	0.00001201
28	Yes	6	0.00000001	0.00001142
29	Yes	6	0.00000001	0.00001183
30	Yes	6	0.00000001	0.00001237
31	Yes	6	0.00000001	0.00001328
32	Yes	6	0.00000001	0.00001381
33	Yes	6	0.00000001	0.00001442
34	Yes	6	0.00000001	0.00001404
35	Yes	6	0.00000001	0.00001401
36	Yes	6	0.00000001	0.00001349
37	Yes	6	0.00000001	0.00001302
38	Yes	6	0.00000001	0.00001258
39	Yes	6	0.00000001	0.00000001
40	Yes	6	0.00000001	0.00000001
41	Yes	6	0.00000001	0.00000001
42	Yes	6	0.00000001	0.00000001
43	Yes	6	0.00000001	0.00000001
44	Yes	6	0.00000001	0.00000001
45	Yes	6	0.00000001	0.00000001
46	Yes	6	0.00000001	0.00000001
47	Yes	6	0.00000001	0.00000001
48	Yes	6	0.00000001	0.00000001
49	Yes	6	0.00000001	0.00000001
50	Yes	6	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	100 - 80	0.246	47	0.0131	0.0020

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T2	80 - 60	0.185	47	0.0128	0.0016
T3	60 - 40	0.123	47	0.0112	0.0012
T4	40 - 20	0.067	43	0.0080	0.0007
T5	20 - 0	0.024	43	0.0046	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.00	(2) 6'-P2x0.154	47	0.246	0.0131	0.0020	Inf
99.00	Reflector Dish	47	0.243	0.0131	0.0020	Inf
95.00	2' Dish	47	0.231	0.0131	0.0019	Inf
94.00	6' Grid Dish	47	0.228	0.0131	0.0019	Inf
90.00	4 FT DISH	47	0.216	0.0131	0.0018	Inf
86.00	9' Dipole AF	47	0.204	0.0130	0.0017	Inf
85.00	12' Dipole IK	47	0.201	0.0130	0.0017	Inf
83.00	8'x2.5" Whip -Ak	47	0.195	0.0129	0.0017	Inf
80.00	Side Arm Mount [SO 311-1]	47	0.185	0.0128	0.0016	Inf
70.00	12' Dipole IK	47	0.154	0.0122	0.0014	Inf
60.00	Side Arm Mount [SO 311-1]	47	0.123	0.0112	0.0012	599550
58.00	20'x3.5" Whip	47	0.116	0.0109	0.0011	551518

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	100 - 80	1.276	10	0.0672	0.0104
T2	80 - 60	0.962	10	0.0657	0.0084
T3	60 - 40	0.637	10	0.0576	0.0062
T4	40 - 20	0.347	10	0.0412	0.0038
T5	20 - 0	0.128	10	0.0236	0.0017

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.00	(2) 6'-P2x0.154	10	1.276	0.0672	0.0104	733358
99.00	Reflector Dish	10	1.261	0.0672	0.0103	733358
95.00	2' Dish	10	1.199	0.0671	0.0099	733358
94.00	6' Grid Dish	10	1.183	0.0671	0.0098	611133
90.00	4 FT DISH	10	1.121	0.0669	0.0094	366681
86.00	9' Dipole AF	10	1.058	0.0666	0.0090	261915
85.00	12' Dipole IK	10	1.042	0.0665	0.0089	244454
83.00	8'x2.5" Whip -Ak	10	1.010	0.0662	0.0087	218124
80.00	Side Arm Mount [SO 311-1]	10	0.962	0.0657	0.0084	215165
70.00	12' Dipole IK	10	0.799	0.0628	0.0074	511225

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	Client T-Mobile	Designed by Ahmet Colakoglu

Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
60.00	Side Arm Mount [SO 311-1]	10	0.637	0.0576	0.0062	118980
58.00	20'x3.5" Whip	10	0.606	0.0562	0.0060	109041

