NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
199 Brickyard Rd Farmington, CT 06032
860-209-4690
denise@northeastsitesolutions.com

May 11, 2017

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

RE: Notice of Exempt Modification
200 Colt Highway, Farmington CT 06032
Latitude: 41.70088000
Longitude: -72.83218400
T-Mobile Site#: CT11134A_L1900

Dear Ms. Bachman:

T-Mobile is requesting to file an exempt modification for an existing 120-foot Guyed Tower located at 200 Colt Highway, Farmington CT 06032. T-Mobile currently maintains nine (9) antennas at the 103-foot level of the existing 120-foot tower. The guyed tower is owned by WVIT/Outlet Broadcasting Inc. The property is owned by Outlet Broadcasting Inc. T-Mobile now intends to replace three (3) existing antenna with three (3) new 1900/2100 MHz antenna. The new antennas would be installed at the 103-foot and level of the tower.

Planned Modifications:

Remove:
NONE

Remove and Replace:
(3) AIR21 B2A_B4P Antenna **(Remove) –** (3) AIR32DB B66Aa B2a Antenna **(Replace)**

Install New:
(1) Hybrid Line

Existing to Remain:
(6) 1-1/4" Coax
(1) Hybrid line
(3) RRU
(3) Commscope LNX6515DS A1M Antenna
(3) AIR21 B2A_B4P Antenna
(3) TMA

This facility was approved by the Town of Farmington PZC. The tower was built in the 1980's the original zoning approval file is not available – See attached letter from the Town Planner.

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

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.SA. § 16-SOj-73, a copy of this letter is being sent to Kathleen Eagen, Town Manager, as Elected Official for the Town of Farmington and William Warner, Town Planner 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: 199 Brickyard Rd, Farmington, CT 06032
Email: denise@northeastsitesolutions.com

Attachments
cc: Kathleen Eagen – Town Manager - as elected official
William Warner- Town Planner
Outlet Broadcasting Inc - Tower and property owner

Exhibit A

Denise Sabo
Project Manager, Northeast Site Solutions
54 Main St. Unit 3
Sturbridge, MA 01566

June 8th, 2016

RE : Zoning Compliance Letter for transmission towers at 190 & 200 Colt Highway, Farmington, CT.

Dear Ms. Sabo

The purpose of this letter is to confirm zoning compliance for the above referenced subject property.

Please be advised the subject property is located in the Residential R80 zone. As you requested we have searched town archives and we have been unable to locate the original zoning approval. As I have indicated the town zoning authority has consistently signed off on building permits for modifications to the towers which indicates zoning compliance. We are not aware of any zoning violations at the subject property at this time.

Thank you.

Sincerely,

William Warner, AICP
Town Planner
Farmington, CT

Exhibit B

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2012.

Information on the Property Records for the Municipality of Farmington was last updated on 5/4/2017.

Property Summary Information

Parcel Data And Values | Building | Outbuildings | Sales | Google Map

Parcel Information

Location:	200 COLT HIGHWAY	Property Use:	Industrial	Primary Use:	Utility Building
Unique ID:	03750200	Map Block Lot:	0141 7B	Acres:	10.00
490 Acres:	0.00	Zone:	EE	Volume / Page:	0554/0608
Developers Map / Lot:		Census:	4602-02		

Value Information

	Appraised Value	70% Assessed Value
Land	600,000	420,000
Buildings	291,886	204,320

	Appraised Value	70% Assessed Value
Detached Outbuildings	0	0
Total	891,886	624,320

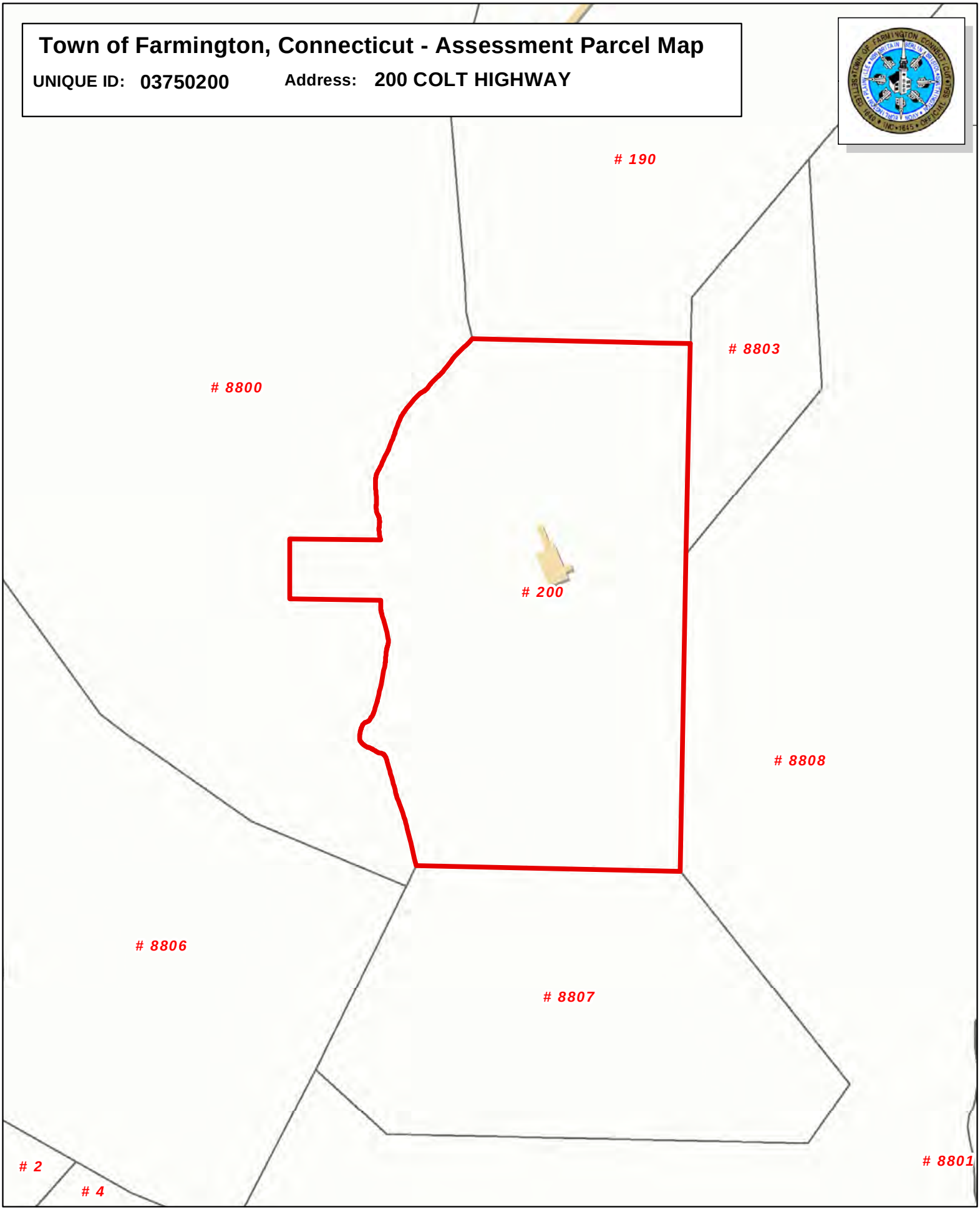
Owner's Information

Owner's Data
OUTLET BROADCASTING INC E-PROPERTY TAX DEPT 201 ONE COMCAST CENTER,32ND FL PHILADELPHIA, PA 19103

Back To Search (JavaScript:window.history.back(1);)
Print View (PrintPage.aspx?towncode=052&uniqueid=03750200)

Town of Farmington, Connecticut - Assessment Parcel Map

UNIQUE ID: 03750200 **Address:** 200 COLT HIGHWAY



Map Produced Mar 2017

Approximate Scale: 1 inch = 200 feet

Exhibit C

ANTENNA UPGRADES
BY

T-Mobile

T-MOBILE NORTHEAST LLC

SITE NUMBER: CT11134A
SITE NAME: FARMINGTON/ I-84 X 37_1
SITE ADDRESS: 200 COLT HIGHWAY
FARMINGTON, CT 06032
(792DB CONFIGURATION)

PROJECT SCOPE:

T-MOBILE, A WIRELESS TELECOMMUNICATIONS PROVIDER PROPOSES TO UPGRADE THEIR EXISTING FACILITY AS FOLLOWS:

REPLACE (3) EXISTING ANTENNAS AND ADD (1) HYBRID CABLE.

PROJECT NOTES:

1. 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.
2. 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.
3. DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES, ORDINANCES AND SPECIFICATIONS.

APPLICABLE STATE ADOPTION CODES:

2016 CONNECTICUT STATE BUILDING CODE (CSBC).

ANSI/TIA-222-G-2005 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

2014 NATIONAL ELECTRICAL CODE (NFPA 70) FOR POWER AND GROUNDING REQUIREMENTS.

SATELLITE IMAGE:

VICINITY MAP:

PROJECT INFORMATION:

ADDRESS:	200 COLT HIGHWAY FARMINGTON, CT 06032
STRUCTURE TYPE:	GUY TOWER
ZONING DISTRICT:	R-80
PARCEL ID:	141 7B
COORDINATES:	N 41.700880 / W -72.832184
ANTENNA HEIGHT:	103'

PROJECT TEAM:

APPLICANT:	T-MOBILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 860-692-7100
LANDLORD:	OUTLET BROADCASTING INC ONE COMCAST CENTER, 32ND FL PHILADELPHIA PA 19103
PROJECT MANGER:	NORTHEAST SITE SOLUTIONS 420 MAIN STREET, BLDG 4 STURBRIDGE, MA 01566 SHELDON FREINCLE SHELDON@NORTHEASTSITE SOLUTIONS.COM 201-776-8521
CONSULTANTS:	FORESITE LLC 462 WALNUT ST NEWTON, MA 02460 SAEED MOSSAVAT SMOSSAVAT@FORESITELLC.COM 617-212-3123

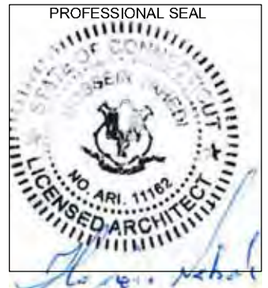
SHEET INDEX:

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

PROJECT MANGER
NSS NORTHEAST SITE SOLUTIONS
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



REV	DESCRIPTION	DATE
A	PRELIMINARY	05/03/17
0	ISSUED FOR PERMITTING	05/05/17

SITE NUMBER: CT11134A
SITE NAME: FARMINGTON/ I-84 X 37_1
SITE ADDRESS: 200 COLT HIGHWAY
FARMINGTON, CT 06032

SHEET TITLE:
T-1: TITLE SHEET

NOTES AND DISCLAIMERS:

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.

2. THE ARCHITECT/ENGINEER HAS MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.

3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE CLIENT'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.

4. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.

5. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S / VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.

6. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS DURING CONSTRUCTION.

7. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJEC

8. THE CONTRACTOR SHALL NOTIFY THE CLIENT'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE CLIENT'S REPRESENTATIVE.

9. THE WORK SHALL CONFORM TO THE CODES AND STANDARDS OF THE FOLLOWING AGENCIES AS FURTHER CITED HEREIN:

A. ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS, AS PUBLISHED IN "COMPILATION OF ASTM STANDARDS BUILDING CODES" OR LATEST EDITION.

B. AWS: AMERICAN WELDING SOCIETY INC. AS PUBLISHED IN "STANDARD D1.1-08, STRUCTURAL WELDING CODE" OR LATEST EDITION.

C. AISC: AMERICAN INSTITUTE FOR STEEL CONSTRUCTION AS PUBLISHED IN "CODE FOR STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"; "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (LATEST EDITION).

