

November 17, 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 – CT11358A
Notice of Exempt Modification
Wildcat Hill Road, Harwinton, CT
LAT: 41-45-24.9N
LNG: -73-05-42.67W

Dear Ms. Bachman:

T-Mobile Northeast LLC ("T-Mobile") currently maintains three (3) antennas at the 96' level on the existing 100' guyed tower located at Wildcat Hill Road, Harwinton, CT. The structure is owned by Frontier Communications, their use of the structure was approved by the Council on November 26, 1990 (Docket No. 138).

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. 16-50j-73, a copy of this letter is being sent to Michael R. Criss, First Selectman, Town of Harwinton, and the property owner, Southern New England Telephone Co c/o Frontier Communications.

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 add three (3) new antennas, and swap (3) antennas, at a centerline height of 96' on the existing 100' guyed tower.
2. The proposed modifications will not require the extension of the site boundary. 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 3.00%; the combined site operations will result in a total power density of 4.46%.
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 mounts.
6. The existing structure, and its foundation can support T-Mobile's proposed loading, as indicated in the attached structural analysis.

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: Michael R. Criss, First Selectman, Town of Harwinton
Southern New England Telephone Co, c/o Frontier Communications

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

HARWINTON SNET_1

SITE ID: CT11358A

WILDCAT HILL ROAD

HARWINTON, CT 06791

T-MOBILE RF CONFIGURATION:
704G_UNCONSTRAINED

GENERAL NOTES

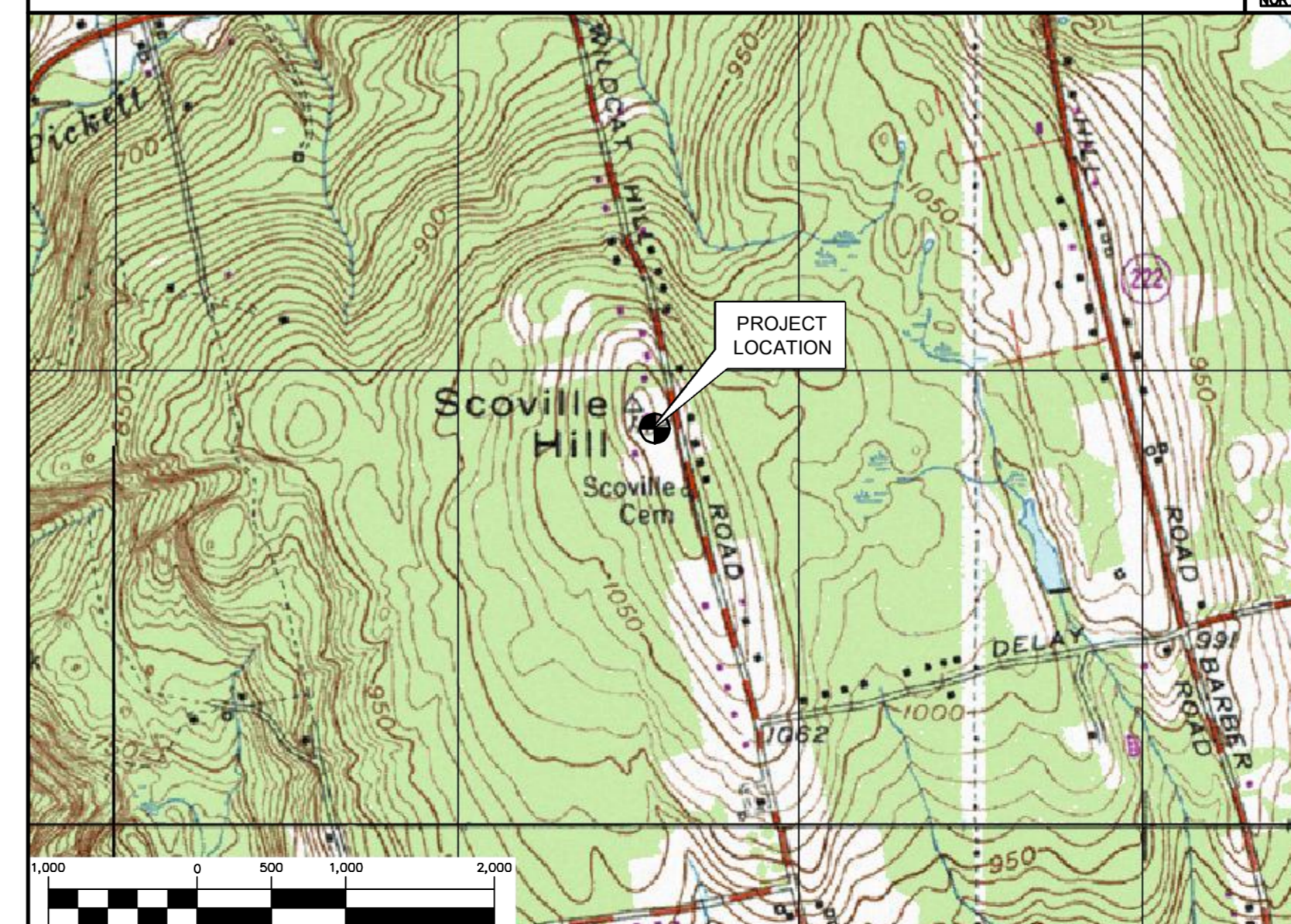
- ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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:	TO:
35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002	WILDCAT HILL ROAD HARWINTON, CT 06791
1. TAKE DAY HILL RD TO CT-189 S	1.2 MI
2. HEAD NORTHEAST ON GRIFFIN RD S TOWARD W NEWBERRY RD	0.6 MI
3. TURN LEFT ONTO DAY HILL RD	0.6 MI
4. CONTINUE ON CT-189 S. TAKE CT-185 W, CT-179 S, CT-4 AND LITCHFIELD RD TO	26.5 MI
5. WILDCAT HILL RD IN HARWINTON	2.5 MI
6. TURN LEFT ONTO CT-189 S	0.9 MI
7. SLIGHT RIGHT ONTO BROWN ST	1.1 MI
8. TURN RIGHT ONTO CT-178 W	2.8 MI
9. TURN RIGHT ONTO CT-185 W	0.2 MI
10. TURN RIGHT ONTO HOPMEADOW ST	1.3 MI
11. TURN LEFT ONTO CANAL ST	0.8 MI
12. CONTINUE ONTO DEER PARK RD	0.1 MI
13. TURN LEFT ONTO CT-167 S/BUSHY HILL RD	0.8 MI
14. TURN RIGHT ONTO CANTON RD	0.3 MI
15. CONTINUE STRAIGHT ONTO WILDWOOD RD	1.0 MI
16. TURN LEFT ONTO NOTCH RD	0.3 MI
17. SLIGHT LEFT ONTO WASHBURN RD	0.3 MI
18. TURN LEFT ONTO LAWTON RD	0.4 MI
19. TURN RIGHT ONTO ALBANY TURNPIKE	0.9 MI
20. TURN LEFT ONTO DOWD AVE	0.8 MI
21. CONTINUE ONTO MAPLE AVE	0.4 MI
22. CONTINUE ONTO BRIDGE ST	8.1 MI
23. TURN LEFT ONTO CT-179 S/BURLINGTON AVE CONTINUE TO FOLLOW CT-179 S	1.6 MI
24. TURN RIGHT ONTO CT-4	
25. CONTINUE ONTO LITCHFIELD RD	
26. TURN LEFT ONTO WILDCAT HILL RD	