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
T1	100	Diagonal	A325N	0.7500	1	4223.71	12615.00	0.335	1	Member Bearing
T2	80	Leg	A325N	1.2500	6	1561.73	82835.00	0.019	1	Bolt Tension
		Diagonal	A325N	0.7500	1	6119.80	12615.00	0.485	1	Member Bearing
T3	60	Leg	A325N	1.2500	6	4386.12	82835.00	0.053	1	Bolt Tension
		Diagonal	A325N	0.7500	1	8096.44	12615.00	0.642	1	Member Bearing
T4	40	Leg	A325N	1.2500	6	7931.27	82835.00	0.096	1	Bolt Tension
		Diagonal	A325N	0.7500	1	9557.67	15768.80	0.606	1	Member Bearing
T5	20	Leg	A325N	1.2500	6	12786.80	82835.00	0.154	1	Bolt Tension
		Diagonal	A325N	0.7500	1	10890.30	15768.80	0.691	1	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio P _u / φP _n
T1	100 - 80	P8.625x0.3125	20.03	0.08	0.3	8.1608	-14422.40	308475.00	0.047 ¹
					K=1.00				
T2	80 - 60	P8.625x0.3125	20.03	0.08	0.3	8.1608	-35189.80	308475.00	0.114 ¹
					K=1.00				
T3	60 - 40	P8.625x0.3125	20.03	0.08	0.3	8.1608	-61220.90	308475.00	0.198 ¹
					K=1.00				
T4	40 - 20	P10x.375	20.03	0.08	0.3	11.3392	-90480.60	428619.00	0.211 ¹
					K=1.00				
T5	20 - 0	P10x.375	20.03	10.01	35.3	11.3392	-113144.00	397070.00	0.285 ¹
					K=1.00				

¹ P_u / φP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio P _u / φP _n
-------------	--------------	------	------	-------------------	------	-------------------	-------------------	--------------------	--

tnxTower Destek Engineering, LLC 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: (770) 693-0835 FAX:	Job CT11249A	Page 20 of 21
	Project 1875009	Date 16:36:45 04/13/18
	Client T-Mobile	Designed by Ahmet Colakoglu

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	L3 1/2x3 1/2x1/4	19.11	9.26	160.1 K=1.00	1.6900	-4272.36	14904.10	0.287 ¹
T2	80 - 60	L3 1/2x3 1/2x1/4	20.65	10.03	173.5 K=1.00	1.6900	-6191.22	12689.80	0.488 ¹
T3	60 - 40	L4x4x1/4	22.23	10.82	163.4 K=1.00	1.9400	-8186.57	16420.40	0.499 ¹
T4	40 - 20	L4x4x5/16	23.83	11.57	175.5 K=1.00	2.4000	-9691.17	17610.80	0.550 ¹
T5	20 - 0	L5x5x5/16	25.50	12.40	149.7 K=1.00	3.0300	-11068.30	30530.60	0.363 ¹

¹ P_u / φP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	L3 1/2x3 1/2x1/4	15.01	14.29	198.1 K=0.80	1.6900	-554.59	9724.27	0.057 ¹

¹ P_u / φP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	P8.625x0.3125	20.03	0.08	0.3	8.1608	9372.03	308477.00	0.030 ¹
T2	80 - 60	P8.625x0.3125	20.03	0.08	0.3	8.1608	26318.30	308477.00	0.085 ¹
T3	60 - 40	P8.625x0.3125	20.03	0.08	0.3	8.1608	47589.30	308477.00	0.154 ¹
T4	40 - 20	P10x.375	20.03	0.08	0.3	11.3392	71073.80	428621.00	0.166 ¹
T5	20 - 0	P10x.375	20.03	10.01	35.3	11.3392	88955.90	428621.00	0.208 ¹

¹ P_u / φP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	L3 1/2x3 1/2x1/4	19.11	9.26	103.4	1.1034	4223.71	47999.50	0.088 ¹

tnxTower Destek Engineering, LLC 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: (770) 693-0835 FAX:	Job CT11249A	Page 21 of 21
	Project 1875009	Date 16:36:45 04/13/18
	Client T-Mobile	Designed by Ahmet Colakoglu

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	80 - 60	L3 1/2x3 1/2x1/4	20.65	10.03	111.9	1.1034	6119.80	47999.50	0.127 ¹
T3	60 - 40	L4x4x1/4	22.23	10.82	105.2	1.2909	8096.44	56155.80	0.144 ¹
T4	40 - 20	L4x4x5/16	23.83	11.57	113.2	1.5949	9557.67	69379.10	0.138 ¹
T5	20 - 0	L5x5x5/16	25.50	12.40	95.8	2.0674	10890.30	89932.90	0.121 ¹

¹ P_u / φP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	L3 1/2x3 1/2x1/4	15.01	14.29	157.3	1.6900	438.65	54756.00	0.008 ¹

