November 15, 2016

VIA EMAIL AND OVERNIGHT DELIVERY

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

RE: T-Mobile Northeast LLC – CT11227A
Notice of Exempt Modification
482 Pigeon Hill Road, Windsor, CT
LAT: 41-51-59.89N
LNG: -72-40-29.19W

Dear Ms. Bachman:

T-Mobile Northeast LLC ("T-Mobile") currently maintains nine (9) antennas at the 145' level on the existing 145' tall monopole located at 482 Pigeon Hill Road, Windsor, CT. The tower is owned by Cellco Partnership d/b/a Verizon Wireless ("Cellco"). T- Mobile intends to replace (3) existing APX18 antennas with (3) new 700 MHz antenna, as well as remove (3) APX18 antennas, and (3) APX16 antennas are to remain. These antennas will be installed at the 145' level of the tower.

The existing facility consists of a 145' foot monopole tower. The tower is owned by Cellco; their use of the tower was approved by the Council on July 11, 1986 (Docket No. 58).

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50j-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. l6-50j-73, a copy of this letter is being sent to Peter Souza, Town Manager for the Town of Windsor, and the property owner, Cellco.

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

1. The proposed modifications will not result in an increase in the height of the existing structure. T-Mobile proposes to swap three (3) new antennas, and have (3) antennas remain, at a centerline height of 145' on the existing 160' monopole, and remove (3) antennas.

2. The proposed modifications will not require the extension of the site boundary. T-Mobile does not propose any equipment modifications at

grade. Thus, there will be no effect on the site compound or T-Mobile's leased area.

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. The incremental effect of the proposed changes will be negligible.

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. As indicated in the attached power density calculations, T-Mobile's operations at the site will result in a power density of 1.84%; the combined site operations will result in a total power density of 5.52%.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site. T-Mobile will swap antennas on the existing wireless frames.

6. The existing structure and its foundation can support the proposed loading. As indicated in the attached structural analysis the subject tower is adequate to support the proposed T-Mobile equipment upgrade.

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. J 6-50j-72(b)(2) .

Please feel free to call me with any questions or concerns regarding this matter. Thank you for your consideration.

Respectfully submitted,

By: _____
Jamie Ford, Agent for T-Mobile
jford@verticaldevelopmentllc.com
774-248-5373

Attachments

cc: Peter Souza, Town Manager, Town of Windsor
Aleksey Tyurin, Cellco Partnership

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

WINDSOR I91/X38

SITE ID: CT11227D

482 PIGEON HILL ROAD

WINDSOR, CT 06095

T-MOBILE RF CONFIGURATION:
1HP_704Bu

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

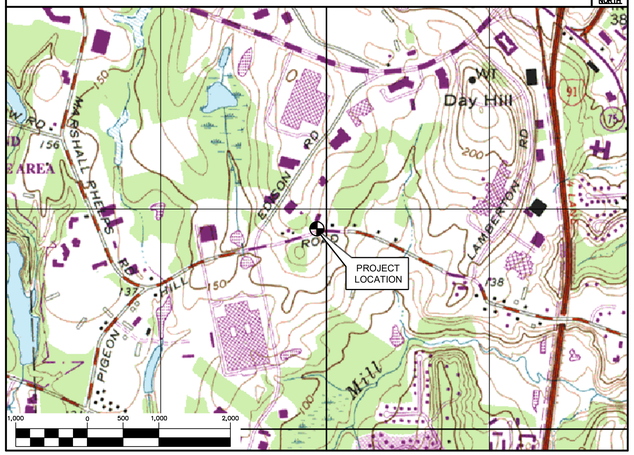
TO: 482 PIGEON HILL ROAD
WINDSOR, CT 06095

1.	HEAD NORTH ON GRIFFIN RD S TOWARD HARTFORD RD.	0.21 MI.
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	2.52 MI.
3.	TURN RIGHT ONTO MARSHALL PHELPS RD.	0.80 MI.
4.	TAKE THE 1ST LEFT ONTO PIGEON HILL RD.	0.55 MI.
5.	482 PIGEON HILL ROAD IS ON YOUR LEFT	

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. THE REMOVAL OF SIX (6) EXISTING T-MOBILE ANTENNAS AND THE INSTALLATION OF THREE (3) T-MOBILE ANTENNAS ALONG WITH THREE (3) RRU'S MOUNTED AT A CENTERLINE ELEVATION OF 145' ON AN EXISTING 160' TALL LATTICE TOWER.
2. POWER & TELCO UTILITIES WILL BE ROUTED UNDERGROUND FROM THEIR RESPECTIVE DEMARCS LOCATED WITHIN THE EXISTING FENCED COMPOUND.

PROJECT INFORMATION

SITE NAME:	WINDSOR I91/X38
SITE ID:	CT11227D
SITE ADDRESS:	482 PIGEON HILL ROAD WINDSOR, CT 06095
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	JAIME FORD (PROJECT MANAGER) (774) 248-5373 VERTICAL DEVELOPMENT, LLC
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-51'-59.89" N LONGITUDE: 72°-40'-29.19" W GROUND ELEVATION: 170'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM CSC WEBLOG.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	10/31/16	KAMJR	HMR	CONSTRUCTION DRAWINGS
0	10/20/16	KAMJR	HMR	CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

T-Mobile

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
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Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
WINDSOR I91/X38
SITE ID: CT11227D
482 PIGEON HILL ROAD
WINDSOR, CT 06095

DATE: 10/11/16
SCALE: AS NOTED
JOB NO. 16159.02

TITLE SHEET

T-1

Sheet No. 1 of 5

DESIGN BASIS

1. GOVERNING CODE: 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CT STATE SUPPLEMENT.
2. TIA/EIA-222 REVISION "G", ASCE MANUAL NO. 72 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES SECOND EDITION".
3. DESIGN CRITERIA:

   WIND LOAD: (TOWER & FOUNDATION)
   NOMINAL DESIGN WIND SPEED (V) = 97 MPH (2016 CSBC: APPENDIX 'N')

GENERAL NOTES

1. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
2. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.
3. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
4. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. ALL RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED OFF SITE AND BE LEGALLY DISPOSED, AT NO ADDITIONAL COST.
4. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE EQUIPMENT AND TOWER AREAS.
5. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
6. THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
7. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
8. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
9. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
10. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.