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

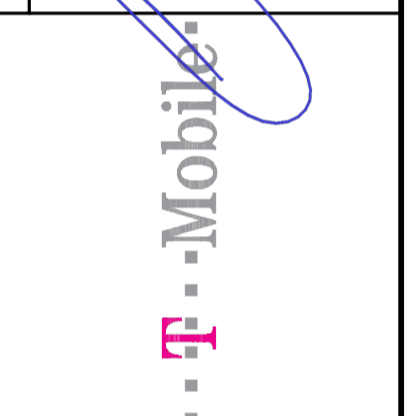
- THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:
- T-MOBILE EQUIPMENT INSTALLATION SHALL CONSIST OF THE ADDITION OF (1) BATTERY CABINET LOCATED WITHIN THE EXISTING EQUIPMENT SHELTER.
 - T-MOBILE ANTENNA INSTALLATION SHALL CONSIST OF THE ADDITION OF (1) PANEL ANTENNA PER SECTOR FOR A TOTAL OF (3) AND THE REPLACEMENT OF (1) PANEL ANTENNA PER SECTOR FOR A TOTAL OF (3).
 - POWER AND TELCO UTILITIES WILL BE ROUTED FROM THEIR RESPECTIVE DEMARCS LOCATED WITHIN OR ADJACENT TO THE EXISTING COMPOUND.

PROJECT INFORMATION

SITE NAME:	HARWINTON SNET_1
SITE ID:	CT11358A
SITE ADDRESS:	WILDCAT HILL ROAD HARWINTON, CT 06791
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	JAIME FORD (PROJECT MANAGER) VERTICAL DEVELOPMENT, LLC (774) 248-5373
ENGINEER:	CEN TEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-45'-24.9" N LONGITUDE: 73°-05'-42.67" W GROUND ELEVATION: 1000'± AMSL COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS AND SITE NOTES	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.	0
C-3	ANTENNA DETAILS	0



CEN TEK engineering
Centek on Solutions
(203) 498-0380
(203) 498-3387 Fax
632 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
HARWINTON SNET_1
SITE ID: CT11358A
WILDCAT HILL ROAD
HARWINTON, CT 06791

DATE: 11/07/16
SCALE: AS NOTED
JOB NO. 16119.000

TITLE SHEET

T-1
Sheet No. 1 of 5

CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW
HMR
DRAWN BY CHK'D BY
DBA
DATE
11/09/16
REV.

DESIGN BASIS

- GOVERNING CODE: 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CT STATE SUPPLEMENT.
- TIA/EIA-222 REVISION "G", ASCE MANUAL NO. 72 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES SECOND EDITION".
- DESIGN CRITERIA:
WIND LOAD: (TOWER & FOUNDATION)
 NOMINAL DESIGN WIND SPEED (V) = 93 MPH (2016 CSBC: APPENDIX 'N')

GENERAL NOTES

- 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.
- DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.
- THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
- REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

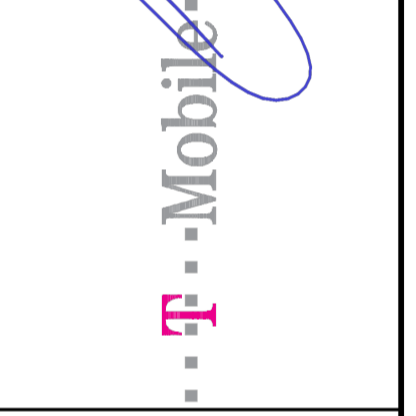
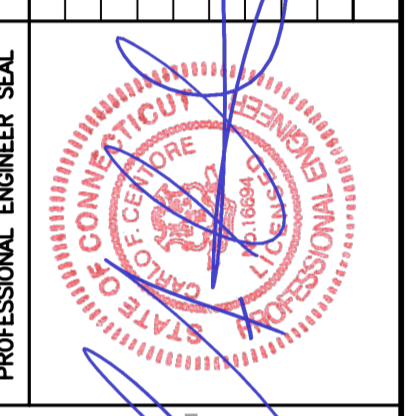
SITE NOTES

- THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
- 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.
- ALL RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED OFF SITE AND BE LEGALLY DISPOSED, AT NO ADDITIONAL COST.
- THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE EQUIPMENT AND TOWER AREAS.
- 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.
- THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
- THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
- 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.
- 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.
- DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.

ELECTRIC NOTES

- ALL NEW ANTENNAS SHALL BE BONDED TO EXISTING GROUNDING SYSTEM PER MANUFACTURERS AND NEC SPECIFICATIONS. COORDINATE WITH CONSTRUCTION MANAGER FOR REQUIREMENTS.
- PROVIDE NEW POWER FEED TO NEW EQUIPMENT CABINET FROM EXISTING PANEL PER MANUFACTURERS SPECIFICATIONS. COORDINATE EXISTING CAPACITY PRIOR TO INSTALLATION.
- BOND NEW EQUIPMENT CABINET TO EXISTING INTERIOR GROUNDING SYSTEM PER MANUFACTURERS SPECIFICATIONS.