¹ P_u / φP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	φP _{allow} lb	% Capacity	Pass Fail	
T1	100 - 80	Leg	P8.625x0.3125	2	-14422.40	308475.00	4.7	Pass	
T2	80 - 60	Leg	P8.625x0.3125	20	-35189.80	308475.00	11.4	Pass	
T3	60 - 40	Leg	P8.625x0.3125	35	-61220.90	308475.00	19.8	Pass	
T4	40 - 20	Leg	P10x.375	50	-90480.60	428619.00	21.1	Pass	
T5	20 - 0	Leg	P10x.375	65	-113144.00	397070.00	28.5	Pass	
T1	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	9	-4272.36	14904.10	28.7	Pass	
							33.5 (b)		
T2	80 - 60	Diagonal	L3 1/2x3 1/2x1/4	23	-6191.22	12689.80	48.8	Pass	
T3	60 - 40	Diagonal	L4x4x1/4	38	-8186.57	16420.40	49.9	Pass	
							64.2 (b)		
T4	40 - 20	Diagonal	L4x4x5/16	53	-9691.17	17610.80	55.0	Pass	
							60.6 (b)		
T5	20 - 0	Diagonal	L5x5x5/16	68	-11068.30	30530.60	36.3	Pass	
							69.1 (b)		
T1	100 - 80	Top Girt	L3 1/2x3 1/2x1/4	5	-554.59	9724.27	5.7	Pass	
							Summary		
							Leg (T5)	28.5	Pass
							Diagonal (T5)	69.1	Pass
							Top Girt (T1)	5.7	Pass
							Bolt Checks	69.1	Pass
							RATING =	69.1	Pass

Exhibit D



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

T-Mobile Existing Facility

Site ID: CT11249A

Troop K
15 Old Hartford Road
Colchester, CT 06415

April 20, 2018

EBC Project Number: 6218003018

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	5.725 %



April 20, 2018

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

Emissions Analysis for Site: **CT11249A – Troop K**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **15 Old Hartford Road, Colchester, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 1900 MHz (PCS), 2100 MHz (AWS) and 5 GHz Microwave bands is 1000 $\mu\text{W}/\text{cm}^2$. 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 **15 Old Hartford Road, Colchester, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas for broadcast and microwave backhaul, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

- 1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 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.
- 4) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 5) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel
- 6) 1 microwave backhaul channel (5 GHz) was considered for the proposed facility. This channel has a transmit power of 1 Watt.



- 7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 8) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas for broadcast and microwave backhaul, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antennas used in this modeling are the **RFS APXV18-209014** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Fastback IBR1300** for the proposed 5 GHz microwave backhaul. This is based on feedback from the carrier with regard to anticipated antenna selection. The **RFS APXV18-209014** has a maximum gain of **14.4 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Fastback IBR1300** has a maximum gain of **10 dBd** at its main lobe at 5 GHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas for broadcast and microwave backhaul, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 10) The antenna mounting height centerline of the proposed antennas (both panel antennas and microwave radio / antenna) is **95 feet** above ground level (AGL).
- 11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 12) All calculations were done with respect to uncontrolled / general population threshold limits.



T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APXV18-209014	Make / Model:	RFS APXV18-209014	Make / Model:	RFS APXV18-209014
Gain:	14.4 dBd	Gain:	14.4 dBd	Gain:	14.4 dBd
Height (AGL):	95	Height (AGL):	95	Height (AGL):	95
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	10	Channel Count	10	Channel Count	11
Total TX Power(W):	420	Total TX Power(W):	420	Total TX Power(W):	421
ERP (W):	11,567.76	ERP (W):	11,567.76	ERP (W):	11,577.76
Antenna A1 MPE%	5.250	Antenna B1 MPE%	5.250	Antenna C1 MPE%	5.250

Microwave Backhaul Data

Make / Model:	Gain	Height (AGL):	Frequency Bands	Channel Count	Total TX Power(W)	ERP (W)	MPE %	Sector
Fastback IBR1300	10 dBd	95	5 GHz	1	1	10.91	0.005	C

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Sector C)	5.255 %
CEC	0.400 %
CSP	0.070 %
NEC	0.000 %
Site Total MPE %:	5.725 %

T-Mobile Sector A Total:	5.250 %
T-Mobile Sector B Total:	5.250 %
T-Mobile Sector C Total:	5.255 %
Site Total:	5.72 %

T-Mobile Max Power Values (Sector C)