10. BOLTING:

A. BOLTS SHALL BE CONFORMING TO ASTM A325 HIGH STRENGTH, HOT DIP GALVANIZED WITH ASTM A153 HEAVY HEX TYPE NUTS.
B. BOLTS SHALL BE 3/4"Ø MINIMUM (UNLESS OTHERWISE NOTED)
C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

11. FABRICATION:

A. FABRICATION OF STEEL SHALL CONFORM TO THE AISC AND AWS STANDARDS AND CODES (LATEST EDITION).
B. ALL STRUCTURAL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 (LATEST EDITION), UNLESS OTHERWISE NOTED.

12. ERECTION OF STEEL:

A. PROVIDE ALL ERECTION EQUIPMENT, BRACING, PLANKING, FIELD BOLTS, NUTS, WASHERS, DRIFT PINS, AND SIMILAR MATERIALS WHICH DO NOT FORM A PART OF THE COMPLETED CONSTRUCTION BUT ARE NECESSARY FOR ITS PROPER ERECTION.
B. ERECT AND ANCHOR ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC REFERENCE STANDARDS. ALL WORK SHALL BE ACCURATELY SET TO ESTABLISHED LINES AND ELEVATIONS AND RIGIDLY FASTENED IN PLACE WITH SUITABLE ATTACHMENTS TO THE CONSTRUCTION OF THE BUILDING.
C. TEMPORARY BRACING, GUYING AND SUPPORT SHALL BE PROVIDED TO KEEP THE STRUCTURE SAFE AND ALIGNED AT ALL TIMES DURING CONSTRUCTION, AND TO PREVENT DANGER TO PERSONS AND PROPERTY. CHECK ALL TEMPORARY LOADS AND STAY WITHIN SAFE CAPACITY OF ALL BUILDING COMPONENTS.

13. ANTENNA INSTALLATION:

A. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND CLIENT'S REPRESENTATIVE SPECIFICATIONS.

B. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

C. INSTALL COAXIAL / FIBER CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS.

14. ANTENNA AND COAXIAL / FIBER CABLE GROUNDING:

A. ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT TYPE #221213 OR EQUAL.

B. ALL COAXIAL / FIBER CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL / FIBER CABLE (NOT WITHIN BENDS).

15. RELATED WORK, FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH OTHER TRADES PRIOR TO BID:

A. FLASHING OF OPENING INTO OUTSIDE WALLS
B. SEALING AND CAULKING ALL OPENINGS
C. PAINTING
D. CUTTING AND PATCHING

16. REQUIREMENTS OF REGULATORY AGENCIES:

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.
B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATION IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES, AND SPECIAL CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:
C. TIA-EIA - 222 (LATEST EDITION). STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.
D. FAA - FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7460-IH, OBSTRUCTION MARKING AND LIGHTING.
E. FCC - FEDERAL COMMUNICATIONS COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES AND FORM 715A, HIGH INTENSITY OBSTRUCTION LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES.
F. AISC - AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS (LATEST EDITION).
G. NEC - NATIONAL ELECTRICAL CODE - ON TOWER LIGHTING KITS.
H. UL - UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.
I. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.
J. 2009 LIFE SAFETY CODE NFPA - 101.

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

PROJECT MANGER
NSS NORTHEAST SITE SOLUTIONS
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

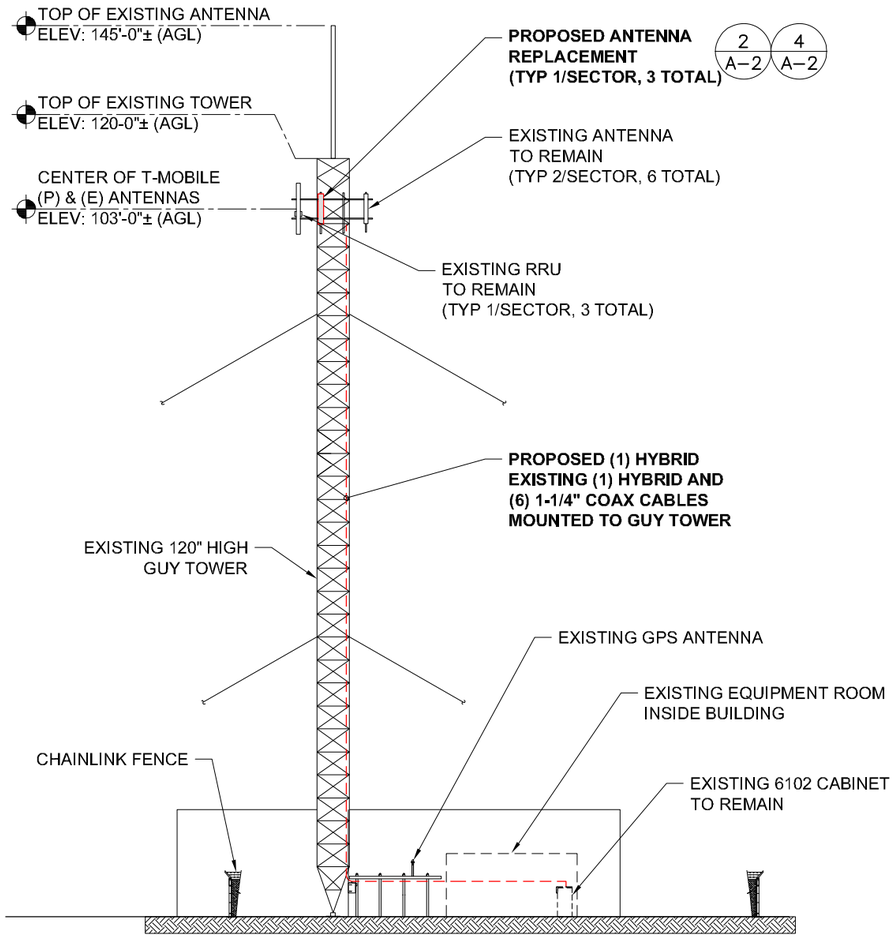
REV	DESCRIPTION	DATE
A	PRELIMINARY	05/03/17
0	ISSUED FOR PERMITTING	05/05/17

SITE NUMBER: CT11134A
SITE NAME: FARMINGTON/ I-84 X 37_1
SITE ADDRESS: 200 COLT HIGHWAY
FARMINGTON, CT 06032

SHEET TITLE:
N-1: NOTES AND DISCLAIMERS

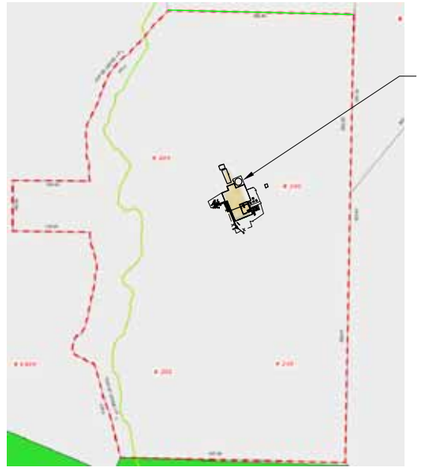
ELEVATION PHOTO DETAIL
SCALE: 3/4"=1'-0"

2
A–1



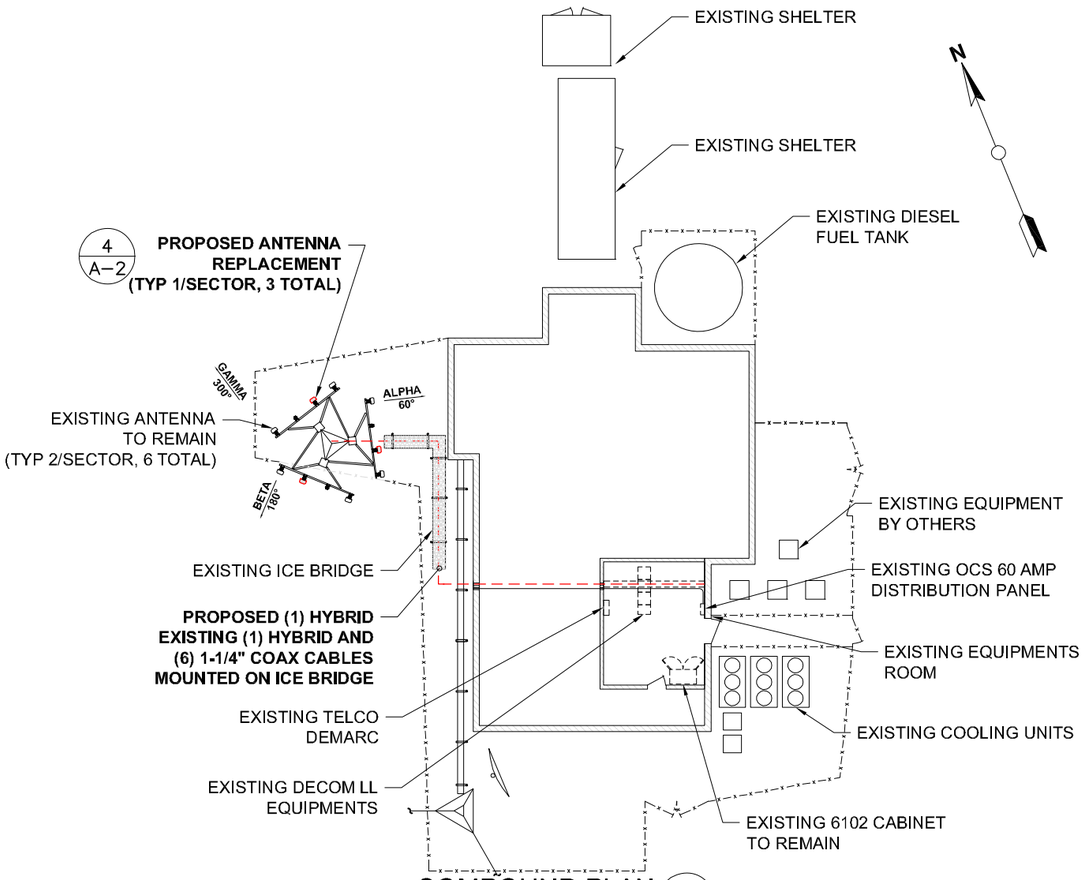
ELEVATION
SCALE: 1/2"=1'-0"

1
A–1



SITE PLAN
SCALE: 1"=300'

4
A–1



COMPOUND PLAN
SCALE: 1/2"=1'-0"

3
A–1

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

PROJECT MANGER
NSS NORTHEAST SITE SOLUTIONS
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

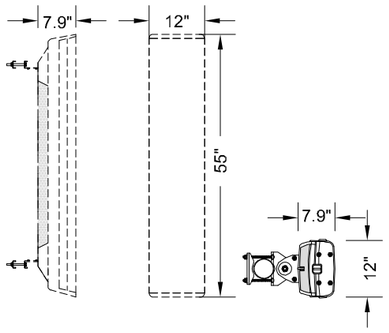
REV	DESCRIPTION	DATE
A	PRELIMINARY	05/03/17
0	ISSUED FOR PERMITTING	05/05/17

SITE NUMBER: CT11134A
SITE NAME: FARMINGTON/ I-84 X 37_1
SITE ADDRESS: 200 COLT HIGHWAY
FARMINGTON, CT 06032

SHEET TITLE:
A-1: PLANS AND ELEVATIONS

REMOVE:
(3) ANTENNAS

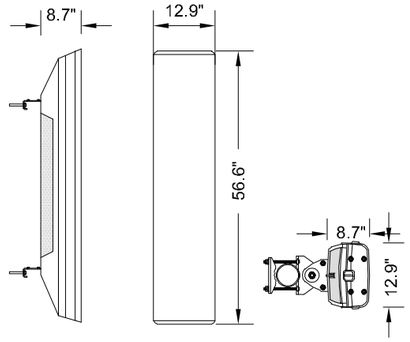
MANUFACTURER: ERICSSON
MODEL: AIR-21 KRC118046-1 B4A-B2P
FOOTPRINT: 55"HX12"WX7.9"D
WEIGHT: 83 LBS
FREQUENCY BAND: 1700-2100 MHZ