REV.	DATE	BY	CHK'D BY	DESCRIPTION
0	11/09/16	DBA	HMR	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW



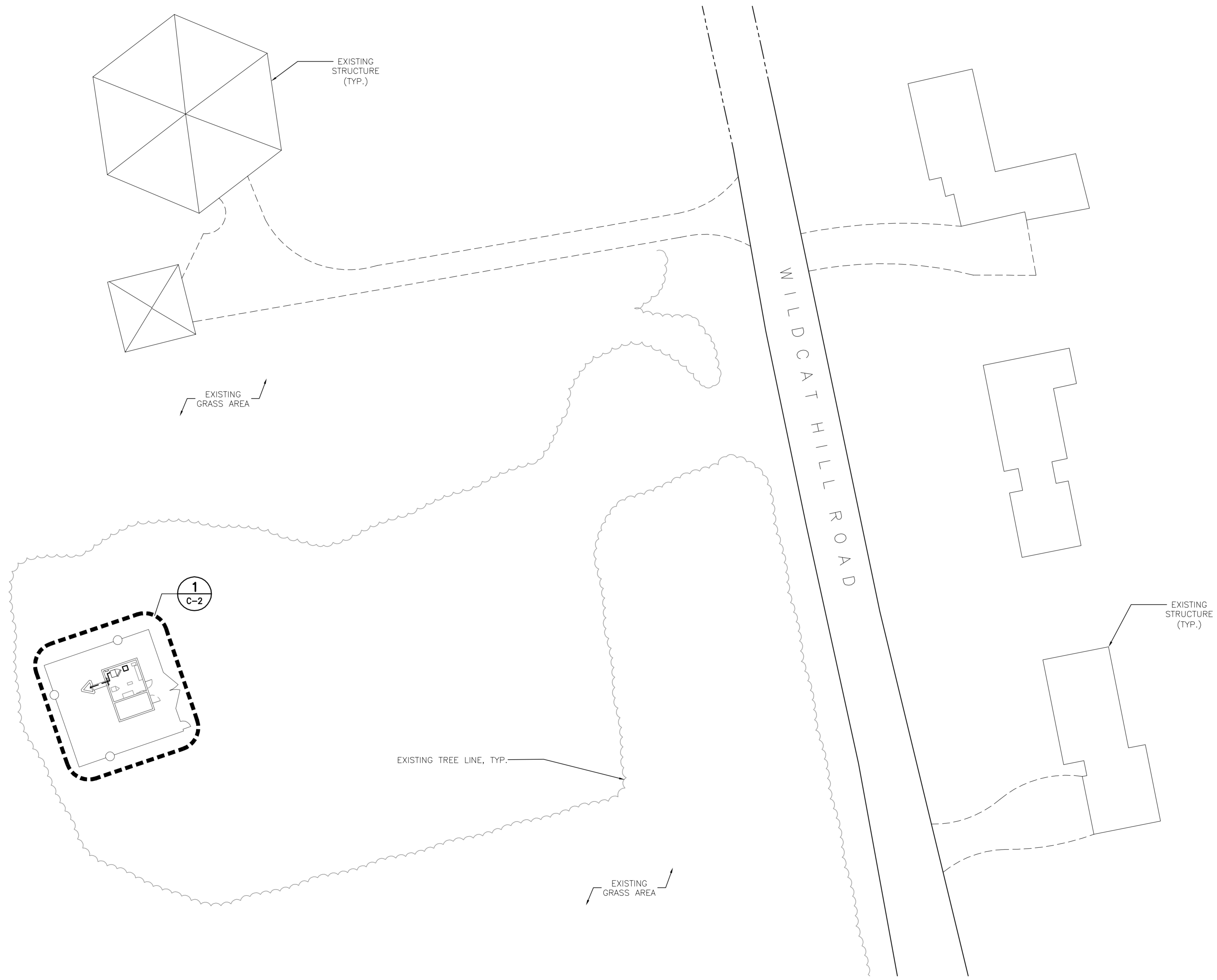
CEN TEK engineering
 Centered on Solutions
 (203) 498-0390
 (203) 498-3897 Fax
 652 North Branford Road
 Branford, CT 06405
 www.CenTekEng.com

T-MOBILE NORTHEAST LLC
 WIRELESS COMMUNICATIONS FACILITY
HARWINTON SNET_1
SITE ID: CT11358A
 WILDCAT HILL ROAD
 HARWINTON, CT 06791

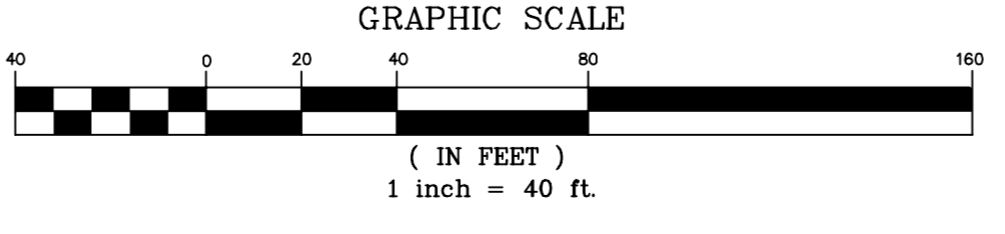
DATE: 11/07/16
 SCALE: AS NOTED
 JOB NO. 16119.000