ELECTRIC NOTES

1. ALL NEW ANTENNAS SHALL BE BONDED TO EXISTING GROUNDING SYSTEM PER MANUFACTURERS AND NEC SPECIFICATIONS. COORDINATE WITH CONSTRUCTION MANAGER FOR REQUIREMENTS.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	10/31/16	KAMJR	HMR	CONSTRUCTION DRAWINGS
0	10/20/16	KAMJR	HMR	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

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T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

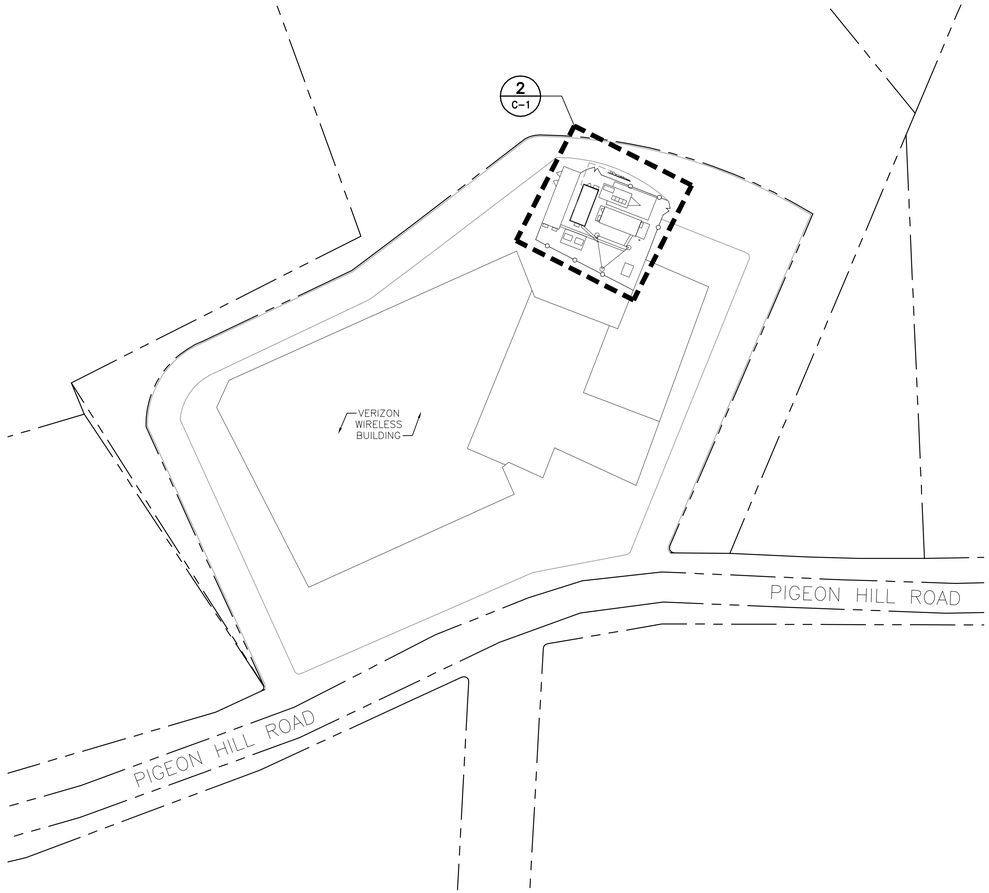
WINDSOR 191/X38
SITE ID: CT11227D

482 PIGEON HILL ROAD
WINDSOR, CT 06095

DATE: 10/11/16
SCALE: AS NOTED
JOB NO. 16159.02

DESIGN BASIS AND SITE NOTES

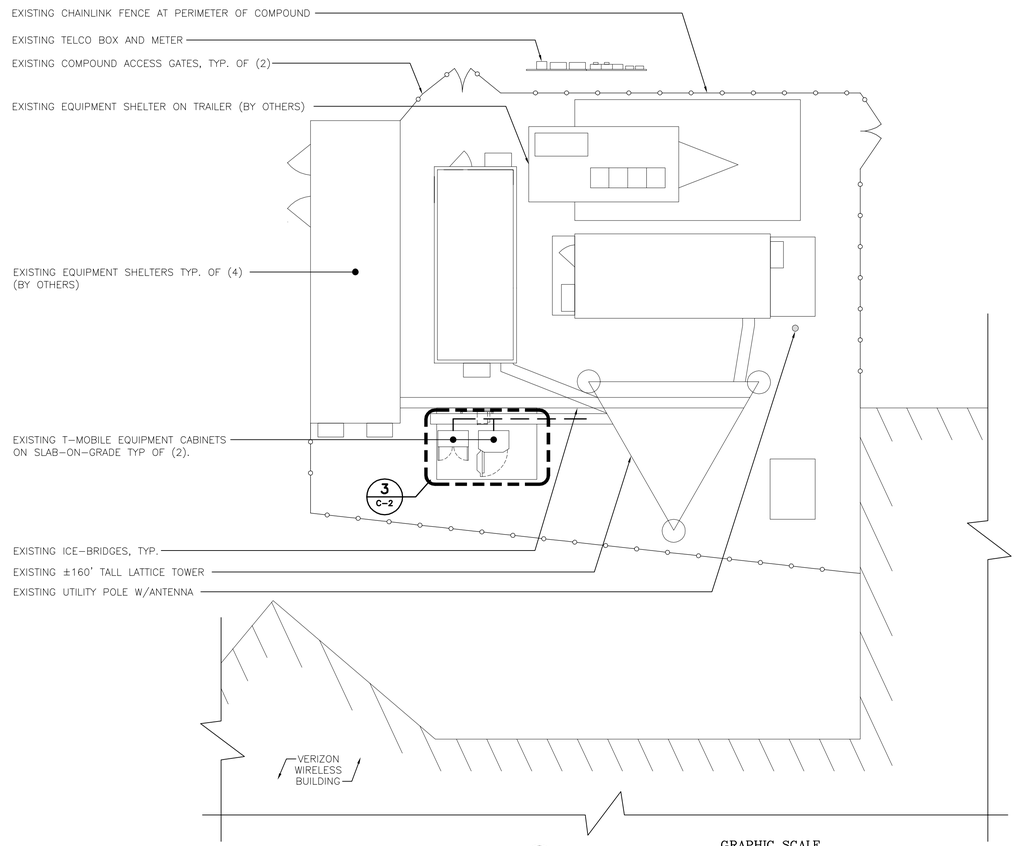
N-1



1 C-1 **SITE LOCATION PLAN**
SCALE: 1" = 50'

TRUE NORTH

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.