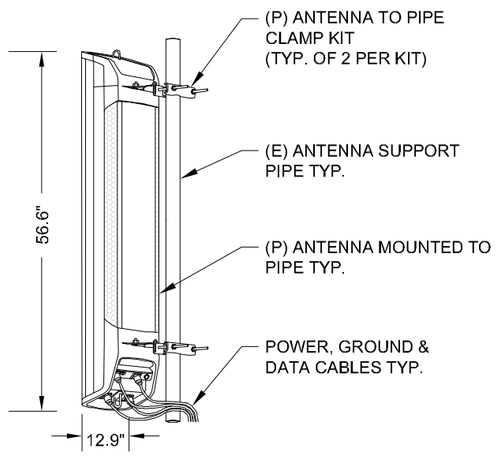
ANTENNA TO BE REMOVED 1/A-2
SCALE: N.T.S

ADD:
(3) ANTENNAS

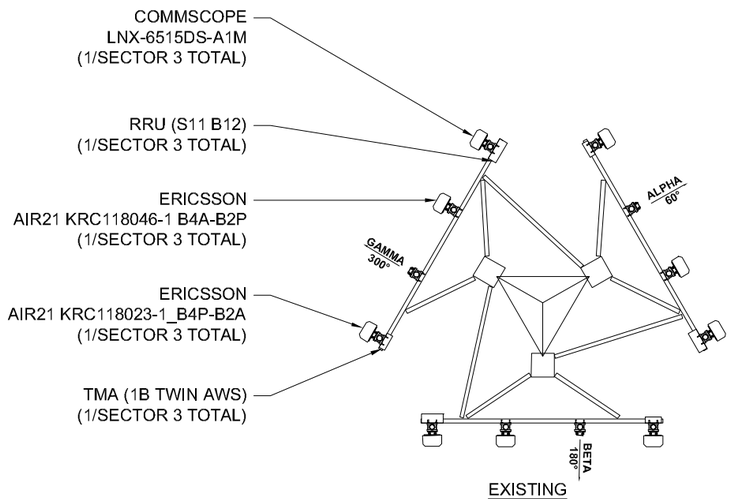
MANUFACTURER: ERICSSON
MODEL AIR32 KRD901146-1_B66A_B2A
FOOTPRINT: 56.6"HX12.9"WX8.7"D
WEIGHT: 132.2 LBS
FREQUENCY BAND: 1710-1755
ANTENNA TYPE: SINGLE BAND
WIND LOADING LATERAL: 300N
WIND LOADING REAR: 660N
WIND LOADING MAXIMUM: 640N



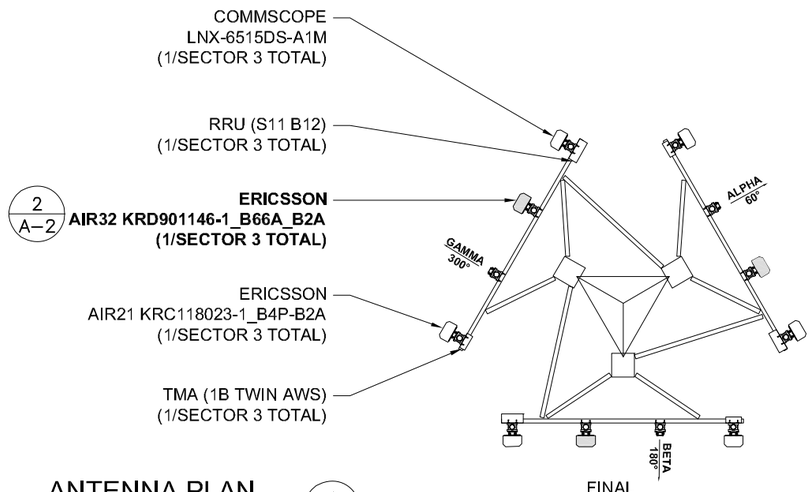
ANTENNA TO BE ADDED 2/A-2
SCALE: N.T.S



ANTENNA MOUNT DETAILS 3/A-2
SCALE: N.T.S



EXISTING



FINAL

ANTENNA PLAN 4/A-2
N.T.S

N

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

PROJECT MANGER
NSS NORTHEAST SITE SOLUTIONS
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
NO. ARI. 11162.
LICENSED ARCHITECT

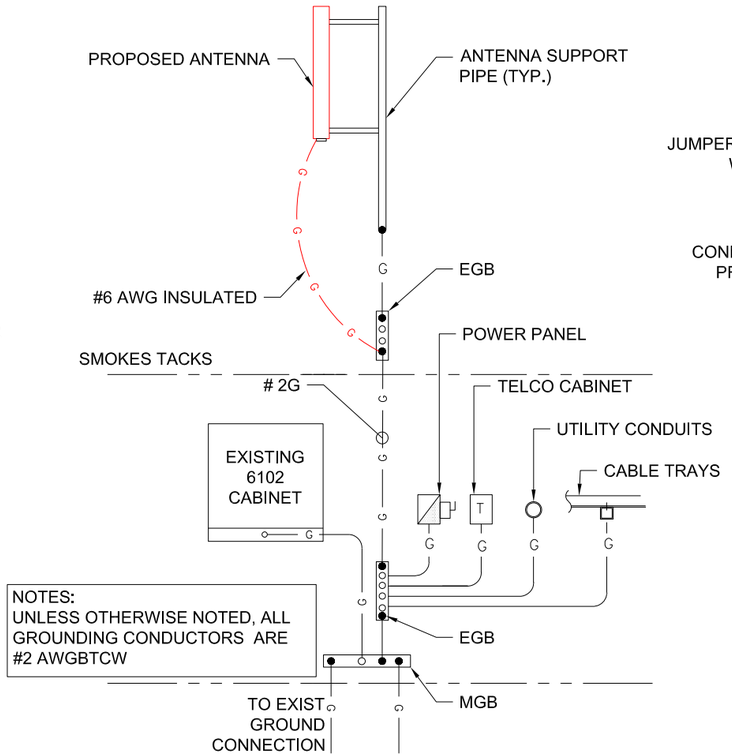
REV	DESCRIPTION	DATE
A	PRELIMINARY	05/03/17
0	ISSUED FOR PERMITTING	05/05/17

SITE NUMBER: CT11134A
SITE NAME: FARMINGTON/ I-84 X 37_1
SITE ADDRESS: 200 COLT HIGHWAY
FARMINGTON, CT 06032

SHEET TITLE:
A-2: ANTENNAS DETAILS

ELECTRICAL & GROUNDING NOTES

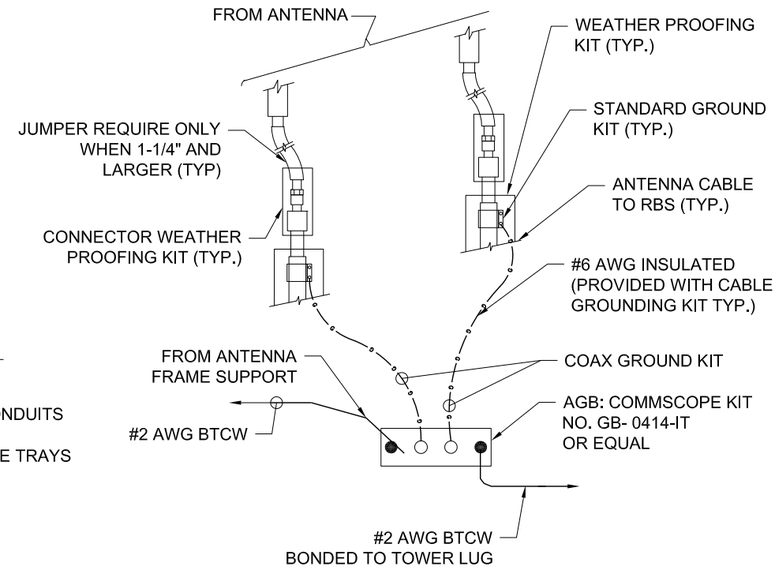
1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PRODUCED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED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



GROUNDING RISER DIAGRAM

1 E–1

SCALE: N.T.S

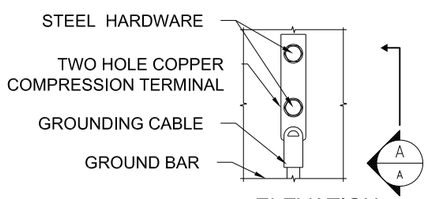


NOTES:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB

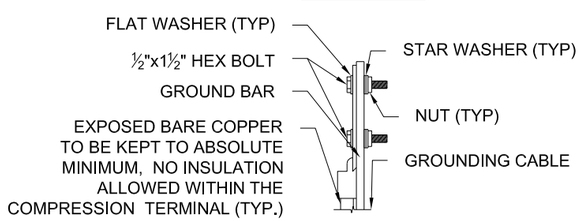
TOWER TOP CABLE GROUNDING DETAIL

2 E–1

SCALE: N.T.S



ELEVATION



SECTION A-A

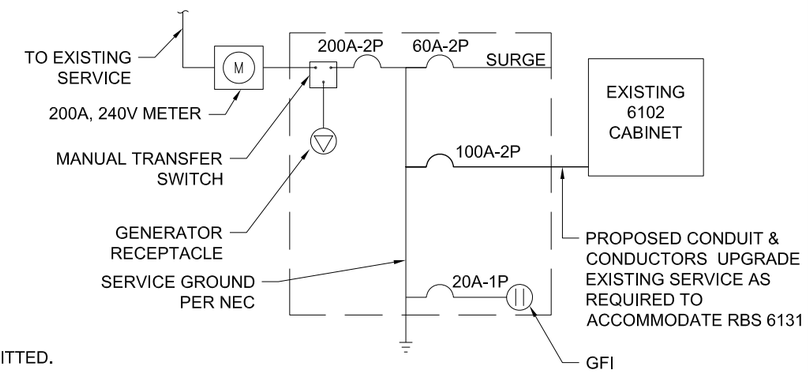
NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

TYPICAL GROUND BAR CONNECTIOS DETAIL

3 E–1

SCALE: N.T.S

NOTES:
G.C TO VERIFY THAT THE EXISTING CONDUCTS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORKS AS REQUIRED



ONE LINE POWER DIAGRAM

4 E–1

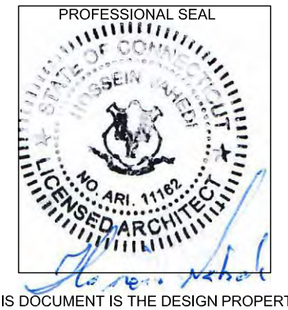
SCALE: N.T.S

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

PROJECT MANGER
NSS NORTHEAST SITE SOLUTIONS
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



REV	DESCRIPTION	DATE
A	PRELIMINARY	05/03/17
0	ISSUED FOR PERMITTING	05/05/17

SITE NUMBER: CT11134A
SITE NAME: FARMINGTON/ I-84 X 37_1
SITE ADDRESS: 200 COLT HIGHWAY
FARMINGTON, CT 06032

SHEET TITLE:
E-1: GROUNDING AND ELECTRICAL DETAILS

Exhibit D

Structural Analysis report

Date: May 2, 2017

Site Number: CT11134A
Site Name: Farmington/I-84 X37_1

Site Address:
200 Colt Highway
Farmington, CT 06032

PREPARED FOR:

T-Mobile

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

CONSULTANT:

FORESITE LLC
Architects . Engineers . Surveyors

462 Walnut street
Newton, MA 02460
Contact: Saeed Mossavat
email:smossavat@Foresitellc.com
617-527-3031

PROJECT MANAGER:

NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

420 Main Street, Bldg 4
Sturbridge MA 01566
Contact: Sheldon Freincle
sheldon@northeastsitesolution.com
203-275-6669

STRUCTURAL ANALYSIS REPORT – REV. 1
GUYED TOWER

Prepared For:

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

Structure Rating:

Guyed Tower: **Pass**

Sincerely,
Destek Engineering, LLC

5-9-2017

STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN. 27057
LICENSED
PROFESSIONAL ENGINEER

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057

T-Mobile Site ID: CT11134A
T-Mobile Site Name: Farmington/I-84 X37_1
200 Colt Highway
Farmington, CT 06032

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066-Tel: (770) 693-0835

CONTENTS

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066-Tel: (770) 693-0835

1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the 120 feet tall guyed tower located at 200 Colt Highway, Farmington, CT 06032 for the additions and alterations proposed by T-Mobile.