DESIGN BASIS
 AND SITE NOTES

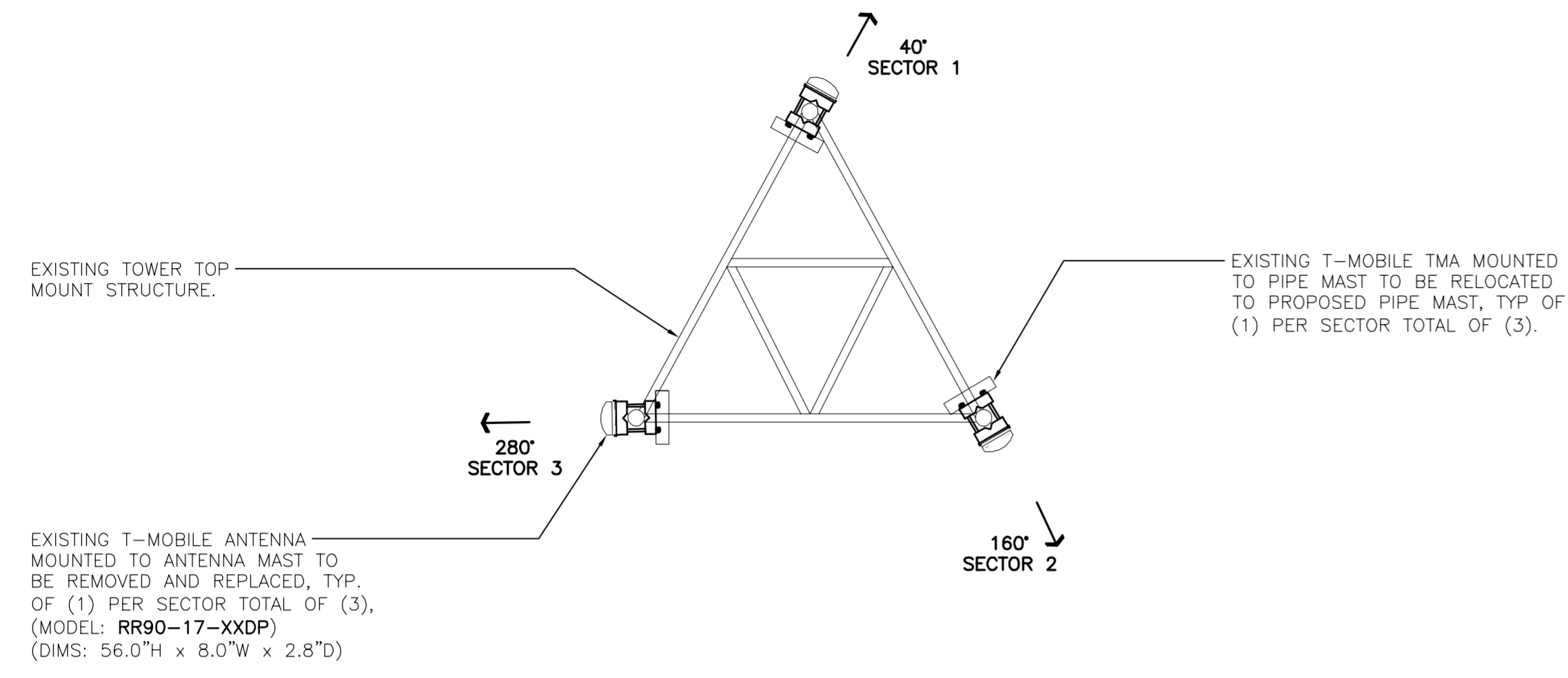
N-1
 Sheet No. 2 of 5



1
C-1 **SITE LOCATION PLAN**
SCALE: 1" = 40'

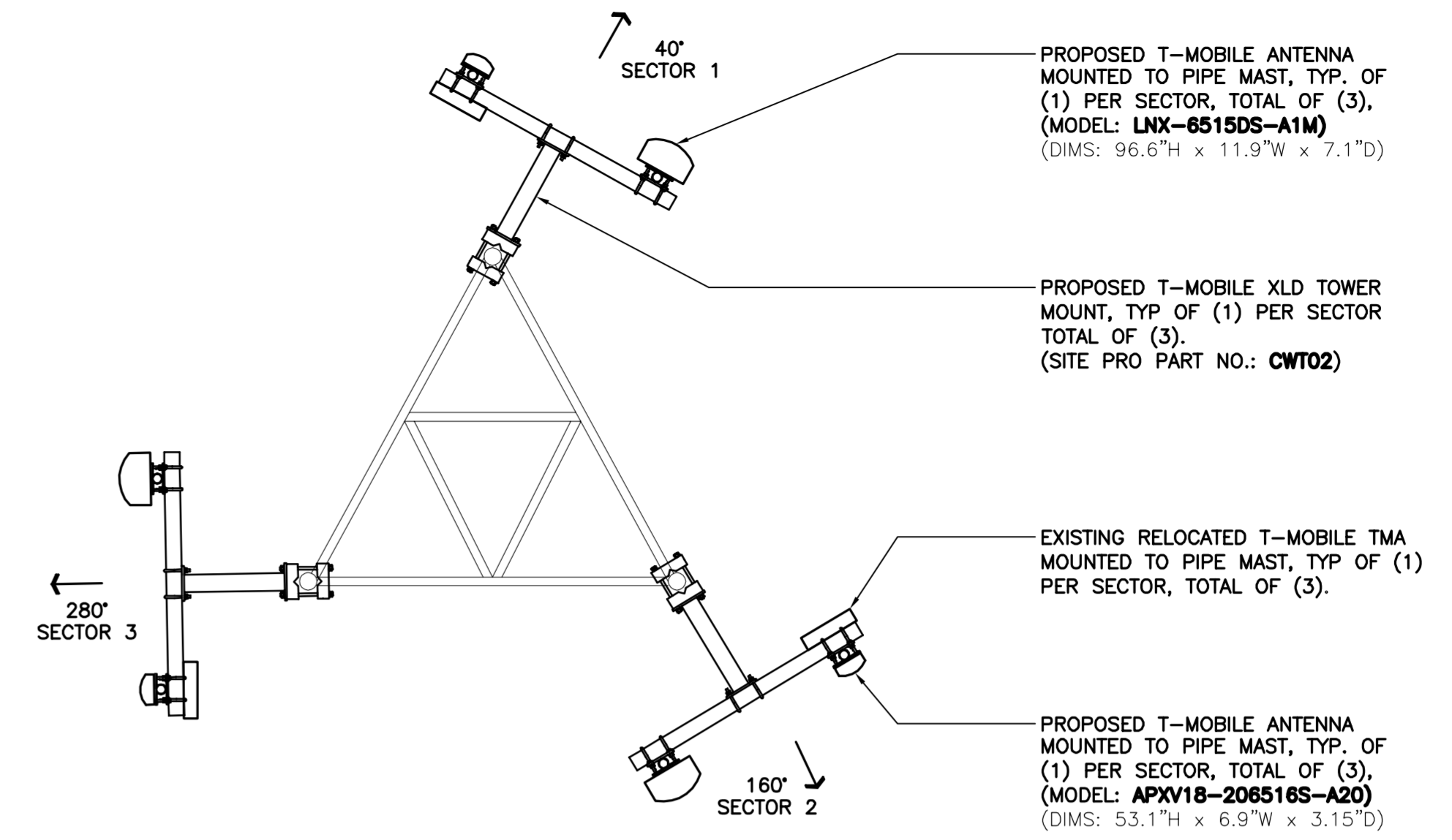


<p>T-MOBILE NORTHEAST LLC WIRELESS COMMUNICATIONS FACILITY HARWINTON SNET_1 SITE ID: CT11358A WILDCAT HILL ROAD HARWINTON, CT 06791</p>		<p>CEN-TEK engineering <i>Centered on Solutions</i> 203) 488-0380 203) 488-3387 Fax 632 North Branford Road Branford, CT 06405 www.CenTekEng.com</p>		<p>PROFESSIONAL ENGINEER SEAL </p>		<p>REV. 0 11/09/16 DATE</p>	<p>HMR DRAWN BY</p>	<p>DBA CHK'D BY</p>	<p>CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW DESCRIPTION</p>
<p>DATE: 11/07/16 SCALE: AS NOTED JOB NO. 16119.000</p>									
<p>SITE LOCATION PLAN</p>									
<p>C-1</p>									
<p>Sheet No. 3 of 5</p>									