2 C-1 **COMPOUND PLAN**
SCALE: 1" = 10'

TRUE NORTH

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	10/20/16	KAMJR	HMR	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW
1	10/31/16	KAMJR	HMR	CONSTRUCTION DRAWINGS

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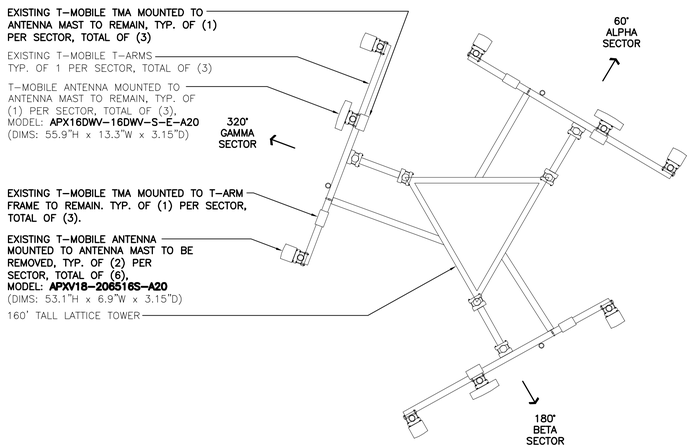
SITE ID: CT11227D
482 PIGEON HILL ROAD
WINDSOR, CT 06095

DATE: 10/11/16
SCALE: AS NOTED
JOB NO. 16159.02

SITE LOCATION PLAN AND COMPOUND PLAN

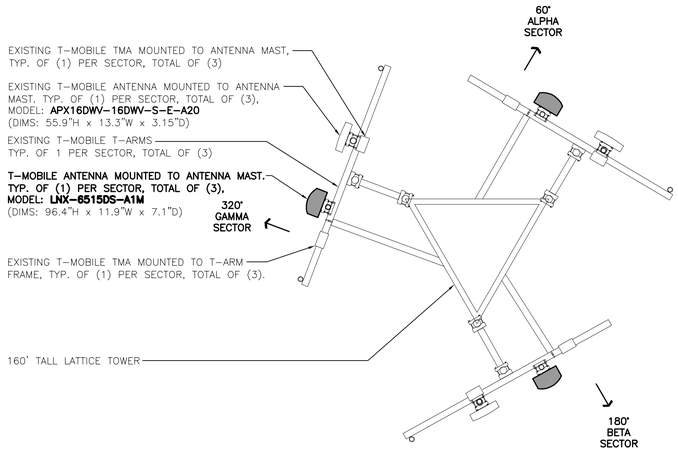
C-1

Sheet No. 3 of 5

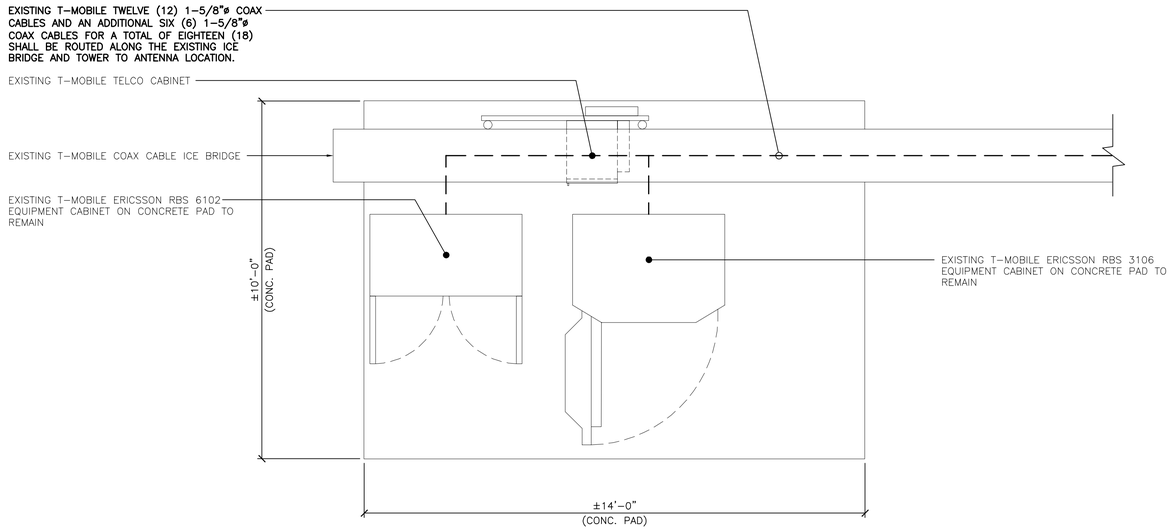


1 / C-2 **EXISTING ANTENNA MOUNTING CONFIGURATION**
SCALE: 3/8" = 1'

T-MOBILE RAN TEMPLATE: 704Bu OUTDOOR
T-MOBILE RF CONFIGURATION: 1HP_704Bu

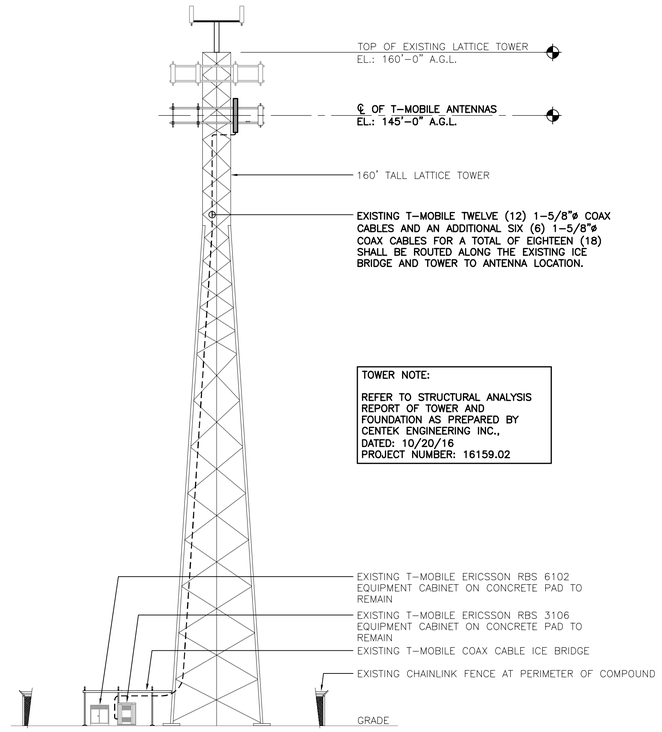


2 / C-2 **PROPOSED ANTENNA MOUNTING CONFIGURATION**
SCALE: 3/8" = 1'



3 / C-2 **EQUIPMENT PLAN**
SCALE: 1/2" = 1'

TRUE NORTH



GRAPHIC SCALE
17 0 8.5 17 34 68
(IN FEET)
1 inch = 17 ft.