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

- Structural Analysis Report prepared by Atlantis Design Group, Inc., dated 5/26/2016.
- Construction Drawings prepared by Atlantis Design Group, Inc., dated 6/6/2016.
- RFDS provided by T-Mobile, dated 4/25/2017.

1.1 STRUCTURE

The subject structure is a 120 feet high, triangular based guyed tower. Solid rod legs are X-braced along the tower height with solid rods. The tower is guyed at (1) elevation at 103.5 feet above grade line. Guy wires are terminated at anchors 250 feet away from the tower. Please refer to the tower elevation drawing in Appendix A, for details about the tower geometry, member sizes, etc.

2.0 EXISTING AND PROPOSED APPURTENNANCES

Existing Configuration of T-Mobile Appurtenances:

Rad Center (ft.)	Antennas & Equipment	Feedlines	Mounts
103	(3) Ericsson AIR21 B2A/B4P (3) Ericsson AIR21 B4A/B2P (3) Andrew LNX-6515DS-A1M (3) Twin AWS TMA (3) RRUS11 B12	(6) 1-1/4" (1) 9x18 Hybrid	(3) Sector Mounts

Proposed and Final Configuration of T-Mobile Appurtenances:

Rad Center (ft.)	Antennas & Equipment	Feedlines	Mounts
103	(3) Ericsson AIR21 B2A/B4P (3) Ericsson AIR32 B66A/B2A (3) Andrew LNX-6515DS-A1M (3) Twin AWS TMA (3) RRUS11 B12	(6) 1-1/4" (1) 9x18 Hybrid (1) 6x12 Hybrid	(3) Sector Mounts

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066-Tel: (770) 693-0835

Appurtenances by Others:

Rad Center (ft.)	Antennas & Equipment	Feedlines	Mounts
120	(1) TFU-30J	(1) 6-1/8"	Leg Mounted

3.0 CODES AND LOADING

The tower was analyzed per *ANSI/TIA-222-G* as referenced by the *2016 Connecticut State Building Code* with all adopted amendments and supplements. The following wind loading was used in compliance with the standard for Farmington, CT.

- Ultimate wind speed of 125 mph converted to a basic wind speed of 97 mph without ice (V)
- Basic wind speed 50 mph with 1.0" escalating ice (V_i)
- Exposure Category B
- Topographic Category 1
- Structure Class II (I_w = 1.0)

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 tower:

- 1.2 D + 1.6 W_o
- 0.9 D + 1.6 W_o
- 1.2 D + 1.0 D_i + 1.0 W_i + 1.0 T_i

D: Dead load of structures and appurtenances
D_i: Weight of ice due to factored ice thickness (based upon t_i)
T_i: Load effects due to temperature
W_o: Wind load without ice (based upon V)
W_i: Wind load with ice (based upon V_i)

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066-Tel: (770) 693-0835

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 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 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 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.

6.0 RESULTS AND CONCLUSION

Based on a structural analysis per ANSI/TIA-222-G, the existing guyed tower has **adequate** structural capacity for the proposed changes by T-Mobile. For the code specified load combinations and as a maximum, the tower guy wires at 103.5 feet AGL are stressed to **53.6%** of capacity. The tower legs and diagonals are stressed to 11.5% and 47.1% of capacity, respectively.

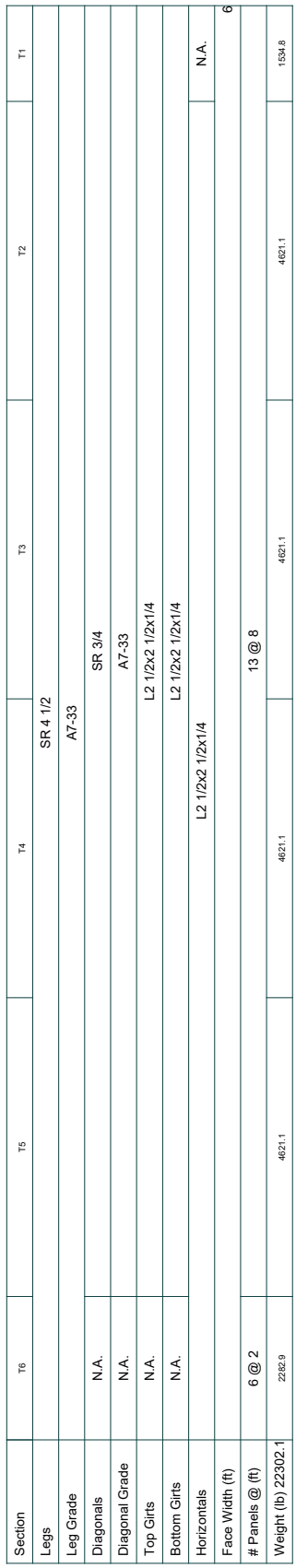
Foundation and soils information was not available at the time of this analysis. Thus, evaluation of those elements is not possible at this time and the reported results explicitly exclude those elements.

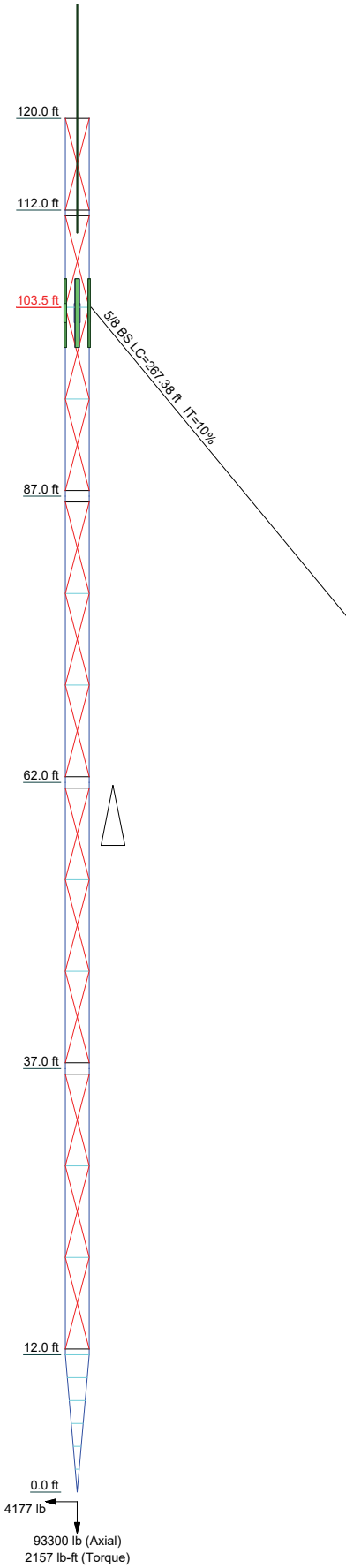
Therefore, the additions and alterations proposed by T-Mobile **can** be implemented as intended and with the conditions outlined in this report**.**

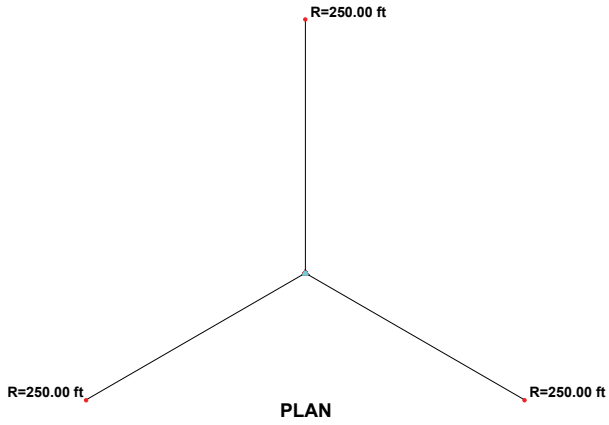
Should you need any clarifications or have any questions about this report, please contact Ahmet Colakoglu at (770) 693-0835 or acolakoglu@destekengineering.com.

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066-Tel: (770) 693-0835

APPENDIX A
SOFTWARE OUTPUT







DESIGNED APPURTENANCE LOADING

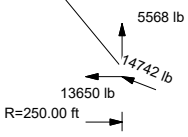
TYPE	ELEVATION	TYPE	ELEVATION
TFU-30J	120	Generic Twin AWS TMA (T-Mobile)	103
AIR 21 B2A/B4P w/ Mount Pipe (T-Mobile)	103	Generic Twin AWS TMA (T-Mobile)	103
AIR 21 B2A/B4P w/ Mount Pipe (T-Mobile)	103	Generic Twin AWS TMA (T-Mobile)	103
AIR 21 B2A/B4P w/ Mount Pipe (T-Mobile)	103	LNX-6515DS-A1M w/ Mount Pipe (T-Mobile)	103
AIR 32 B2a/B66Aa w/ Mount Pipe (T-Mobile)	103	LNX-6515DS-A1M w/ Mount Pipe (T-Mobile)	103
AIR 32 B2a/B66Aa w/ Mount Pipe (T-Mobile)	103	LNX-6515DS-A1M w/ Mount Pipe (T-Mobile)	103
AIR 32 B2a/B66Aa w/ Mount Pipe (T-Mobile)	103	RRUS 11 B12	103
AIR 32 B2a/B66Aa w/ Mount Pipe (T-Mobile)	103	RRUS 11 B12	103
		RRUS 11 B12	103
		Sector Mount [SM 502-3] (T-Mobile)	103

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A7-33	33 ksi	60 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 53.6%



ALL REACTIONS ARE FACTORED

Destek Engineering, LLC
1281 Kennestone Circle, Suite 100
Marietta, GA 30066
Phone: (770) 693-0835
FAX:

Job: *CT11134A*			
Project: *CT11134A*			
Client: T-Mobile	Drawn by: Ahmet Colakoglu	App'd:	
Code: TIA-222-G	Date: 05/09/17	Scale: NTS	
Path: Z:\Projects\2017\75 - Foresite LLC\021 - CT11134A\CT11134A - WVIT - New 4-20-17\TNX\050917 Rev. 1\CT11134A_Rev_1.eri		Dwg No. E-1	

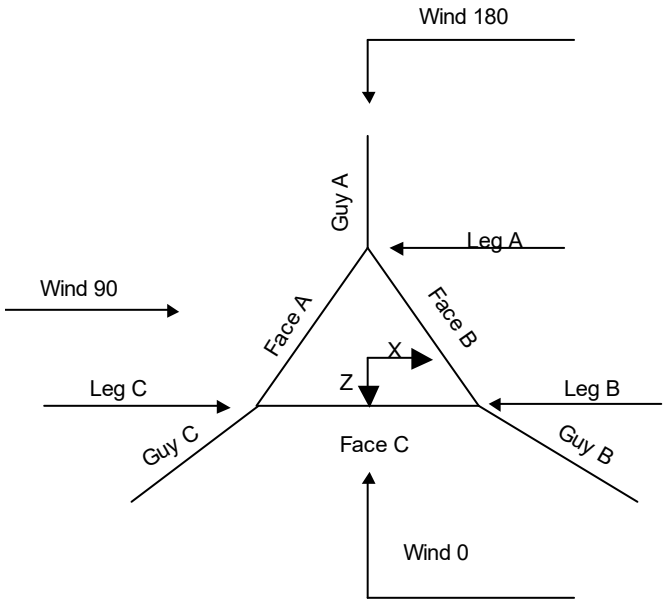
Tower Input Data

The main tower is a 3x guyed 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 6.00 ft at the top and tapered at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 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.
Tension only take-up is 0.0313 in.
Pressures are calculated at each section.
Safety factor used in guy design is 1.
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