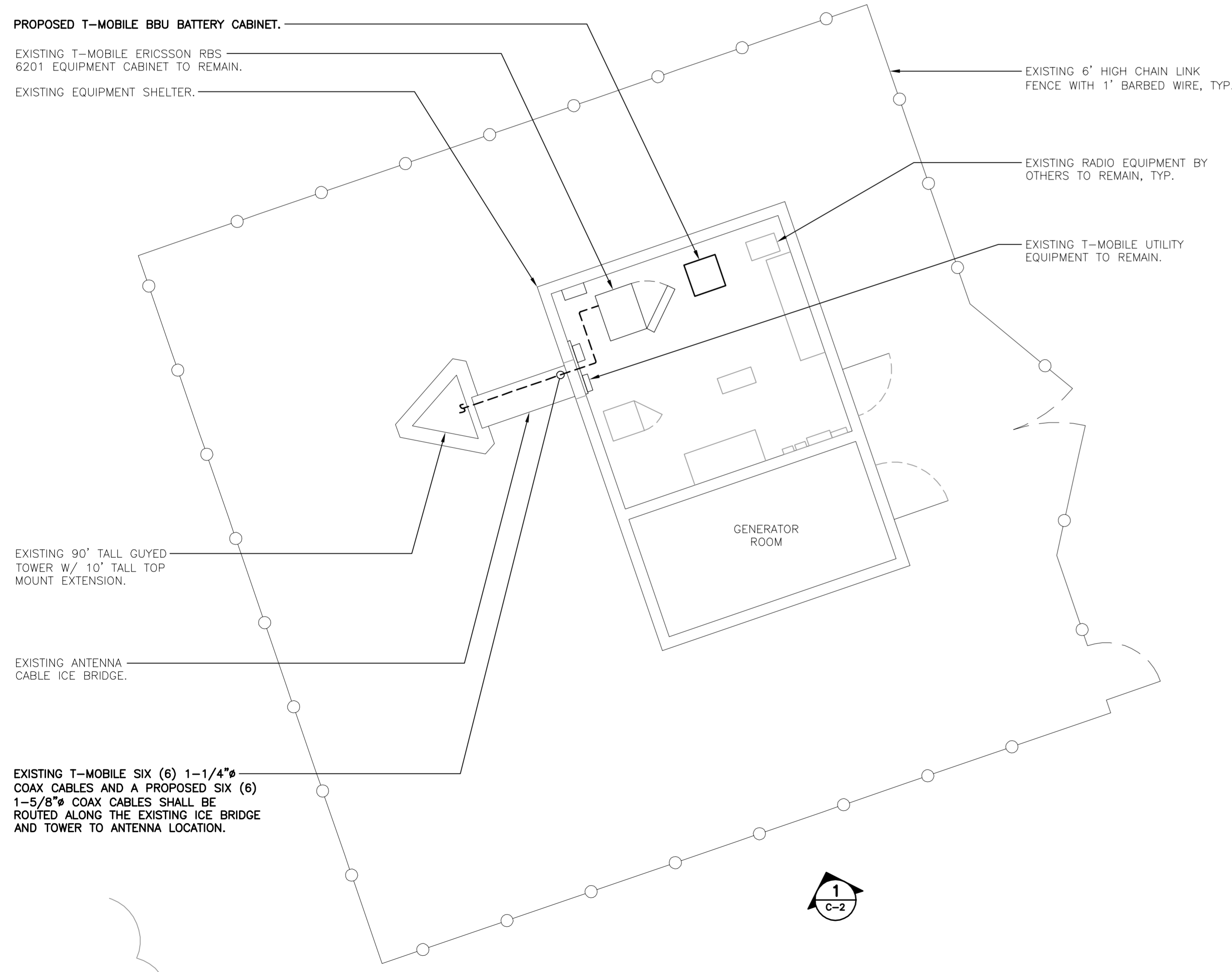


3 EXISTING ANTENNA MOUNTING CONFIGURATION
 C-2 SCALE: 3/8" = 1'
 96' ELEVATION NORTH

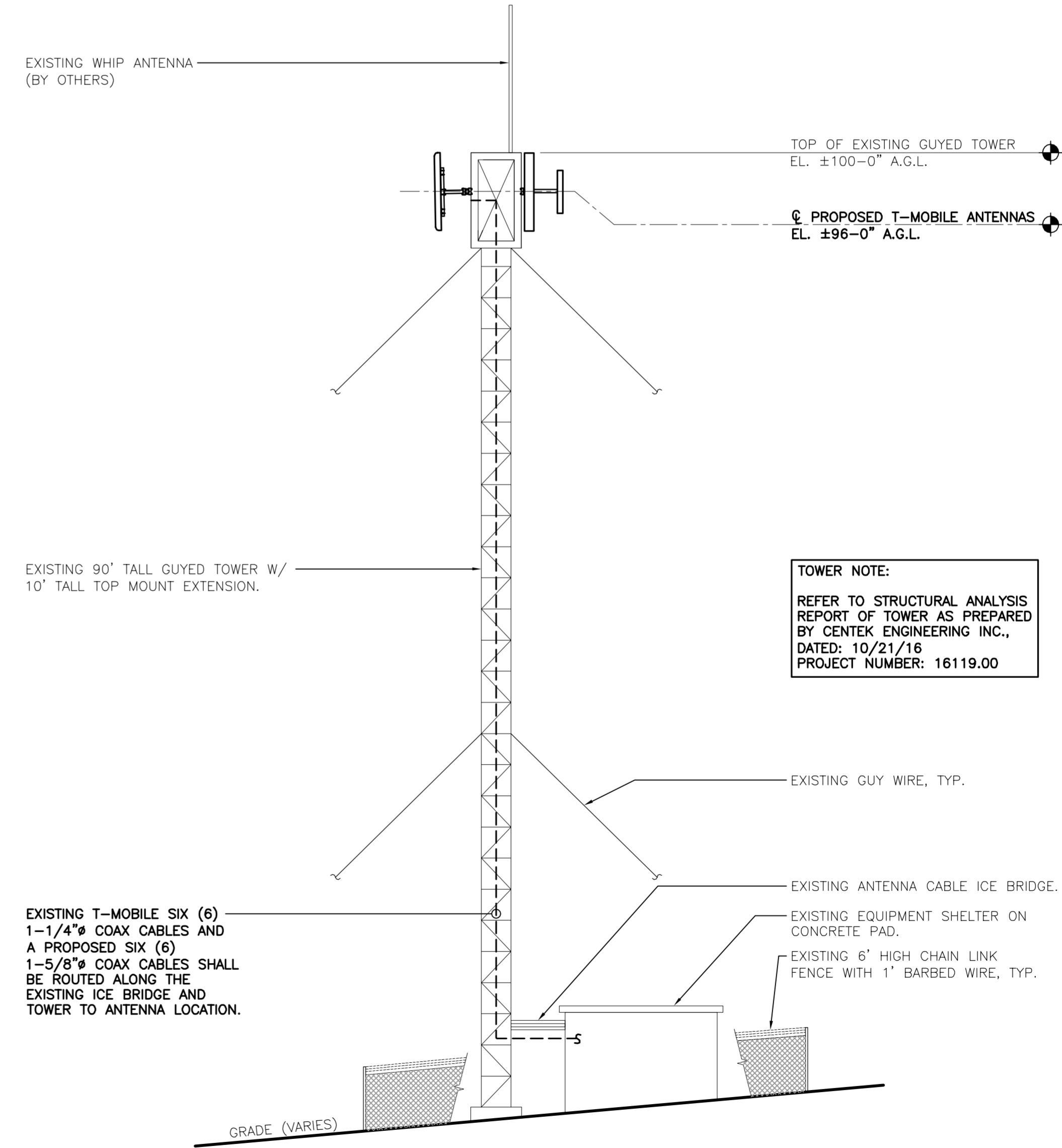
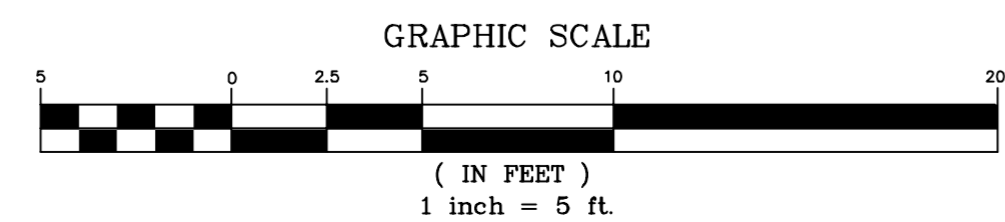
T-MOBILE RAN TEMPLATE: 704G
 T-MOBILE RF CONFIGURATION: 704G_UNCONSTRAINED