4 / C-2 **TOWER ELEVATION**
SCALE: 1" = 17'

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	10/31/16	KAMJR	HMR	CONSTRUCTION DRAWINGS
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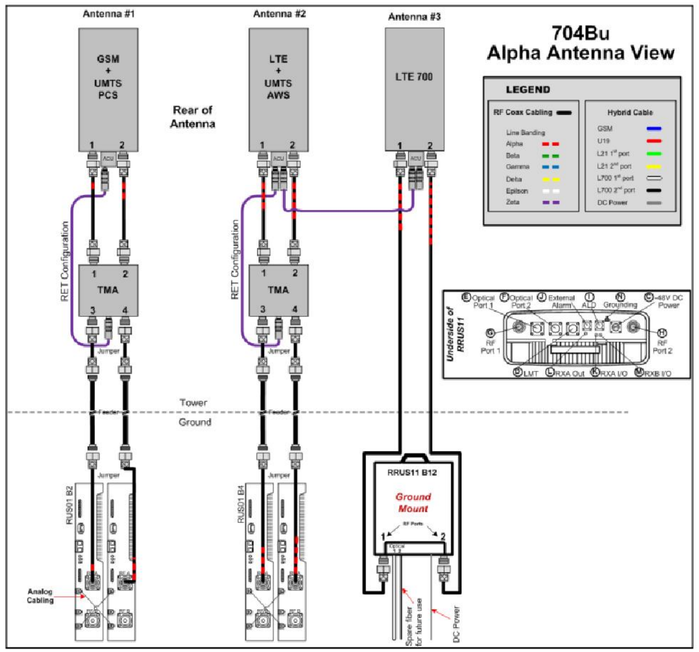
DATE:	10/11/16
SCALE:	AS NOTED
JOB NO.	16159.02

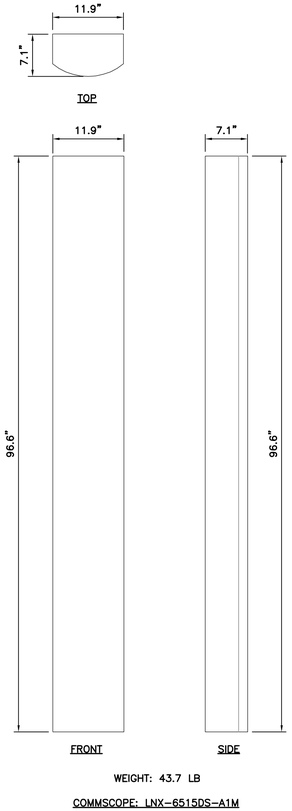
EQUIPMENT PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.

C-2

Sheet No. 4 of 5

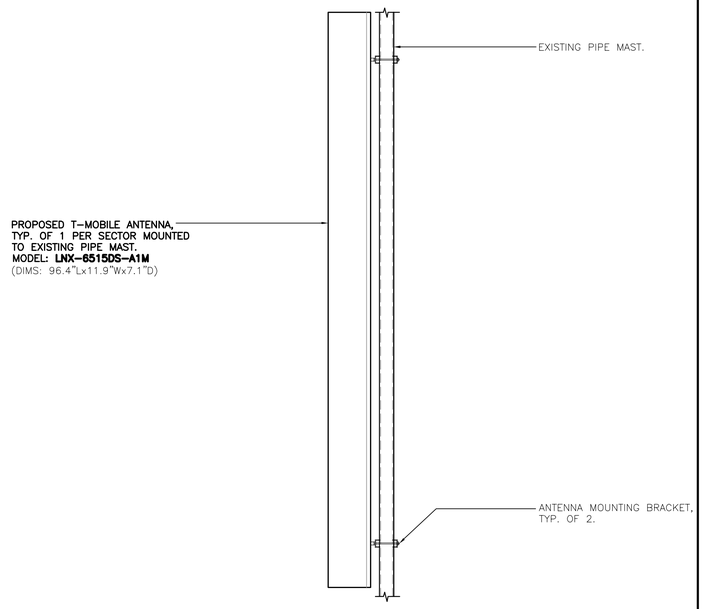


3 C-3 **PROPOSED PLUMBING DIAGRAM**
SCALE: NOT TO SCALE



WEIGHT: 43.7 LB
COMMSCOPE: LNX-6515DS-A1M

2 C-3 **PROPOSED ANTENNA DETAIL**
SCALE: 1" = 1'-0"



1 C-3 **PROPOSED ANTENNA MOUTNING DETAIL**
SCALE: 1" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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SCALE: AS NOTED
JOB NO. 16159.02

ANTENNA DETAILS

C-3
Sheet No. 5 of 5

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

160-ft Existing ROHN Lattice Tower

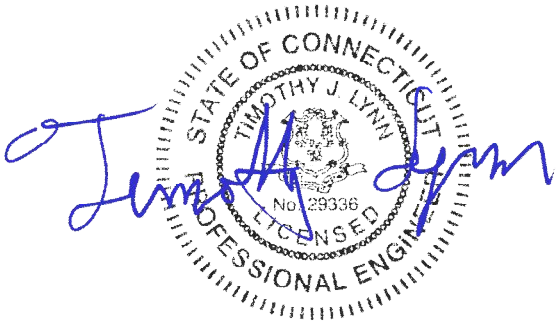
Proposed T-Mobile Antenna Upgrade

T-Mobile Site Ref: CT11227D

482 Pigeon Hill Road
Windsor, CT

CENTEK Project No. 16159.02

Date: October 20, 2016



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by T-Mobile on the existing self-supporting lattice tower located in Windsor, Connecticut.

The host tower is a 160-ft, three legged, tapered steel lattice tower originally designed and manufactured by UNR-ROHN. The manufacturer's drawings and calculations were unavailable for use in this report. The existing tower geometry, structure member sizes and foundation information were obtained from a previous structural report prepared by Centek job no. 15001.40 dated September 1, 2015.

Antenna and appurtenance information were obtained from the aforementioned Centek structural report, visual verification from grade by Centek personnel on September 29, 2016 and a T-Mobile RF data sheet.

The tower consists of eight (8) tapered vertical sections consisting of structural steel pipe legs conforming to ASTM A572 Gr. 50. Diagonal lateral support bracing consists of structural steel angle shapes conforming to ASTM A36. The vertical tower sections are connected by bolted flange plates while the pipe legs and bracing are connected by welded and bolted gusset connections. The width of the tower face is 8.56-ft at the top and 22.85-ft at the base.