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



Corner & Starmount Guyed Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	120.00-112.00			6.00	1	8.00
T2	112.00-87.00			6.00	1	25.00
T3	87.00-62.00			6.00	1	25.00
T4	62.00-37.00			6.00	1	25.00
T5	37.00-12.00			6.00	1	25.00
T6	12.00-0.00			6.00	1	12.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	120.00-112.00	8.00	TX Brace	No	Yes	0.0000	0.0000
T2	112.00-87.00	8.00	TX Brace	No	Yes	6.0000	6.0000
T3	87.00-62.00	8.00	TX Brace	No	Yes	6.0000	6.0000
T4	62.00-37.00	8.00	TX Brace	No	Yes	6.0000	6.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T5	37.00-12.00	8.00	TX Brace	No	Yes	6.0000	6.0000
T6	12.00-0.00	2.00	X Brace	No	Yes	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 120.00-112.00	Solid Round	4 1/2	A7-33 (33 ksi)	Solid Round	3/4	A7-33 (33 ksi)
T2 112.00-87.00	Solid Round	4 1/2	A7-33 (33 ksi)	Solid Round	3/4	A7-33 (33 ksi)
T3 87.00-62.00	Solid Round	4 1/2	A7-33 (33 ksi)	Solid Round	3/4	A7-33 (33 ksi)
T4 62.00-37.00	Solid Round	4 1/2	A7-33 (33 ksi)	Solid Round	3/4	A7-33 (33 ksi)
T5 37.00-12.00	Solid Round	4 1/2	A7-33 (33 ksi)	Solid Round	3/4	A7-33 (33 ksi)
T6 12.00-0.00	Solid Round	4 1/2	A7-33 (33 ksi)	Solid Round		A7-33 (33 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 120.00-112.00	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)
T2 112.00-87.00	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)
T3 87.00-62.00	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)
T4 62.00-37.00	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)
T5 37.00-12.00	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 120.00-112.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)
T2 112.00-87.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T3 87.00-62.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)
T4 62.00-37.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)
T5 37.00-12.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 ksi)
T6 12.00-0.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A7-33 (33 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	Double Angle Stitch Bolt Spacing Redundants in
T1 120.00-112.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt	36.0000
T2 112.00-87.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt	36.0000
T3 87.00-62.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt	36.0000
T4 62.00-37.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt	36.0000
T5 37.00-12.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt	36.0000
T6 12.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	Mid-Pt	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	1	1	1
120.00-112.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
112.00-87.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
87.00-62.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
62.00-37.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
37.00-12.00				1	1	1	1	1	1	1
T6 12.00-0.00	Yes	Yes	0.2	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 120.00-112.00	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 112.00-87.00	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 87.00-62.00	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 62.00-37.00	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 37.00-12.00	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 12.00-0.00	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

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension lb	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
103.5	BS	A	5/8	4800.00	10%	24000	0.820	267.17	250.00	0.0000	0.00	100%
		B	5/8	4800.00	10%	24000	0.820	267.17	250.00	0.0000	0.00	100%
		C	5/8	4800.00	10%	24000	0.820	267.17	250.00	0.0000	0.00	100%

Guy Data*(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
103.5	Corner						

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
103.50	A572-50 (50 ksi)	Solid Round				A572-50 (50 ksi)	Solid Round	

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A lb	Cable Weight B lb	Cable Weight C lb	Cable Weight D lb	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
103.5	219.08	219.08	219.08		6.05 4.2 sec/pulse	6.05 4.2 sec/pulse	6.05 4.2 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
103.5	No	No			1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
103.5	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
103.5	A	51.75	17	4	2.0920
	B	51.75	17	4	2.0920
	C	51.75	17	4	2.0920

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
MACX675A (6-1/8 AIR)	A	No	Ar (CaAa)	120.00 - 10.00	-18.0000	0	1	1	6.0800	6.0800		4.52
Climbing Ladder *****	C	No	Af (CaAa)	120.00 - 0.00	0.0000	0.3	2	2	24.0000 0.2500	2.0000		7.90
Feedline Ladder (Af)	B	No	Af (CaAa)	103.00 - 0.00	-6.0000	0.3	2	2	3.0000	3.0000		8.40

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
LDF6-50A (1-1/4 FOAM) (T-Mobile) ****** ********** ********** *********	B	No	Ar (CaAa)	103.00 - 0.00	-8.0000	0.3	8	4	1.5500	1.5500		0.66
Highcapacity Hybrid for TMO - 1.584" (T-Mobile)	B	No	Ar (CaAa)	103.00 - 0.00	-2.0000	0.32	1	1	1.5840	1.5840		1.61
Highcapacity Hybrid for TMO - 1.584" (T-Mobile)	B	No	Ar (CaAa)	103.00 - 0.00	-2.0000	0.34	1	1	1.5840	1.5840		1.61

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	120.00-112.00	A	0.000	0.000	3.119	0.000	36.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	5.333	0.000	126.40
T2	112.00-87.00	A	0.000	0.000	9.963	0.000	113.00
		B	0.000	0.000	40.909	0.000	404.93
		C	0.000	0.000	16.667	0.000	395.00
T3	87.00-62.00	A	0.000	0.000	10.383	0.000	113.00
		B	0.000	0.000	63.920	0.000	632.70
		C	0.000	0.000	16.667	0.000	395.00
T4	62.00-37.00	A	0.000	0.000	11.008	0.000	113.00
		B	0.000	0.000	63.920	0.000	632.70
		C	0.000	0.000	16.667	0.000	395.00
T5	37.00-12.00	A	0.000	0.000	11.829	0.000	113.00
		B	0.000	0.000	63.920	0.000	632.70
		C	0.000	0.000	16.667	0.000	395.00
T6	12.00-0.00	A	0.000	0.000	0.946	0.000	9.04
		B	0.000	0.000	30.682	0.000	303.70
		C	0.000	0.000	8.000	0.000	189.60

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	120.00-112.00	A	2.268	0.000	0.000	8.493	0.000	221.20
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	12.591	0.000	336.21
T2	112.00-87.00	A	2.233	0.000	0.000	26.367	0.000	680.09
		B		0.000	0.000	85.808	0.000	1971.84
		C		0.000	0.000	39.000	0.000	1035.00
T3	87.00-62.00	A	2.170	0.000	0.000	26.048	0.000	659.70
		B		0.000	0.000	132.352	0.000	3005.58
		C		0.000	0.000	38.363	0.000	1006.57

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
T4	62.00-37.00	A	2.083	0.000	0.000	25.614	0.000	632.27
		B		0.000	0.000	130.001	0.000	2904.35
		C		0.000	0.000	37.494	0.000	968.75
T5	37.00-12.00	A	1.941	0.000	0.000	24.907	0.000	588.62
		B		0.000	0.000	126.180	0.000	2743.75
		C		0.000	0.000	36.080	0.000	909.57
T6	12.00-0.00	A	1.687	0.000	0.000	1.891	0.000	41.05
		B		0.000	0.000	57.269	0.000	1184.37
		C		0.000	0.000	16.095	0.000	389.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	120.00-112.00	-1.2714	1.2771	-2.2026	2.1896
T2	112.00-87.00	1.3604	1.9616	-0.5478	2.0049
T3	87.00-62.00	2.1237	2.1301	0.0347	1.9158
T4	62.00-37.00	2.1075	2.1137	0.0672	1.9055
T5	37.00-12.00	2.0865	2.0924	0.1201	1.8894
T6	12.00-0.00	1.3984	1.2589	-0.0468	1.5989

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	MACX675A (6-1/8 AIR)	112.00 - 120.00	1.0000	0.5020
T1	2	Climbing Ladder	112.00 - 120.00	0.6000	0.5020
T2	1	MACX675A (6-1/8 AIR)	87.00 - 112.00	1.0000	0.5561
T2	2	Climbing Ladder	87.00 - 112.00	0.6000	0.5561
T2	4	Feedline Ladder (Af)	87.00 - 103.00	0.6000	0.5561
T2	5	LDF6-50A (1-1/4 FOAM)	87.00 - 103.00	0.6000	0.5561
T2	12	Highcapacity Hybrid for TMO - 1.584"	87.00 - 103.00	0.6000	0.5561
T2	13	Highcapacity Hybrid for TMO - 1.584"	87.00 - 103.00	0.6000	0.5561
T3	1	MACX675A (6-1/8 AIR)	62.00 - 87.00	1.0000	0.5635
T3	2	Climbing Ladder	62.00 - 87.00	0.6000	0.5635
T3	4	Feedline Ladder (Af)	62.00 - 87.00	0.6000	0.5635
T3	5	LDF6-50A (1-1/4 FOAM)	62.00 - 87.00	0.6000	0.5635
T3	12	Highcapacity Hybrid for TMO - 1.584"	62.00 - 87.00	0.6000	0.5635
T3	13	Highcapacity Hybrid for TMO - 1.584"	62.00 - 87.00	0.6000	0.5635
T4	1	MACX675A (6-1/8 AIR)	37.00 - 62.00	1.0000	0.5737
T4	2	Climbing Ladder	37.00 - 62.00	0.6000	0.5737
T4	4	Feedline Ladder (Af)	37.00 - 62.00	0.6000	0.5737
T4	5	LDF6-50A (1-1/4 FOAM)	37.00 - 62.00	0.6000	0.5737
T4	12	Highcapacity Hybrid for	37.00 - 62.00	0.6000	0.5737

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	13	TMO - 1.584" Highcapacity Hybrid for TMO - 1.584"	37.00 - 62.00	0.6000	0.5737
T5	1	MACX675A (6-1/8 AIR)	12.00 - 37.00	1.0000	0.5903
T5	2	Climbing Ladder	12.00 - 37.00	0.6000	0.5903
T5	4	Feedline Ladder (Af)	12.00 - 37.00	0.6000	0.5903
T5	5	LDF6-50A (1-1/4 FOAM)	12.00 - 37.00	0.6000	0.5903
T5	12	Highcapacity Hybrid for TMO - 1.584"	12.00 - 37.00	0.6000	0.5903
T5	13	Highcapacity Hybrid for TMO - 1.584"	12.00 - 37.00	0.6000	0.5903
T6	1	MACX675A (6-1/8 AIR)	10.00 - 12.00	1.0000	0.4205
T6	2	Climbing Ladder	0.00 - 12.00	0.6000	0.4205
T6	4	Feedline Ladder (Af)	0.00 - 12.00	0.6000	0.4205
T6	5	LDF6-50A (1-1/4 FOAM)	0.00 - 12.00	0.6000	0.4205
T6	12	Highcapacity Hybrid for TMO - 1.584"	0.00 - 12.00	0.6000	0.4205
T6	13	Highcapacity Hybrid for TMO - 1.584"	0.00 - 12.00	0.6000	0.4205