T-Mobile _Max Power Values (Sector C)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	1,652.54	95	15.00	AWS - 2100 MHz	1000	1.500%
T-Mobile PCS - 1900 MHz LTE	2	1,652.54	95	15.00	PCS - 1900 MHz	1000	1.500%
T-Mobile AWS - 2100 MHz UMTS	2	826.27	95	7.50	AWS - 2100 MHz	1000	0.750%
T-Mobile PCS - 1900 MHz UMTS	2	826.27	95	7.50	PCS - 1900 MHz	1000	0.750%
T-Mobile PCS - 1900 MHz GSM	2	826.27	95	7.50	PCS - 1900 MHz	1000	0.750%
T-Mobile 5 GHz Microwave	1	10	95	0.05	5 GHz	1000	0.005%
						Total:	5.255%



Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	5.250 %
Sector B:	5.250 %
Sector C:	5.255 %
T-Mobile Per Sector Maximum (Sector C):	5.255 %
Site Total:	5.725 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **5.725%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit E

SENT VIA EMAIL

April 20, 2018

Connecticut State Police
1111 Country Club Road
Middletown, CT 06457
Attn: Brian Benito, Planning Specialist - CTS Unit

**Re: Acknowledgment and Consent Letter for Modification of Antenna Facilities at
Site#: CT11249A - 15 Old Hartford Rd, Colchester, CT – Troop K**

Dear Mr. Benito,

T-Mobile Northeast LLC, as successor in interest to Omnipoint Communications, Inc., (“T-Mobile”), and THE STATE OF CONNECTICUT DEPARTMENT OF EMERGENCY SERVICES AND PUBLIC PROTECTION DIVISION OF STATE POLICE, (“the State Police”), entered into a License Agreement dated September 16, 2013 for a portion of the real property located at **15 Old Hartford Road, Colchester, CT**, (the “Property”), to install telecommunications equipment as defined therein on the Property.

This letter is to notify you that T-Mobile will be performing maintenance and minor modifications to its antenna facility located on the Property, according to the terms of the license. We are replacing installing a temporary MW dish and (3) temporary lines as per the attached site plans by Foresite LLC dated 4/4/18. The temporary equipment will be installed on or about 7/25/18 and will be removed by 1/25/19.

If you accept the terms of this Acknowledgment and Consent Letter set forth above, please sign and date the acknowledgment below and return via email attachment to sheldon@northeastssitesolutions.com. Should you have any questions, please contact Sheldon Freinle at (570) 606-4257

We thank you in advance for your continued cooperation in this matter.


Sincerely,



Mark Richard
Site Development Manager
T-Mobile Northeast LLC

Acknowledged, Accepted and Agreed:


**THE STATE OF CONNECTICUT
DEPARTMENT OF EMERGENCY SERVICES
AND PUBLIC PROTECTION
DIVISION OF STATE POLICE**


BY: Brian Benito

Date: 4/27/2018

Site Number: CT11249A
Site Name: Colchester-2-State PD 1
Acknowledgement and Consent: Connecticut Market

Exhibit F




**UNITED STATES
POSTAL SERVICE®**

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US POSTAGE
Flat Rate Env



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05/15/2018 Mailed from 06002 062S00000001310

PRIORITY MAIL 1-DAY™

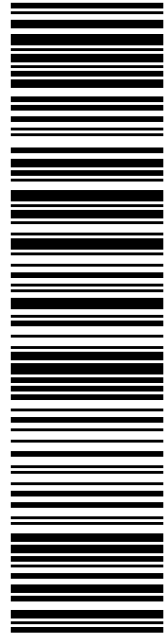
DEBORAH CHASE
T-MOBILE USA- NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

Expected Delivery Date: 05/16/18
Ref#: 249ZAPMWWAA
0024

C041

SHIP TO: BRIAN BENITO
CT STATE POLICE
1111 COUNTRY CLUB RD
MIDDLETOWN CT 06457-2389

USPS TRACKING #



9405 8036 9930 0638 0540 48

Electronic Rate Approved #038555749



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3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

Click-N-Ship® Label Record

**USPS TRACKING # / Insurance Number:
9405 8036 9930 0638 0540 48**

Trans. #:	435050718	Priority Mail® Postage:	\$6.70
Print Date:	05/15/2018	Insurance Fee	\$0.00
Ship Date:	05/15/2018	Total	\$6.70
Expected Delivery Date:	05/16/2018		
Insured Value:	\$1.00		