T-Mobile proposes the removal of six (6) panel antennas and the installation of three (3) panel antennas mounted on the existing T-frames. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna configuration.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- AT&T (Existing/Reserved):
  Antennas: Three (3) Quintel QS66512-2 panel antennas, six (6) KMW AM-X-CD-14-65-00T-RET panel antennas, six (6) Powerwave TT19-08DB111 TMA's, three (3) Ericsson RRUS-12 remote radio heads, three (3) Ericsson A2s and one (1) Raycap DC-6-48-60-18-8F surge arrestor mounted on three (3) 10-ft-6in T-Arms connected to one (1) 8" SCH.40 x 18-ft long mast with a RAD center elevation of ±169-ft above the existing tower base.
  Coax Cables: Twelve (12) 1-1/4" ∅ coax cables, one (1) fiber trunk and two (2) DC trunks running on the leg/face of the existing tower as specified within Section 3 of this report.
- UNKNOWN (EXISTING):
  Antenna: One (1) 15-ft ∅ Omni-directional (whip) antenna mounted with an elevation of ±167.5-ft above the tower base.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) 15-ft ∅ Omni-directional (whip) antenna on a 4-ft side mount standoff with an elevation of ±127.5-ft above the tower base.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower.

- UNKNOWN (Existing):
  Antenna: One (1) 16-ft ∅ Omni-directional (whip) antenna on a 4-ft side mount standoff with an elevation of ±108-ft above the tower base.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower.
- UNKNOWN (EXISTING):
  Antenna: One (1) empty 4-ft side mount standoff with an elevation of ±47-ft above the tower base.
- UNKNOWN (Existing):
  Antenna: One (1) 12-ft ∅ Omni-directional (whip) antenna on a 4-ft side mount standoff with an elevation of ±45.41-ft above the tower base.
  Coax Cable: One (1) 1/2-in ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VERIZON (Existing to Remain):
  Antennas: Six (6) Antel LPA-80063-4CF panel antennas, two (2) Antel BXA-70040/6CF panel antennas, one (1) Antel BXA-70063/6CF panel antennas, six (6) Andrew SBNHH-1D65B panel antennas, three (3) Alcatel-Lucent RRH4x30-B13 remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads and three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio heads mounted on three (3) Valmont 15-ft T-Frames with a RAD center elevation of ±156.5-ft above the existing tower base.
  Misc Equipment: Two (2) RFS DB-T1-6Z-8AB-0Z main distribution boxes mounted to the leg of the existing tower with a RAD center elevation of 156.5-ft above the existing tower base.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables and two (2) 1-5/8" ∅ fiber cable running on the face of the existing tower as specified in Section 3 of this report.
- T-MOBILE (Existing to Remain):
  Antenna: Three (3) RFS APX16DWV-16DWVS-C-A20 panel antennas and six (6) TMA's mounted on three (3) 15-ft Wireless Frames with a RAD center elevation of ±145-ft above the existing tower base.
  Coax Cable: Eighteen (18) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- T-MOBILE (Existing to Remove):
  Antenna: Six (6) RFS APXV18-206516S panel antennas mounted on three (3) 15-ft Wireless Frames with a RAD center elevation of ±145-ft above the existing tower base.
- **T-MOBILE (Proposed):**
  Antenna: Three (3) Andrew LNX6515DS panel antennas mounted on three (3) 15-ft Wireless Frames with a RAD center elevation of ±145-ft above the existing tower base.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	Hartford; v = 90-105 mph (3-second gust)	*[Annex B of TIA-222-G-2005]*
	Windsor; v = 97 mph (3 second gust)	*[Appendix N of the 2016 CT Building Code]*
Load Cases:	Load Case 1; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2016 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2012 International Building Code as amended by the 2016 Connecticut State Building Code (CSBC).

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 4-8 of the TIA code.

- Calculated stresses were found to be within allowable limits. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **90.7%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T7)	20'-0"- 40'-0"	90.7%	**PASS**
Diagonal (T5)	60'-0"- 80'-0"	87.9%	**PASS**

Foundation and Anchors

The existing foundation consists of three (3) 3-ft ∅ reinforced concrete piers on three (3) 8-ft square reinforced concrete pads subsequently reinforced with four (4) rock anchors per pad. The existing foundation locations and dimensions were taken from the aforementioned Centek structural analysis and reinforcement design documents. The sub-grade conditions used in the analysis of the existing foundation were obtained from a geo-technical soils study report prepared by Clarence Welti & Associates, Inc., dated September 20, 2010. The tower legs are connected to the three (3) reinforced concrete piers by means of six (6) 7/8" ∅, ASTM A354 Grade BC anchor bolts per leg, embedded into the concrete foundation structure.

- The tower reactions developed from the governing Load Case 1 of the proposed reinforced tower condition were used in the verification of the foundation and anchor bolts:

Leg Reactions	Vector	Proposed Tower Reactions
Leg	Shear	**26 kips**
	Compression	**216 kips**
	Uplift	**185 kips**
Base	Shear	**42 kips**
	Compression	**36 kips**
	Moment	**4041 kip-ft**

- The anchor bolts were found to be within allowable limits.

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	70.6%	**PASS**

- The foundation was found to be within allowable limits.

Foundation Type	Design Limit	Allowable Limit/FS	Proposed Loading	Result
Rock Anchored Pad and Pier (x3)	Ultimate Bearing Pressure	24.00 ksf	6.6ksf	**PASS**
	Rock Mass Uplift Resistance	1.00 (1)	3.70(2)	**PASS**

Note 1: Minimum required Factor of Safety (FS) of 1.0 required per TIA-222-G section 9.4

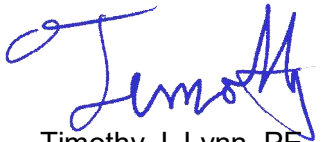
Conclusion

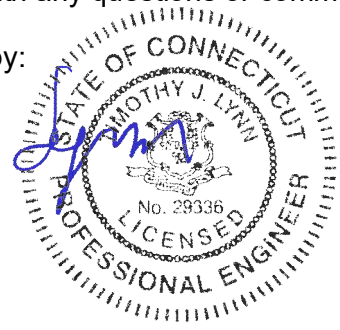
This analysis shows that the subject tower **is adequate** to support the proposed antenna configuration.