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
TFU-30J	B	None			0.0000	120.00	No Ice	50.00	50.00	100.00
							1/2" Ice	53.43	53.43	348.92
							1" Ice	56.88	56.88	622.67
****										
*****										
**********										
**********										
AIR 21 B2A/B4P w/ Mount Pipe	A	From Leg	0.00		0.0000	103.00	No Ice	6.16	5.55	103.38
			0.00				1/2" Ice	6.60	6.30	159.18
(T-Mobile)			0.00				1" Ice	7.03	7.00	221.63
AIR 21 B2A/B4P w/ Mount Pipe	B	From Leg	0.00		0.0000	103.00	No Ice	6.16	5.55	103.38
			0.00				1/2" Ice	6.60	6.30	159.18
(T-Mobile)			0.00				1" Ice	7.03	7.00	221.63
AIR 21 B2A/B4P w/ Mount Pipe	C	From Leg	0.00		0.0000	103.00	No Ice	6.16	5.55	103.38
			0.00				1/2" Ice	6.60	6.30	159.18
(T-Mobile)			0.00				1" Ice	7.03	7.00	221.63
AIR 32 B2a/B66Aa w/ Mount Pipe	A	From Leg	0.00		0.0000	103.00	No Ice	6.75	6.07	153.07
			0.00				1/2" Ice	7.20	6.87	214.04
(T-Mobile)			0.00				1" Ice	7.65	7.58	281.89
AIR 32 B2a/B66Aa w/ Mount Pipe	B	From Leg	0.00		0.0000	103.00	No Ice	6.75	6.07	153.07
			0.00				1/2" Ice	7.20	6.87	214.04
(T-Mobile)			0.00				1" Ice	7.65	7.58	281.89
AIR 32 B2a/B66Aa w/ Mount Pipe	C	From Leg	0.00		0.0000	103.00	No Ice	6.75	6.07	153.07
			0.00				1/2" Ice	7.20	6.87	214.04
(T-Mobile)			0.00				1" Ice	7.65	7.58	281.89
Generic Twin AWS TMA	A	From Leg	0.00		0.0000	103.00	No Ice	0.64	0.52	22.43

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
(T-Mobile)			0.00			1/2" Ice	0.82	0.71	31.53
			0.00			1" Ice	1.00	0.91	43.17
Generic Twin AWS TMA	B	From Leg	0.00	0.0000	103.00	No Ice	0.64	0.52	22.43
(T-Mobile)			0.00			1/2" Ice	0.82	0.71	31.53
			0.00			1" Ice	1.00	0.91	43.17
Generic Twin AWS TMA	C	From Leg	0.00	0.0000	103.00	No Ice	0.64	0.52	22.43
(T-Mobile)			0.00			1/2" Ice	0.82	0.71	31.53
			0.00			1" Ice	1.00	0.91	43.17
LNX-6515DS-A1M w/	A	From Leg	0.00	0.0000	103.00	No Ice	11.68	9.84	83.27
Mount Pipe			0.00			1/2" Ice	12.40	11.37	172.93
(T-Mobile)			0.00			1" Ice	13.14	12.91	272.55
LNX-6515DS-A1M w/	B	From Leg	0.00	0.0000	103.00	No Ice	11.68	9.84	83.27
Mount Pipe			0.00			1/2" Ice	12.40	11.37	172.93
(T-Mobile)			0.00			1" Ice	13.14	12.91	272.55
LNX-6515DS-A1M w/	C	From Leg	0.00	0.0000	103.00	No Ice	11.68	9.84	83.27
Mount Pipe			0.00			1/2" Ice	12.40	11.37	172.93
(T-Mobile)			0.00			1" Ice	13.14	12.91	272.55
RRUS 11 B12	A	From Leg	0.00	0.0000	103.00	No Ice	2.83	1.18	50.70
			0.00			1/2" Ice	3.04	1.33	71.57
			0.00			1" Ice	3.26	1.48	95.49
RRUS 11 B12	B	From Leg	0.00	0.0000	103.00	No Ice	2.83	1.18	50.70
			0.00			1/2" Ice	3.04	1.33	71.57
			0.00			1" Ice	3.26	1.48	95.49
RRUS 11 B12	C	From Leg	0.00	0.0000	103.00	No Ice	2.83	1.18	50.70
			0.00			1/2" Ice	3.04	1.33	71.57
			0.00			1" Ice	3.26	1.48	95.49
Sector Mount [SM 502-3]	C	None		0.0000	103.00	No Ice	33.02	33.02	1673.10
(T-Mobile)						1/2" Ice	47.36	47.36	2223.90
						1" Ice	61.70	61.70	2774.70

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy
3	1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy
4	1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy
5	1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy
6	1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy
7	1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy
8	1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy
9	1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy
10	1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy
11	1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy
12	1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy
13	1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy
14	1.2 Dead+1.0 Ice+1.0 Temp+Guy
15	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy
16	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy
17	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy

Comb. No.	Description
18	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy
19	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy
20	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy
21	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy
22	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy
23	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy
24	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy
25	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy
26	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy
27	Dead+Wind 0 deg - Service+Guy
28	Dead+Wind 30 deg - Service+Guy
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
T1	120 - 112	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	10	-7902.72	-294.47	171.77
			Max. Mx	5	-5239.48	326.72	-79.68
			Max. My	8	-4930.13	0.61	365.64
			Max. Vy	5	-574.58	-0.00	0.00
			Max. Vx	2	578.16	0.00	-0.00
		Diagonal	Max Tension	5	4655.15	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	4	-2495.11	0.00	0.00
			Max. Mx	14	-2153.03	-94.23	0.00
			Max. My	10	-2330.92	0.00	-0.00
			Max. Vy	14	-62.82	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00
		Bottom Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-2395.12	0.00	0.00
			Max. Mx	14	-2262.73	-94.23	0.00
			Max. My	10	-2147.85	0.00	0.00
			Max. Vy	14	-62.82	0.00	0.00
			Max. Vx	10	-0.00	0.00	0.00
T2	112 - 87	Leg	Max Tension	2	3593.38	1.00	689.06
			Max. Compression	17	-23240.52	-299.85	137.79
			Max. Mx	5	-10864.14	-894.69	84.56
			Max. My	8	-10353.21	-12.48	-923.35
			Max. Vy	5	-1374.13	-736.20	150.75
			Max. Vx	8	-1556.33	-3.82	-834.13
		Diagonal	Max Tension	7	6174.12	0.00	0.00
		Horizontal	Max Tension	19	3196.24	0.00	0.00
			Max. Compression	3	-4131.27	0.00	0.00
			Max. Mx	14	351.32	-92.70	0.00
			Max. My	10	289.00	0.00	-0.00
			Max. Vy	14	-61.80	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	4	-2266.47	0.00	0.00
			Max. Mx	14	-2168.29	-92.70	0.00
			Max. My	10	-2222.50	0.00	0.00
			Max. Vy	14	-61.80	0.00	0.00
			Max. Vx	10	-0.00	0.00	0.00
		Bottom Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-2545.95	0.00	0.00
			Max. Mx	14	-1965.78	-92.70	0.00
			Max. My	10	-2309.27	0.00	-0.00
			Max. Vy	14	-61.80	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00
		Guy A	Bottom Tension	21	14742.32		
			Top Tension	7	15446.61		
			Top Cable Vert	21	6883.74		
			Top Cable Norm	21	13827.93		
			Top Cable Tan	21	0.67		
			Bot Cable Vert	7	-5567.98		
			Bot Cable Norm	7	13650.15		
			Bot Cable Tan	7	82.57		
		Guy B	Bottom Tension	25	14639.74		
			Top Tension	11	15103.22		
			Top Cable Vert	25	6751.34		
			Top Cable Norm	25	13510.24		
			Top Cable Tan	25	0.63		
			Bot Cable Vert	11	-5528.44		
			Bot Cable Norm	11	13555.50		
			Bot Cable Tan	11	82.84		
		Guy C	Bottom Tension	17	14681.33		
			Top Tension	5	15302.82		
			Top Cable Vert	17	6828.30		
			Top Cable Norm	17	13694.91		
			Top Cable Tan	17	1.32		
			Bot Cable Vert	5	-5544.47		
			Bot Cable Norm	5	13593.87		
			Bot Cable Tan	5	83.06		
T3	87 - 62	Leg	Max Tension	2	12733.22	-18.05	121.54
			Max. Compression	4	-34904.73	-163.11	127.88
			Max. Mx	5	1937.74	714.82	155.43
			Max. My	2	3539.79	5.87	-801.51
			Max. Vy	5	-1368.09	-50.71	32.35
			Max. Vx	8	-1550.81	-2.86	-57.59
		Diagonal	Max Tension	9	5385.73	0.00	0.00
		Horizontal	Max Tension	4	604.57	0.00	0.00
			Max. Compression	4	-4301.32	0.00	0.00
			Max. Mx	14	429.44	-89.92	0.00
			Max. My	10	445.12	0.00	-0.00
			Max. Vy	14	59.95	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-2257.76	0.00	0.00
			Max. Mx	14	-1950.16	-89.92	0.00
			Max. My	10	-1892.68	0.00	0.00
			Max. Vy	14	59.95	0.00	0.00
			Max. Vx	10	-0.00	0.00	0.00
		Bottom Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-2303.18	0.00	0.00
			Max. Mx	14	-1894.55	-89.92	0.00
			Max. My	10	-2161.72	0.00	-0.00
			Max. Vy	14	59.95	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
T4	62 - 37	Leg	Max Tension	2	12706.95	3.78	-77.23
			Max. Compression	4	-38222.76	-3.90	-19.76
			Max. Mx	10	4814.64	-358.28	126.36
			Max. My	2	5020.49	-35.08	-390.77
			Max. Vy	10	-576.40	-71.29	49.05
			Max. Vx	2	-611.16	4.37	-86.46
		Diagonal	Max Tension	10	4184.44	0.00	0.00
		Horizontal	Max Tension	4	662.04	0.00	0.00
			Max. Compression	4	-4273.84	0.00	0.00
			Max. Mx	14	506.16	-86.20	0.00
			Max. My	10	493.37	0.00	-0.00
			Max. Vy	14	-57.47	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	12	-2088.57	0.00	0.00
			Max. Mx	14	-1929.35	-86.20	0.00
			Max. My	10	-2047.83	0.00	0.00
			Max. Vy	14	-57.47	0.00	0.00
			Max. Vx	10	-0.00	0.00	0.00
		Bottom Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-2017.87	0.00	0.00
			Max. Mx	14	-1848.68	-86.20	0.00
			Max. My	10	-2003.55	0.00	-0.00
			Max. Vy	14	-57.47	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00
T5	37 - 12	Leg	Max Tension	2	9374.99	4.48	-86.46
			Max. Compression	25	-37951.40	-481.17	-193.54
			Max. Mx	18	-31750.26	-1722.90	958.40
			Max. My	21	-31941.18	-34.85	-2012.69
			Max. Vy	25	-4311.56	1674.38	1038.77
			Max. Vx	21	4772.31	-34.85	-2012.69
		Diagonal	Max Tension	10	5418.37	0.00	0.00
		Horizontal	Max Tension	25	657.34	0.00	0.00
			Max. Compression	12	-4192.65	0.00	0.00
			Max. Mx	14	583.84	-80.32	0.00
			Max. My	10	487.62	0.00	-0.00
			Max. Vy	14	53.55	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	12	-2307.25	0.00	0.00
			Max. Mx	14	-1892.95	-80.32	0.00
			Max. My	10	-2139.25	0.00	-0.00
			Max. Vy	14	53.55	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00
		Bottom Girt	Max Tension	19	665.86	0.00	0.00
			Max. Compression	8	-822.73	0.00	0.00
			Max. Mx	14	554.83	-80.32	0.00
			Max. My	10	-618.11	0.00	-0.00
			Max. Vy	14	53.55	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00
T6	12 - 0	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	25	-35671.52	-152.05	-99.13
			Max. Mx	21	-33285.69	2072.69	-37.17
			Max. My	9	-7405.76	25.67	-620.98
			Max. Vy	21	1244.56	-495.93	22.91
			Max. Vx	3	-282.59	-230.22	359.64
		Horizontal	Max Tension	15	1987.65	44.72	8.16
			Max. Compression	19	-120.02	16.81	15.68
			Max. Mx	3	474.50	80.73	-85.00
			Max. My	3	474.70	-62.68	94.19
			Max. Vy	10	-152.08	79.03	-15.37