From: DEBORAH CHASE
T-MOBILE USA- NSS
35 GRIFFIN RD S
BLOOMFIELD CT 06002-1351

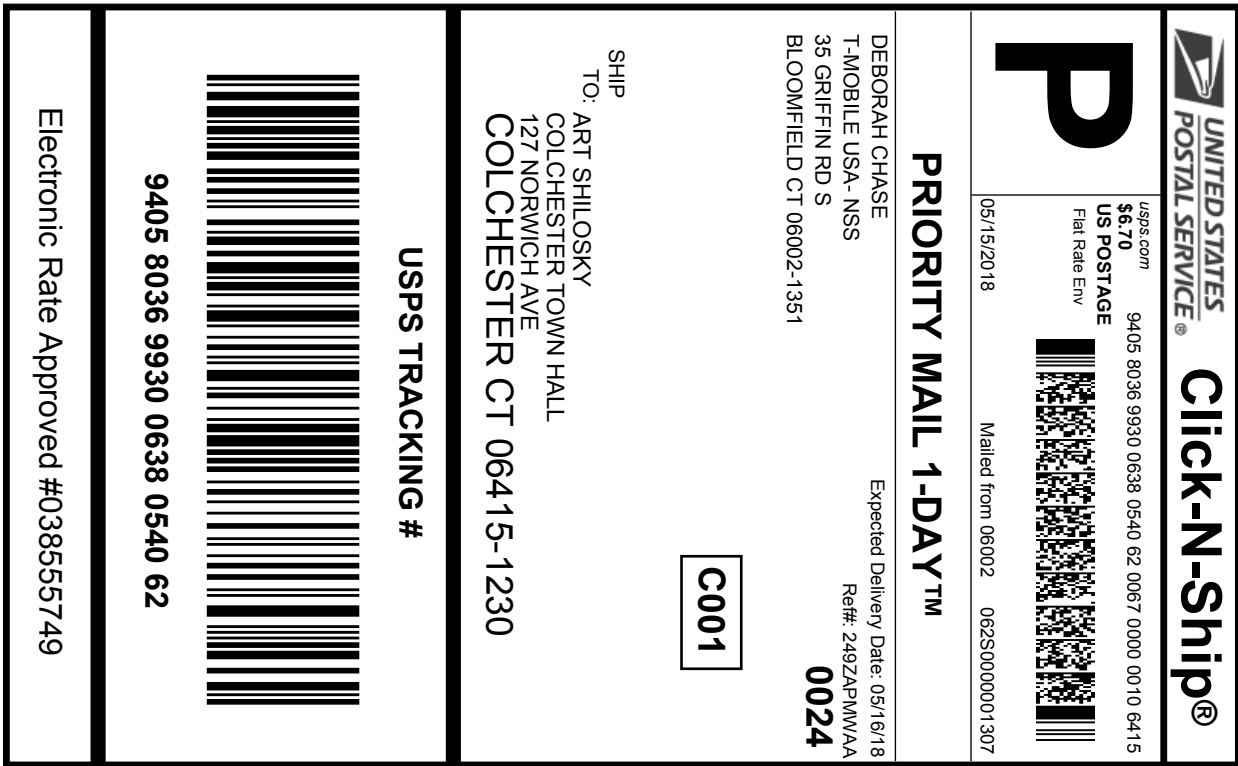
Ref#: 249ZAPMWWAA

To: BRIAN BENITO
CT STATE POLICE
1111 COUNTRY CLUB RD
MIDDLETOWN CT 06457-2389

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Instructions

- Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.
- Place your label so it does not wrap around the edge of the package.
- Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
- To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
- Mail your package on the "Ship Date" you selected when creating this label.

Click-N-Ship® Label Record

USPS TRACKING # / Insurance Number:
9405 8036 9930 0638 0540 62

Trans. #:	435050718	Priority Mail® Postage:	\$6.70
Print Date:	05/15/2018	Insurance Fee	\$0.00
Ship Date:	05/15/2018	Total	\$6.70
Expected Delivery Date:	05/16/2018		
Insured Value:	\$1.00		

From: DEBORAH CHASE
 T-MOBILE USA- NSS
 35 GRIFFIN RD S
 BLOOMFIELD CT 06002-1351

Ref#: 249ZAPMWWAA

To: ART SHILOSKY
 COLCHESTER TOWN HALL
 127 NORWICH AVE
 COLCHESTER CT 06415-1230

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