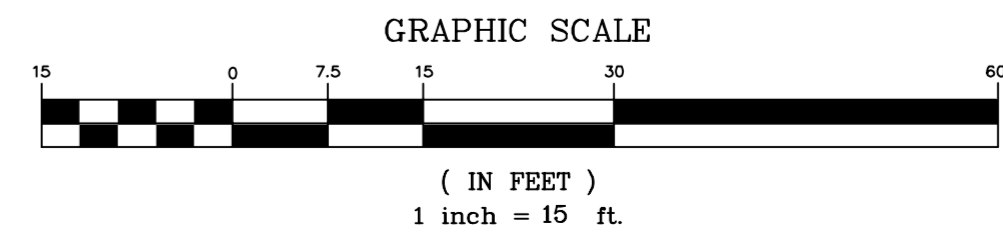
4 PROPOSED ANTENNA MOUNTING CONFIGURATION
 C-2 SCALE: 3/8" = 1'
 96' ELEVATION NORTH



1 COMPOUND PLAN
 C-2 SCALE: 1" = 5'
 TRUE NORTH

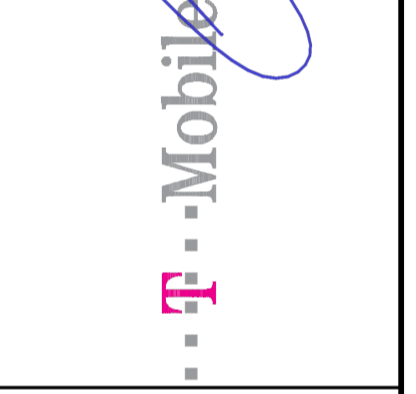
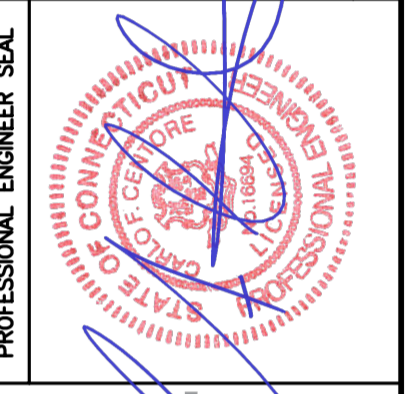


2 SOUTHEAST ELEVATION
 C-2 SCALE: 1" = 15'



TOWER NOTE:
 REFER TO STRUCTURAL ANALYSIS REPORT OF TOWER AS PREPARED BY CENTEK ENGINEERING INC., DATED: 10/21/16 PROJECT NUMBER: 16119.00

REV.	DATE	BY	CHK'D BY	DESCRIPTION
0	11/09/16	DBA	HMR	CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW



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 HARWINTON, CT 06791

DATE: 11/07/16
 SCALE: AS NOTED
 JOB NO. 16119.000
 COMPOUND PLAN,
 ELEVATION AND
 ANTENNA
 MOUNTING CONFIG.

Structural Analysis Report

90' Existing Trylon Guyed Lattice Tower

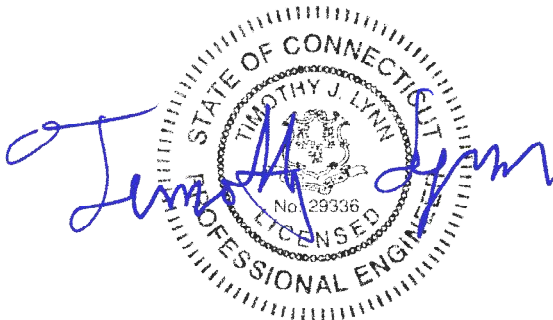
*Proposed T-Mobile
Antenna Upgrade*

T-Mobile Site Ref: CT11358A

*Wildcat Hill Road
Harwington, CT*

CEN TEK Project No. 16119.00

Date: October 21, 2016



Prepared for:
T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

SECTION 1 – REPORT

- INTRODUCTION
- ANTENNA AND APPURTENANCE SUMMARY
- PRIMARY ASSUMPTIONS USED IN THE ANALYSIS
- ANALYSIS
- TOWER LOADING
- TOWER CAPACITY
- CONCLUSION AND RECOMMENDATIONS

SECTION 2 – CONDITIONS & SOFTWARE

- STANDARD ENGINEERING CONDITIONS
- GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

SECTION 3 – CALCULATIONS

- tnxTower INPUT/OUTPUT SUMMARY
- tnxTower FEED LINE PLAN
- tnxTower FEED LINE DISTRIBUTION
- tnxTower LEG COMPRESSION DIAGRAM
- tnxTower GLOBAL MAST SHEAR AND MOMENT DIAGRAMS
- tnxTower DEFLECTION DIAGRAMS
- tnxTower STRESS DISTRIBUTION
- tnxTower WIND PRESSURE AND ICE THICKNESS
- tnxTower DETAILED OUTPUT

SECTION 4 – REFERENCE MATERIALS

- T-MOBILE RF DATA SHEET
- ANTENNA CUT SHEETS

I n t r o d u c t i o n

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 guyed lattice tower located in Harwington, CT.