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Vx	10	-64.71	-5.56	27.34

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Mast	Max. Vert	19	93299.89	-854.74	-374.30
	Max. H_x	11	45749.79	4005.55	108.68
	Max. H_z	2	46921.68	17.85	4176.48
	Max. M_x	1	0.00	14.44	54.57
	Max. M_z	1	0.00	14.44	54.57
	Max. Torsion	9	2156.52	1975.44	-3408.56
	Min. Vert	1	36267.02	14.44	54.57
	Min. H_x	5	45772.27	-3969.79	109.01
	Min. H_z	8	44460.52	18.61	-4039.06
	Min. M_x	1	0.00	14.44	54.57
	Min. M_z	1	0.00	14.44	54.57
	Min. Torsion	3	-2147.10	-2012.47	3501.60
Guy C @ 250 ft Elev 0 ft Azimuth 240 deg	Max. Vert	10	-158.19	-483.25	279.04
	Max. H_x	10	-158.19	-483.25	279.04
	Max. H_z	17	-4686.68	-11885.23	6860.42
	Min. Vert	4	-5546.66	-11755.56	6785.64
	Min. H_x	17	-4686.68	-11885.23	6860.42
	Min. H_z	10	-158.19	-483.25	279.04
Guy B @ 250 ft Elev 0 ft Azimuth 120 deg	Max. Vert	6	-157.59	481.99	278.29
	Max. H_x	11	-5528.44	11780.83	6706.01
	Max. H_z	13	-5507.60	11655.31	6823.61
	Min. Vert	12	-5535.30	11731.69	6772.60
	Min. H_x	6	-157.59	481.99	278.29
	Min. H_z	6	-157.59	481.99	278.29
Guy A @ 250 ft Elev 0 ft Azimuth 0 deg	Max. Vert	2	-159.87	0.02	-562.06
	Max. H_x	24	-3739.68	251.29	-11356.98
	Max. H_z	2	-159.87	0.02	-562.06
	Min. Vert	8	-5577.19	-0.54	-13646.50
	Min. H_x	18	-3751.38	-252.33	-11385.06
	Min. H_z	21	-4742.11	-0.67	-13856.15

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	36267.02	-14.44	-54.57	0.00	0.00	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy	46921.68	-17.85	-4176.48	0.00	0.00	1194.12
1.2 Dead+1.6 Wind 30 deg - No	45688.23	2012.47	-3501.60	0.00	0.00	2147.10

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
Ice+1.0 Guy						
1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy	44439.44	3536.51	-2121.14	0.00	0.00	2075.69
1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy	45772.27	3969.79	-109.01	0.00	0.00	1226.65
1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy	47012.14	3539.13	1987.13	0.00	0.00	639.71
1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy	45772.58	1939.49	3408.35	0.00	0.00	-73.82
1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy	44460.52	-18.61	4039.06	0.00	0.00	-1192.97
1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy	45750.53	-1975.44	3408.56	0.00	0.00	-2156.52
1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy	46988.31	-3574.94	1987.31	0.00	0.00	-2078.42
1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy	45749.79	-4005.55	-108.68	0.00	0.00	-1231.20
1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy	44430.98	-3572.27	-2120.54	0.00	0.00	-629.67
1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy	45687.91	-2048.12	-3501.34	0.00	0.00	89.38
1.2 Dead+1.0 Ice+1.0 Temp+Guy	92821.32	-144.00	-203.20	0.00	0.00	1.20
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	93239.24	-142.69	-1360.11	0.00	0.00	-18.21
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy	93071.63	418.80	-1173.32	0.00	0.00	475.18
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy	92939.76	856.84	-783.15	0.00	0.00	411.22
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	93107.26	974.82	-207.05	0.00	0.00	194.38
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy	93299.89	854.74	374.30	0.00	0.00	408.79
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy	93116.09	412.00	769.02	0.00	0.00	494.46
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	92957.29	-144.91	954.80	0.00	0.00	20.04
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy	93095.06	-701.21	769.81	0.00	0.00	-475.60
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy	93264.11	-1143.41	375.97	0.00	0.00	-418.42
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	93073.17	-1262.34	-205.13	0.00	0.00	-195.31
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy	92914.04	-1143.31	-781.76	0.00	0.00	-403.91
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy	93058.56	-704.52	-1172.60	0.00	0.00	-493.50
Dead+Wind 0 deg - Service+Guy	36415.24	-14.62	-1073.36	0.00	0.00	301.11
Dead+Wind 30 deg - Service+Guy	36365.34	473.99	-900.91	0.00	0.00	537.67
Dead+Wind 60 deg - Service+Guy	36334.51	844.52	-551.24	0.00	0.00	509.17
Dead+Wind 90 deg - Service+Guy	36370.90	962.06	-55.49	0.00	0.00	301.92
Dead+Wind 120 deg - Service+Guy	36425.21	867.05	453.93	0.00	0.00	159.13
Dead+Wind 150 deg - Service+Guy	36372.58	473.43	790.94	0.00	0.00	-18.70
Dead+Wind 180 deg - Service+Guy	36338.11	-14.60	937.03	0.00	0.00	-292.90

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 210 deg - Service+Guy	36371.11	-502.62	790.93	0.00	0.00	-537.70
Dead+Wind 240 deg - Service+Guy	36422.54	-896.25	453.93	0.00	0.00	-522.58
Dead+Wind 270 deg - Service+Guy	36368.75	-991.26	-55.48	0.00	0.00	-301.96
Dead+Wind 300 deg - Service+Guy	36333.13	-873.74	-551.22	0.00	0.00	-154.00
Dead+Wind 330 deg - Service+Guy	36364.67	-503.23	-900.90	0.00	0.00	18.81

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	0.00	-30970.89	0.00	0.02	30970.89	0.07	0.000%
2	-0.00	-37101.60	-15797.75	-0.00	37101.58	15797.37	0.001%
3	7680.16	-37033.63	-13302.43	-7680.19	37033.62	13302.15	0.001%
4	13413.15	-36965.66	-7744.09	-13412.47	36965.65	7745.22	0.003%
5	15360.33	-37033.63	0.00	-15360.08	37033.62	0.16	0.001%
6	13681.25	-37101.60	7898.87	-13680.91	37101.58	-7898.68	0.001%
7	7680.16	-37033.63	13302.43	-7679.90	37033.62	-13302.30	0.001%
8	0.00	-36965.66	15488.17	2.20	36965.65	-15488.29	0.006%
9	-7680.16	-37033.63	13302.43	7679.90	37033.62	-13302.31	0.001%
10	-13681.25	-37101.60	7898.87	13680.91	37101.58	-7898.69	0.001%
11	-15360.33	-37033.63	-0.00	15360.08	37033.62	0.16	0.001%
12	-13413.15	-36965.66	-7744.09	13412.67	36965.65	7744.92	0.002%
13	-7680.16	-37033.63	-13302.43	7680.18	37033.62	13302.15	0.001%
14	0.00	-82022.54	0.00	2.06	82022.53	2.33	0.004%
15	-0.00	-82109.39	-5372.10	-0.02	82109.38	5370.98	0.001%
16	2626.40	-82022.54	-4549.06	-2626.62	82022.53	4548.43	0.001%
17	4619.07	-81935.69	-2666.82	-4618.63	81935.68	2668.62	0.002%
18	5252.81	-82022.54	0.00	-5252.11	82022.53	0.69	0.001%
19	4652.38	-82109.39	2686.05	-4651.09	82109.37	-2685.34	0.002%
20	2626.40	-82022.54	4549.06	-2625.47	82022.53	-4548.84	0.001%
21	0.00	-81935.69	5333.64	1.09	81935.69	-5334.45	0.002%
22	-2626.40	-82022.54	4549.06	2625.65	82022.53	-4548.92	0.001%
23	-4652.38	-82109.39	2686.05	4651.26	82109.37	-2685.46	0.002%
24	-5252.81	-82022.54	-0.00	5252.22	82022.53	0.57	0.001%
25	-4619.07	-81935.69	-2666.82	4618.83	81935.69	2669.04	0.003%
26	-2626.40	-82022.54	-4549.06	2626.59	82022.53	4548.40	0.001%
27	-0.00	-30987.15	-3777.76	-0.00	30987.15	3777.52	0.001%
28	1836.58	-30970.89	-3181.05	-1836.62	30970.89	3180.93	0.000%
29	3207.52	-30954.64	-1851.86	-3207.63	30954.64	1851.96	0.000%
30	3673.16	-30970.89	0.00	-3673.06	30970.89	0.11	0.000%
31	3271.64	-30987.15	1888.88	-3271.40	30987.15	-1888.75	0.001%
32	1836.58	-30970.89	3181.05	-1836.44	30970.89	-3181.02	0.000%
33	-0.00	-30954.64	3703.73	0.01	30954.64	-3703.88	0.000%
34	-1836.58	-30970.89	3181.05	1836.44	30970.89	-3181.03	0.000%
35	-3271.64	-30987.15	1888.88	3271.41	30987.15	-1888.75	0.001%
36	-3673.16	-30970.89	-0.00	3673.07	30970.89	0.10	0.000%
37	-3207.52	-30954.64	-1851.86	3207.63	30954.64	1851.95	0.000%
38	-1836.58	-30970.89	-3181.05	1836.62	30970.89	3180.93	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00001053
2	Yes	13	0.00000001	0.00005867
3	Yes	13	0.00000001	0.00004958
4	Yes	9	0.00000001	0.00011134
5	Yes	13	0.00000001	0.00004650
6	Yes	13	0.00000001	0.00005820
7	Yes	13	0.00000001	0.00004459
8	Yes	7	0.00000001	0.00009604
9	Yes	13	0.00000001	0.00005090
10	Yes	13	0.00000001	0.00006493
11	Yes	13	0.00000001	0.00004623
12	Yes	9	0.00000001	0.00007956
13	Yes	13	0.00000001	0.00004321
14	Yes	6	0.00000001	0.00011430
15	Yes	10	0.00000001	0.00010578
16	Yes	10	0.00000001	0.00006342
17	Yes	8	0.00000001	0.00012408
18	Yes	10	0.00000001	0.00009147
19	Yes	10	0.00000001	0.00013612
20	Yes	10	0.00000001	0.00008986
21	Yes	8	0.00000001	0.00009932
22	Yes	10	0.00000001	0.00007274
23	Yes	10	0.00000001	0.00011814
24	Yes	10	0.00000001	0.00007756
25	Yes	7	0.00000001	0.00011278
26	Yes	10	0.00000001	0.00006653
27	Yes	9	0.00000001	0.00007413
28	Yes	9	0.00000001	0.00004159
29	Yes	8	0.00000001	0.00004067
30	Yes	9	0.00000001	0.00004725
31	Yes	9	0.00000001	0.00008326
32	Yes	9	0.00000001	0.00004696
33	Yes	8	0.00000001	0.00004506
34	Yes	9	0.00000001	0.00004560
35	Yes	9	0.00000001	0.00008099
36	Yes	9	0.00000001	0.00004578
37	Yes	8	0.00000001	0.00004243
38	Yes	9	0.00000001	0.00004149

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T_u lb	Allowable ϕT_n lb	Required S.F.	Actual S.F.
T2	103.50 (A) (171)	5/8 BS	4800.00	47999.95	15446.60	28800.00	1.000	1.864 ✔
	103.50 (B) (170)	5/8 BS	4800.00	47999.95	15103.20	28800.00	1.000	1.907 ✔
	103.50 (C) (169)	5/8 BS	4800.00	47999.95	15302.80	28800.00	1.000	1.882 ✔