The analysis is based, in part, on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:





Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

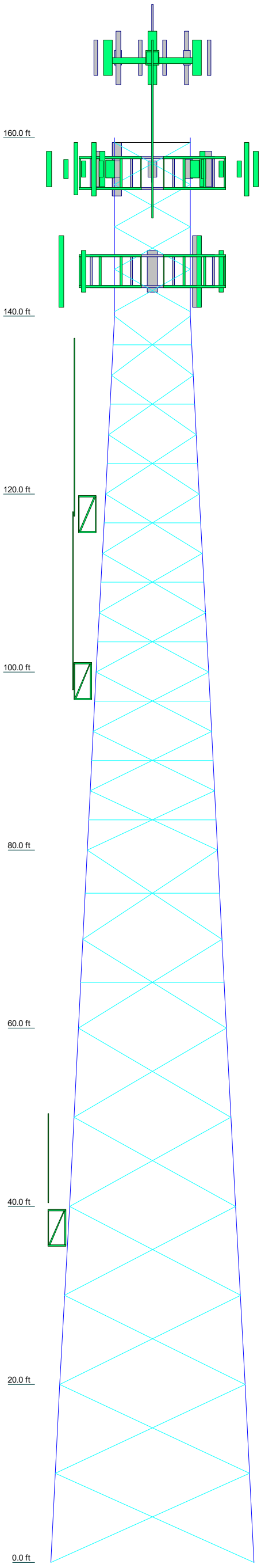
tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISA Tower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

	T1	T2	T3	T4	T5	T6	T7	T8
Section	ROHN 2.5 STD		ROHN 2.5 EH	ROHN 3 EH	ROHN 4 EH	ROHN 5 EH		ROHN 6 EHS
Legs		L1 3/4x1 3/4x1/4				L3 1/2x3 1/2x1/4		L4x4x1/4
Leg Grade			L2 1/2x2 1/2x3/16	L3x3x3/16	L3x3x1/4			
Diagonals		L2x2x1/4						
Diagonal Grade								
Top Girts			L2 1/2x2 1/2x3/8					
Sec. Horizontals		L2x2x1/4	L2 1/2x2 1/2x3/16	L3x3x3/16	L3x3x1/4		N.A.	
Face Width (ft)	8.56		10.56	12.6	14.66	16.69	18.69	20.85
# Panels @ (ft)	4 @ 4.75		9 @ 6.66667			8 @ 10		
Weight (K)	1.1	1.3	1.5	2.1	2.5	2.7	2.8	3.3

Legs: A572-50
Diagonals: A36
Top Girts: N.A.



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) AM-X-CD-14-65-00T-RET (ATI)	169	RRH4x45/2x90-AWS (Verizon)	156.5
(2) AM-X-CD-14-65-00T-RET (ATI)	169	RRH4x45/2x90-AWS (Verizon)	156.5
(2) AM-X-CD-14-65-00T-RET (ATI)	169	RRH4x45/2x90-AWS (Verizon)	156.5
(2) TT19-08BP111-001 TMA (ATI)	169	RRH2x60-PCS (Verizon)	156.5
(2) TT19-08BP111-001 TMA (ATI)	169	RRH2x60-PCS (Verizon)	156.5
(2) TT19-08BP111-001 TMA (ATI)	169	RRH2x60-PCS (Verizon)	156.5
QS66512-2 (ATI)	169	RRH4x30-B13 (Verizon)	156.5
QS66512-2 (ATI)	169	RRH4x30-B13 (Verizon)	156.5
QS66512-2 (ATI)	169	RRH4x30-B13 (Verizon)	156.5
RRUS-12 (ATI)	169	DB-T1-6Z-8AB-0Z (Verizon)	156.5
RRUS-12 (ATI)	169	DB-T1-6Z-8AB-0Z (Verizon)	156.5
RRUS-12 (ATI)	169	LPA-80063-4CF (Verizon)	156.5
A2 (ATI)	169	15' Frame (Verizon)	156
A2 (ATI)	169	15' Frame (Verizon)	156
A2 (ATI)	169	15' Frame (Verizon)	156
DC6-48-60-18-8F Surge Arrestor (ATI)	169	(2) TMA 10"x8"x3" (T-Mobile)	145
Valmont 10'-6" T-Armx 3 (Colo Kit P/N 802738) (ATI)	169	(2) TMA 10"x8"x3" (T-Mobile)	145
		APX16DWV-16DWVS-E-A20 (T-Mobile)	145
15' x 2" Dia Omni (Unknown)	165	APX16DWV-16DWVS-E-A20 (T-Mobile)	145
P8 x18-ft Pipe Mast (ATI)	161	APX16DWV-16DWVS-E-A20 (T-Mobile)	145
SBNHH-1D65B (Verizon)	156.5	LNX-6515DS (T-Mobile - Proposed)	145
BXA-70040/6CF (Verizon)	156.5	LNX-6515DS (T-Mobile - Proposed)	145
SBNHH-1D65B (Verizon)	156.5	LNX-6515DS (T-Mobile - Proposed)	145
LPA-80063-4CF (Verizon)	156.5	15' Frame (T-Mobile)	145
LPA-80063-4CF (Verizon)	156.5	15' Frame (T-Mobile)	145
SBNHH-1D65B (Verizon)	156.5	15' Frame (T-Mobile)	145
BXA-70040/6CF (Verizon)	156.5	(2) TMA 10"x8"x3" (T-Mobile)	145
SBNHH-1D65B (Verizon)	156.5	15' x 2" Dia Omni (Unknown)	127.5
LPA-80063-4CF (Verizon)	156.5	4' Side Mount Standoff (Unknown)	117.75
LPA-80063-4CF (Verizon)	156.5	16' x 2" Dia Omni (Unknown)	108
SBNHH-1D65B (Verizon)	156.5	4' Side Mount Standoff (Unknown)	99
BXA-70063/6CF (Verizon)	156.5	4' Side Mount Standoff (Vacant) (Unknown)	47
SBNHH-1D65B (Verizon)	156.5	12' x 1-1/2" Dia Omni (Unknown)	45.41
LPA-80063-4CF (Verizon)	156.5	4' Side Mount Standoff (Unknown)	37.58

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. Weld together tower sections have flange connections.
8. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
9. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
10. Welds are fabricated with ER-70S-6 electrodes.
11. TOWER RATING: 90.7%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 216 K
SHEAR: 26 K

UPLIFT: -185 K
SHEAR: 22 K

AXIAL 151 K
SHEAR 13 K *MOMENT 1328 kip-ft*

TORQUE 2 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 36 K
SHEAR 42 K *MOMENT 4041 kip-ft*