The host tower is a 90-ft, three legged, guyed lattice tower originally designed and manufactured by Trylon. The original tower design documents were unavailable for use in this report. The tower geometry and structure member sizes were obtained from a tower mapping report prepared by Hightower Solutions dated October 4, 2016.

Antenna and appurtenance information were obtained from the aforementioned tower mapping and a T-Mobile RF data sheet.

The tower consists of nine (9) vertical sections consisting of steel angle legs with an assumed steel grade of ASTM A36. Diagonal and horizontal lateral support bracing consists of steel angles with an assumed steel grade of ASTM A36. The vertical tower sections are connected by bolted sleeves with the diagonal and horizontal bracing to legs consisting of bolted connections. The width of the tower face is 3.125-ft throughout its length.

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

A n t e n n a a n d A p p u r t e n a n c e S u m m a r y

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

- **UNKOWN (EXISTING):**
Antennas: One (1) 20-ft Omni-directional whip antenna on a 2-ft standoff mounted to the top of the tower with an elevation of 104.58-ft above grade.
Coax Cables: One (1) 1/2" \varnothing coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- **UNKOWN (EXISTING):**
Antennas: One (1) 10-ft Omni-directional whip antenna pipe mounted to the top of the tower with an elevation of 100.25-ft above grade.
Coax Cables: One (1) 1-5/8" \varnothing coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- **T-MOBILE (EXISTING TO REMAIN):**
Antennas: Three (3) TMA's mounted on a lattice tower top mount with a RAD center elevation of 96-ft above grade.
Coax Cables: Six (6) 1-1/4" \varnothing coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **T-MOBILE (EXISTING TO REMOVE):**
Antennas: Three (3) EMS RR90-17-02DP panel antennas mounted on a lattice tower top mount with a RAD center elevation of 96-ft above grade.

- **T-MOBILE (PROPOSED):**
Antennas: Three (3) RFS APXV18-206516 and three (3) Andrew LNX-6515DS panel antennas mounted on a lattice tower top mount with a RAD center elevation of 96-ft above grade.
Coax Cables: Six (6) 1-5/8" Ø coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

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.
- All coax cables routed as specified in Section 3 of this report.

A n a l y s i s

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 CSBC¹ and the wind speed data available in the TIA-222-G-2005 Standard.

T o w e r L o a d i n g

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:	Litchfield; v = 90-100 mph (3-second gust)	[Annex B of TIA-222-G-2005]
	Harwington; v = 93 mph (3 second gust)	[Appendix N of the 2016 CT Building Code]
Load Cases:	<u>Load Case 1</u> ; 93 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]
	<u>Load Case 2</u> ; 40 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 **67.3%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T6)	30'-0"-40'-0"	45.1%	PASS
Diagonal (T1)	80'-0"-90'-0"	49.9%	PASS
Guy C @ 66-ft radius (T1)	90-ft	49.3%	PASS
Torque Arm Bottom (T1)	90-ft	67.3%	PASS

Foundation

No foundation information was available for use in this structural analysis report. Based on the type of tower and low level of stress in the tower superstructure the foundation has been deemed to be adequate. It is recommended that if any further loading is added to the tower an exploratory investigation of the foundations be conducted to obtain the necessary information to perform a full analysis

Conclusion and Recommendations

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

- All coax cables routed as specified in Section 3 of this report.**

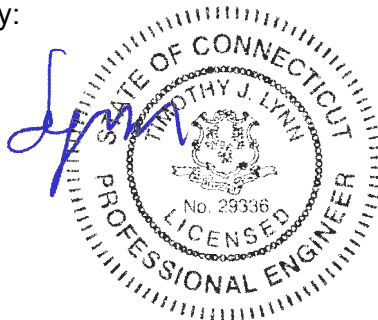
The analysis is based, in part, on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

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.

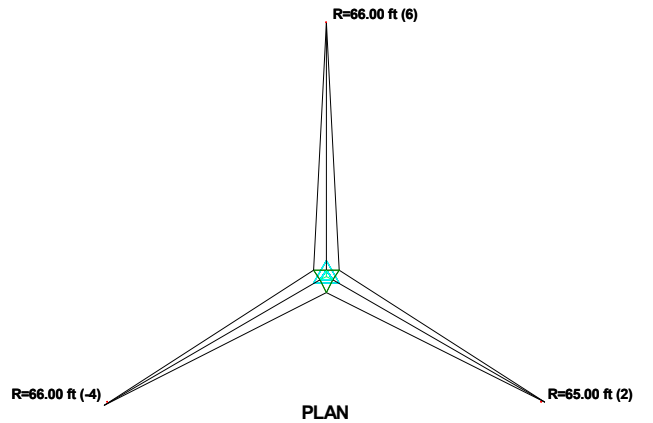
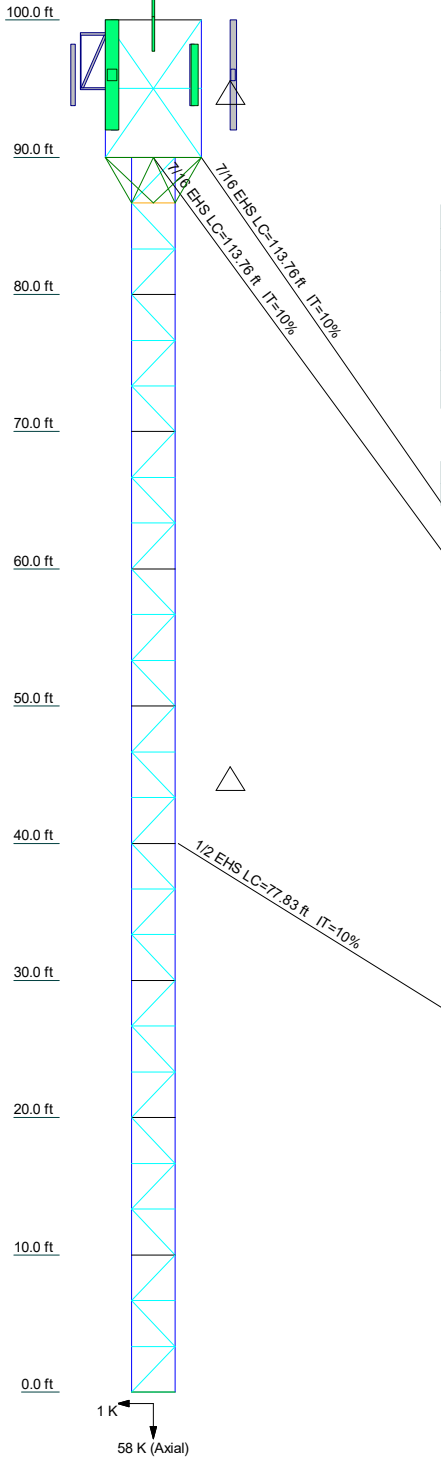
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, 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.