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	Mast Stability Index	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 112	4 1/2	8.00	8.00	85.3 K=1.00	15.9043	1.00	-7902.72	332400.00	0.024 [1] ✓
T2	112 - 87	4 1/2	25.00	8.00	85.3 K=1.00	15.9043	1.00	-23240.50	332400.00	0.070 [1] ✓
T3	87 - 62	4 1/2	25.00	8.00	85.3 K=1.00	15.9043	1.00	-34904.70	332400.00	0.105 [1] ✓
T4	62 - 37	4 1/2	25.00	8.00	85.3 K=1.00	15.9043	1.00	-38222.80	332400.00	0.115 [1] ✓
T5	37 - 12	4 1/2	25.00	8.00	85.3 K=1.00	15.9043	1.00	-37951.40	332400.00	0.114 [1] ✓
T6	12 - 0	4 1/2	12.49	2.08	4.4 K=0.20	15.9043	0.92	-35671.50	434721.00	0.082 [1] ✓

[1] P_u / ϕP_n controls

Horizontal 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 $\frac{P_u}{\phi P_n}$
T2	112 - 87	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-4131.27	15489.40	0.267 [1] ✓
T3	87 - 62	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-4301.32	15489.40	0.278 [1] ✓
T4	62 - 37	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-4273.84	15489.40	0.276 [1] ✓
T5	37 - 12	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-4192.65	15489.40	0.271 [1] ✓
T6	12 - 0	L2 1/2x2 1/2x1/4	4.00	3.63	104.3 K=1.18	1.1900	-120.02	20908.60	0.006 [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	120 - 112	L2 1/2x2 1/2x1/4	6.00	5.63	130.7	1.1900	-2495.11	15489.40	0.161 [1]

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	112 - 87	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-2266.47	15489.40	0.146 [1]
T3	87 - 62	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-2257.76	15489.40	0.146 [1]
T4	62 - 37	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-2088.57	15489.40	0.135 [1]
T5	37 - 12	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-2307.25	15489.40	0.149 [1]

[1] P_u / ϕP_n controls

Bottom 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	120 - 112	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-2395.12	15489.40	0.155 [1]
T2	112 - 87	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-2545.95	15489.40	0.164 [1]
T3	87 - 62	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-2303.18	15489.40	0.149 [1]
T4	62 - 37	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-2017.87	15489.40	0.130 [1]
T5	37 - 12	L2 1/2x2 1/2x1/4	6.00	5.63	130.7 K=0.95	1.1900	-822.73	15489.40	0.053 [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 $\frac{P_u}{\phi P_n}$
T2	112 - 87	4 1/2	25.00	0.50	5.3	15.9043	3593.38	472358.00	0.008 [1]
T3	87 - 62	4 1/2	25.00	0.50	5.3	15.9043	12733.20	472358.00	0.027 [1]
T4	62 - 37	4 1/2	25.00	0.50	5.3	15.9043	12707.00	472358.00	0.027 [1]
T5	37 - 12	4 1/2	25.00	0.50	5.3	15.9043	9374.99	472358.00	0.020 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$

[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	120 - 112	3/4	10.00	9.38	600.0	0.4418	4655.15	13121.10	0.355 [1] ✔
T2	112 - 87	3/4	10.00	9.38	600.0	0.4418	6174.12	13121.10	0.471 [1] ✔
T3	87 - 62	3/4	10.00	9.38	600.0	0.4418	5385.73	13121.10	0.410 [1] ✔
T4	62 - 37	3/4	10.00	9.38	600.0	0.4418	4184.44	13121.10	0.319 [1] ✔
T5	37 - 12	3/4	10.00	9.38	600.0	0.4418	5418.37	13121.10	0.413 [1] ✔

[1] P_u / ϕP_n controls

Horizontal 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 $\frac{P_u}{\phi P_n}$
T2	112 - 87	L2 1/2x2 1/2x1/4	6.00	5.63	87.8	1.1900	3196.24	35343.00	0.090 [1] ✔
T3	87 - 62	L2 1/2x2 1/2x1/4	6.00	5.63	87.8	1.1900	604.57	35343.00	0.017 [1] ✔
T4	62 - 37	L2 1/2x2 1/2x1/4	6.00	5.63	87.8	1.1900	662.04	35343.00	0.019 [1] ✔
T5	37 - 12	L2 1/2x2 1/2x1/4	6.00	5.63	87.8	1.1900	657.34	35343.00	0.019 [1] ✔
T6	12 - 0	L2 1/2x2 1/2x1/4	6.00	5.63	87.8	1.1900	1987.65	35343.00	0.056 [1] ✔

[1] P_u / ϕP_n controls

Bottom 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 $\frac{P_u}{\phi P_n}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T5	37 - 12	L2 1/2x2 1/2x1/4	6.00	5.63	87.8	1.1900	665.86	35343.00	0.019 [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	120 - 112	Leg	4 1/2	1	-7902.72	332400.00	2.4	Pass
T2	112 - 87	Leg	4 1/2	16	-23240.50	332400.00	7.0	Pass
T3	87 - 62	Leg	4 1/2	49	-34904.70	332400.00	10.5	Pass
T4	62 - 37	Leg	4 1/2	82	-38222.80	332400.00	11.5	Pass
T5	37 - 12	Leg	4 1/2	116	-37951.40	332400.00	11.4	Pass
T6	12 - 0	Leg	4 1/2	149	-35671.50	434721.00	8.2	Pass
T1	120 - 112	Diagonal	3/4	10	4655.15	13121.10	35.5	Pass
T2	112 - 87	Diagonal	3/4	36	6174.12	13121.10	47.1	Pass
T3	87 - 62	Diagonal	3/4	81	5385.73	13121.10	41.0	Pass
T4	62 - 37	Diagonal	3/4	92	4184.44	13121.10	31.9	Pass
T5	37 - 12	Diagonal	3/4	125	5418.37	13121.10	41.3	Pass
T2	112 - 87	Horizontal	L2 1/2x2 1/2x1/4	32	-4131.27	15489.40	26.7	Pass
T3	87 - 62	Horizontal	L2 1/2x2 1/2x1/4	74	-4301.32	15489.40	27.8	Pass
T4	62 - 37	Horizontal	L2 1/2x2 1/2x1/4	107	-4273.84	15489.40	27.6	Pass
T5	37 - 12	Horizontal	L2 1/2x2 1/2x1/4	132	-4192.65	15489.40	27.1	Pass
T6	12 - 0	Horizontal	L2 1/2x2 1/2x1/4	151	1987.65	35343.00	5.6	Pass
T1	120 - 112	Top Girt	L2 1/2x2 1/2x1/4	5	-2495.11	15489.40	16.1	Pass
T2	112 - 87	Top Girt	L2 1/2x2 1/2x1/4	20	-2266.47	15489.40	14.6	Pass
T3	87 - 62	Top Girt	L2 1/2x2 1/2x1/4	54	-2257.76	15489.40	14.6	Pass
T4	62 - 37	Top Girt	L2 1/2x2 1/2x1/4	87	-2088.57	15489.40	13.5	Pass
T5	37 - 12	Top Girt	L2 1/2x2 1/2x1/4	120	-2307.25	15489.40	14.9	Pass
T1	120 - 112	Bottom Girt	L2 1/2x2 1/2x1/4	9	-2395.12	15489.40	15.5	Pass
T2	112 - 87	Bottom Girt	L2 1/2x2 1/2x1/4	22	-2545.95	15489.40	16.4	Pass
T3	87 - 62	Bottom Girt	L2 1/2x2 1/2x1/4	55	-2303.18	15489.40	14.9	Pass
T4	62 - 37	Bottom Girt	L2 1/2x2 1/2x1/4	88	-2017.87	15489.40	13.0	Pass
T5	37 - 12	Bottom Girt	L2 1/2x2 1/2x1/4	121	-822.73	15489.40	5.3	Pass
T2	112 - 87	Guy A@103.5	5/8	171	15446.60	28800.00	53.6	Pass
T2	112 - 87	Guy B@103.5	5/8	170	15103.20	28800.00	52.4	Pass
T2	112 - 87	Guy C@103.5	5/8	169	15302.80	28800.00	53.1	Pass
							Summary	
						Leg (T4)	11.5	Pass
						Diagonal (T2)	47.1	Pass
						Horizontal (T3)	27.8	Pass
						Top Girt (T1)	16.1	Pass
						Bottom Girt (T2)	16.4	Pass
						Guy A (T2)	53.6	Pass
						Guy B (T2)	52.4	Pass
						Guy C (T2)	53.1	Pass
						RATING =	**53.6**	**Pass**

Exhibit E

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11134A

Farmington/ I-84 X 37_1
200 Colt Highway
Farmington, CT 06032

May 8, 2017

EBI Project Number: 6217001963

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	10.49 %

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

EBI Consulting
environmental | engineering | due diligence

May 8, 2017

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

Emissions Analysis for Site: **CT11134A – Farmington/ I-84 X 37_1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **200 Colt Highway, Farmington, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **200 Colt Highway, Farmington, 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 (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

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

5) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

6) Since the 2100 MHz UMTS radios are ground mounted there are additional cabling losses accounted for. For each ground mounted 2100 MHz UMTS RF and additional 2.01 dB of loss was factored into the calculations used for this analysis. This is based on manufacturers Specifications for 190 feet of 1-5/8" coax cable on each path.

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 was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antennas used in this modeling are the **Ericsson AIR21 B2A/B4P** & **Ericsson AIR32 B66Aa/B2A** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-A1M** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B2A/B4P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Ericsson AIR32 B66Aa/B2A** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-A1M** has a maximum gain of **14.6 dBd** at its main lobe at 700 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antenna mounting height centerline of the proposed antennas is **103 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. For this tower, there are no additional carriers listed. There is an additional tower adjacent on the property that was included in the additional carrier contributions.

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

EBI Consulting

environmental | engineering | due diligence

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	103	Height (AGL):	103	Height (AGL):	103
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	3.57	Antenna B1 MPE%	3.57	Antenna C1 MPE%	3.57
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR32 B66Aa/B2A	Make / Model:	Ericsson AIR32 B66Aa/B2A	Make / Model:	Ericsson AIR32 B66Aa/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	103	Height (AGL):	103	Height (AGL):	103
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	3,803.71	ERP (W):	3,803.71	ERP (W):	3,803.71
Antenna A2 MPE%	1.45	Antenna B2 MPE%	1.45	Antenna C2 MPE%	1.45
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Commscope LNX-6515DS-A1M	Make / Model:	Commscope LNX-6515DS-A1M	Make / Model:	Commscope LNX-6515DS-A1M
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	103	Height (AGL):	103	Height (AGL):	103
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.71	Antenna B3 MPE%	0.71	Antenna C3 MPE%	0.71

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**5.73 %**
Adjacent Tower Contribution	4.76 %
Site Total MPE %:	**10.49 %**

T-Mobile Sector A Total:	5.73 %
T-Mobile Sector B Total:	5.73 %
T-Mobile Sector C Total:	5.73 %
Site Total:	10.49 %

T-Mobile _Max Values per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	103	17.84	AWS - 2100 MHz	1000	1.78%
T-Mobile PCS - 1900 MHz LTE	2	2,334.27	103	17.84	PCS - 1900 MHz	1000	1.78%
T-Mobile AWS - 2100 MHz UMTS	2	734.72	103	5.61	AWS - 2100 MHz	1000	0.56%
T-Mobile PCS - 1900 MHz GSM	2	1,167.14	103	8.92	PCS - 1900 MHz	1000	0.89%
T-Mobile 700 MHz LTE	1	865.21	103	3.31	700 MHz	467	0.71%
						Total*:	**5.73%**

*NOTE: Totals may vary by 0.01% due to summing or remainders

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 A:	5.73 %
Sector B:	5.73 %
Sector C:	5.73 %
T-Mobile Per Sector Maximum:	5.73 %
Site Total:	10.49 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **10.49%** 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.