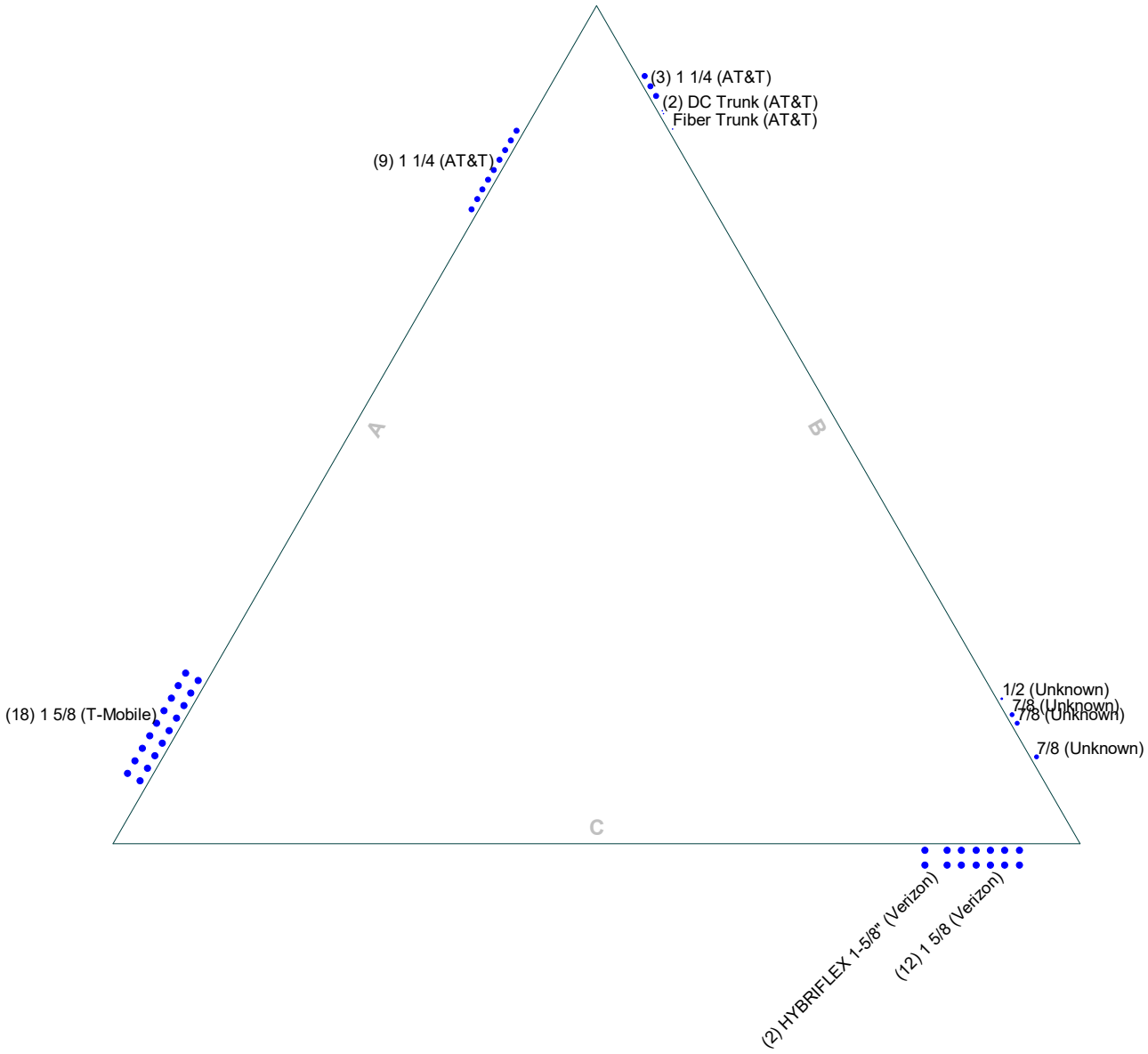
TORQUE 11 kip-ft
REACTIONS - 97 mph WIND

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **16159.02 - CT11227D**		
Project: ***160' Lattice Tower - 482 Pigeon Hill Road, Windsor, CT***		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 10/20/16	Scale: NTS
Path: J:\Jobs\16159\00 Wil\02_Windsor,I91,CT11227D\05_Structural\Backup Documentation\CalosER Files\160' Lattice Windsor.eri		Dwg No. E-1

Feed Line Plan

Round Flat App In Face App Out Face



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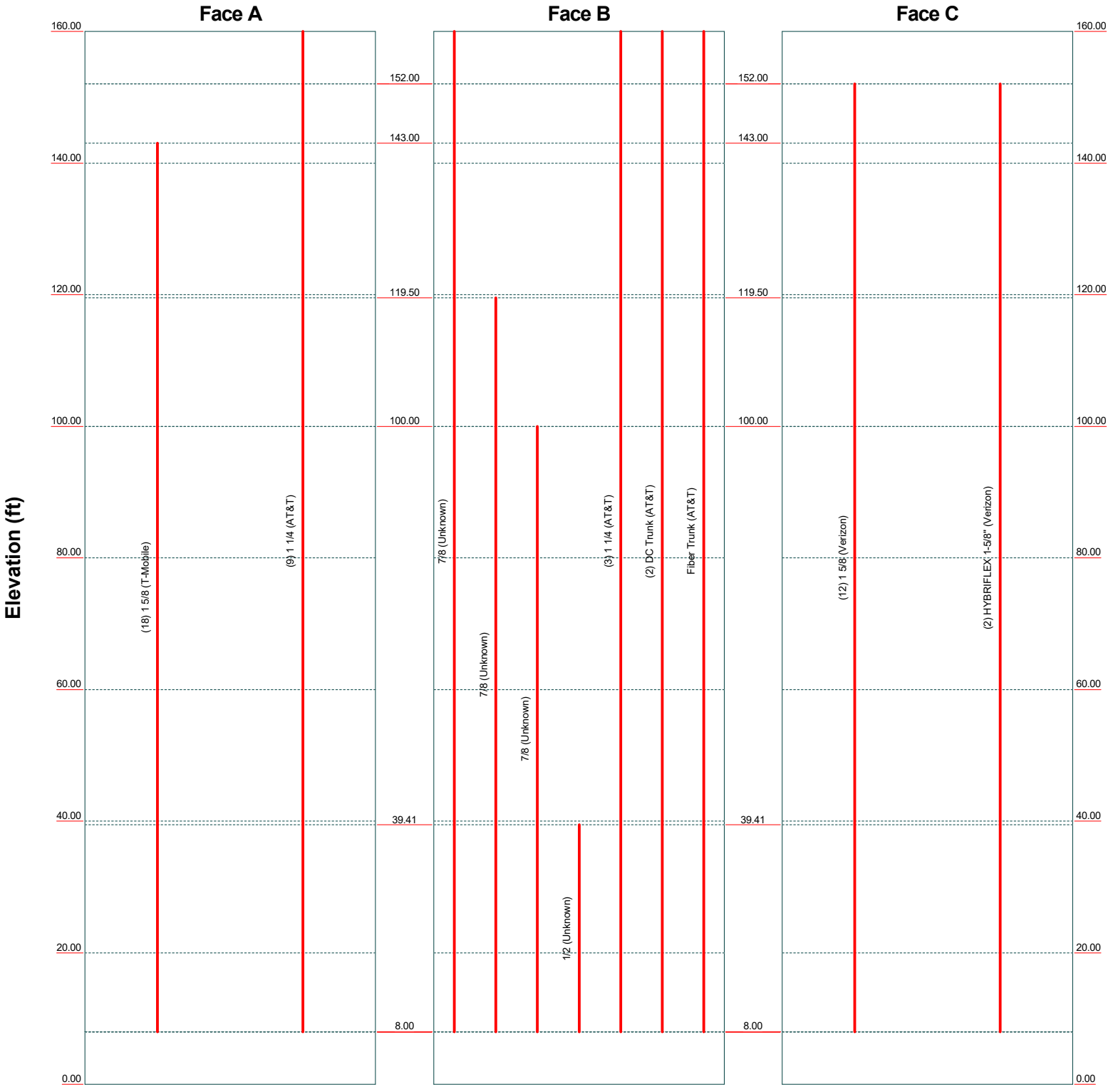
Feed Line Distribution Chart
0' - 160'

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



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Path: J:\Jobs\16159\00.W\02_Windsor\91 CT11227D\05_Structural\Backup Documentation\CatcalERI Files\160' Lattice Windsor.eri		Dwg No. E-7

Product Specifications

LNX-6515DS-VTM | LNX-6515DS-A1M

Single Band Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible

- Excellent choice to maximize both coverage and capacity in suburban and rural applications
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings
- Exceptional horizontal pattern roll-off and strong front-to-back ratio
- Extended bandwidth allows one antenna to serve multiple frequency allocations
- Great solution to maximize network coverage and capacity
- The RF connectors are designed for IP67 rating and the radome for IP56 rating

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	16.7	17.6
Beamwidth, Horizontal, degrees	65	64
Beamwidth, Vertical, degrees	9.7	8.6
Beam Tilt, degrees	0–8	0–8
USLS (First Lobe), dB	17	17
Front-to-Back Ratio at 180°, dB	32	27
CPR at Boresight, dB	24	27
CPR at Sector, dB	15	13
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	**698–806**	**806–896**
Gain by all Beam Tilts, average, dBi	16.6	16.9
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 16.6 4 ° | 16.6 8 ° | 16.4	0 ° | 17.0 4 ° | 17.0 8 ° | 16.8
Beamwidth, Horizontal Tolerance, degrees	±1	±0.9
Beamwidth, Vertical Tolerance, degrees	±0.6	±0.4
USLS, beampeak to 20° above beampeak, dB	18	18
Front-to-Back Total Power at 180° ± 30°, dB	25	23
CPR at Boresight, dB	24	27
CPR at Sector, dB	15	13

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

General Specifications

Antenna Type	Sector
Band	Single band
Brand	DualPol®
Operating Frequency Band	698 – 896 MHz

Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, frontal	878.0 N @ 150 km/h 197.4 lbf @ 150 km/h
Wind Loading, lateral	273.0 N @ 150 km/h 61.4 lbf @ 150 km/h
Wind Loading, rear	1033.0 N @ 150 km/h 232.2 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	180.5 mm | 7.1 in
Length	2453.0 mm | 96.6 in
Width	301.0 mm | 11.9 in
Net Weight, without mounting kit	19.8 kg | 43.7 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	LNX-6515DS-A1M

Packed Dimensions

Depth	295.0 mm | 11.6 in
Length	2718.0 mm | 107.0 in
Width	392.0 mm | 15.4 in
Shipping Weight	36.9 kg | 81.4 lb

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

DB380-3 — Pipe Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Used for wide panel antennas. Includes

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: CT11227D

Windsor I91/ X38
482 Pigeon Hill Road
Windsor, CT 06095

November 4, 2016

EBI Project Number: 6216004976

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	5.52 %

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

EBI Consulting
environmental | engineering | due diligence

November 4, 2016

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

Emissions Analysis for Site: **CT11227D – Windsor I91/ X38**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **482 Pigeon Hill Road, Windsor, 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 **482 Pigeon Hill Road, Windsor, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

3) 2 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 (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 all radios are ground mounted there are additional cabling losses accounted for. For each ground mounted RF path the following losses were calculated. 0.98 dB of additional cable loss for all ground mounted 700 MHz Channels, 1.80 dB of additional cable loss for all ground mounted 1900 MHz channels and 1.86 dB of additional cable loss for all ground mounted 2100 MHz channels. This is based on manufacturers Specifications for 175 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 **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **RFS APX16DWV-16DWVS-E-A20** has a maximum gain of **16.3 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-VTM** 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 **145 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 public threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	145	Height (AGL):	145	Height (AGL):	145
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	8	Channel Count	8	Channel Count	8
Total TX Power(W):	300	Total TX Power(W):	300	Total TX Power(W):	300
ERP (W):	8,385.54	ERP (W):	8,385.54	ERP (W):	8,385.54
Antenna A1 MPE%	1.56%	Antenna B1 MPE%	1.56%	Antenna C1 MPE%	1.56%
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	145	Height (AGL):	145	Height (AGL):	145
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):	690.43	ERP (W):	690.43	ERP (W):	690.43
Antenna A2 MPE%	0.28	Antenna B2 MPE%	0.28	Antenna C2 MPE%	0.28

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.84 %**
Cingular	0.57 %
Verizon Wireless	2.93 %
Town of Windsor	0.18 %
Site Total MPE %:	**5.52 %**

T-Mobile Sector A Total:	1.84 %
T-Mobile Sector B Total:	1.84 %
T-Mobile Sector C Total:	1.84 %
Site Total:	5.52 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	1,667.83	145	6.21	AWS - 2100 MHz	1000	0.62%
T-Mobile AWS - 2100 MHz UMTS	2	833.91	145	3.10	AWS - 2100 MHz	1000	0.31%
T-Mobile PCS - 1950 MHz UMTS	2	845.51	145	3.15	PCS - 1950 MHz	1000	0.31%
T-Mobile PCS - 1950 MHz GSM	2	845.51	145	3.15	PCS - 1950 MHz	1000	0.31%
T-Mobile 700 MHz LTE	1	690.43	145	1.28	700 MHz	467	0.28%
						Total*:	**1.84%**

***NOTE: Totals may vary by 0.01% due to summing of 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:	1.84 %
Sector B:	1.84 %
Sector C:	1.84 %
T-Mobile Per Sector Maximum:	1.84 %
Site Total:	5.52 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.52%** 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.