Section	L1	T1	T2	T3	T4	T5	T6	T7	T8	T9	
Legs	P3.5x2.28					V3x3x1/4					
Leg Grade	A53-B-35					A36					
Diagonals	L2x1 1/2x3/16	L2x2x3/16	L1 1/2x1 1/2x3/16		L2x2x3/16		L1 1/2x1 1/2x3/16				
Diagonal Grade					A36						
Top Girts	L2x2x1/4	L3x2x1/4			L1 1/4x1 1/4x3/16		L1 1/4x1 1/4x3/16				
Bottom Girts	L2x2x1/4				N.A.						
Horizontals	N.A.				L1 1/4x1 1/4x3/16						
Sec. Horizontals					N.A.						
Bot Guy Pull-Offs	L2x1 1/2x3/16	L2 1/2x2 1/2x1/4			N.A.						
Face Width (ft)					3.125						
# Panels @ (ft)	7				27 @ 3.33333						
Weight (K)	1 @ 10										
	0.6										



DESIGNED APPURTENANCE LOADING

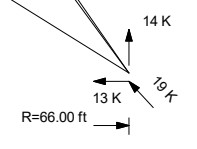
TYPE	ELEVATION	TYPE	ELEVATION
20' x 2" Dia Omni	104.58	LNX-6515DS (T-Mobile Proposed)	96
10' x 2" Dia Omni	100.25	APXV18-206516S-C-A20 (T-Mobile Proposed)	96
2" Std. x 2.5' Pipe	99	LNX-6515DS (T-Mobile Proposed)	96
2-ft Stand Off	97	TMA 10"x8"x3" (T-Mobile Existing)	96
APXV18-206516S-C-A20 (T-Mobile Proposed)	96	TMA 10"x8"x3" (T-Mobile Existing)	96
LNX-6515DS (T-Mobile Proposed)	96	TMA 10"x8"x3" (T-Mobile Existing)	96
APXV18-206516S-C-A20 (T-Mobile Proposed)	96		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 40 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: 67.3%

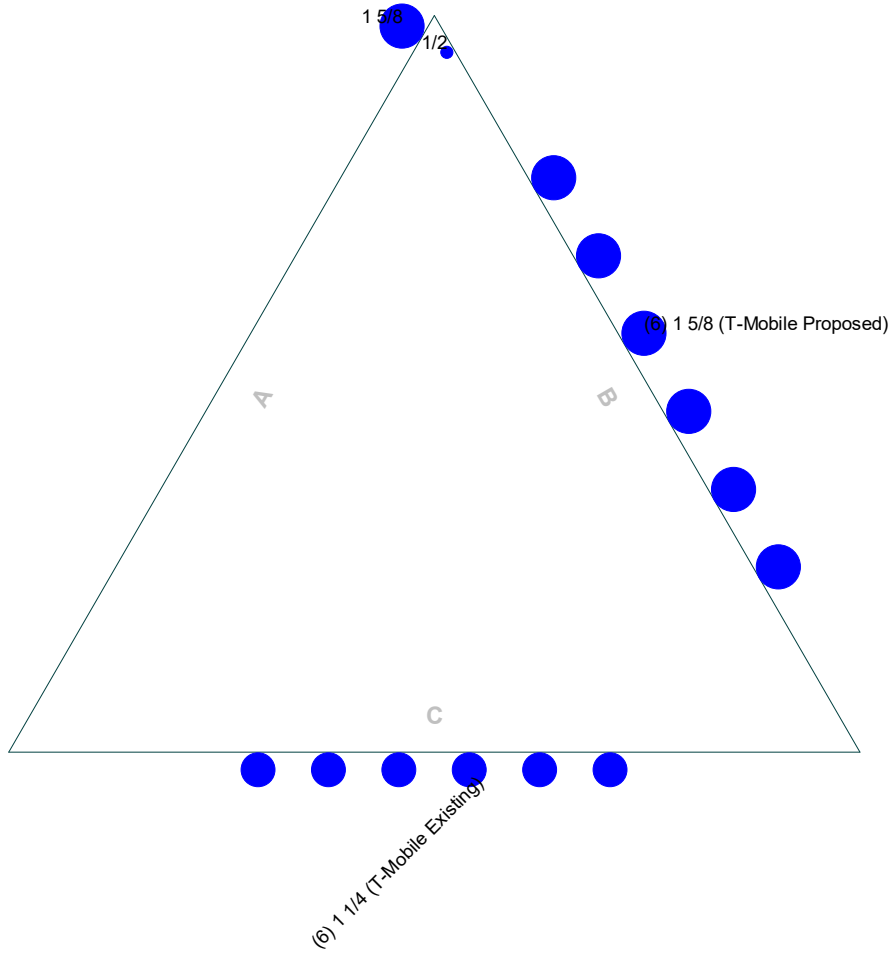


ALL REACTIONS ARE FACTORED

Centek Engineering Inc.		Job: 16119.00 - CT11358A	
63-2 North Branford Rd. Branford, CT 06405		Project: 90' Trylon Guyed Tower - Wildcat Hill Road, Harwinton, CT	
Phone: (203) 488-0580	FAX: (203) 488-8587	Client: T-Mobile	Drawn by: T.JL
		Code: TIA-222-G	Date: 10/21/16
		Path: J:\Users\1911990\161190_00\Structural\Backup Documents\Civil\2016\New Bids\90A Trylon Guyed Tower - Harwinton, CT.dwg	App'd:
			Scale: NTS
			Dwg No: E-1

Feed Line Plan

— Round
 — Flat
 — App In Face
 — App Out Face



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

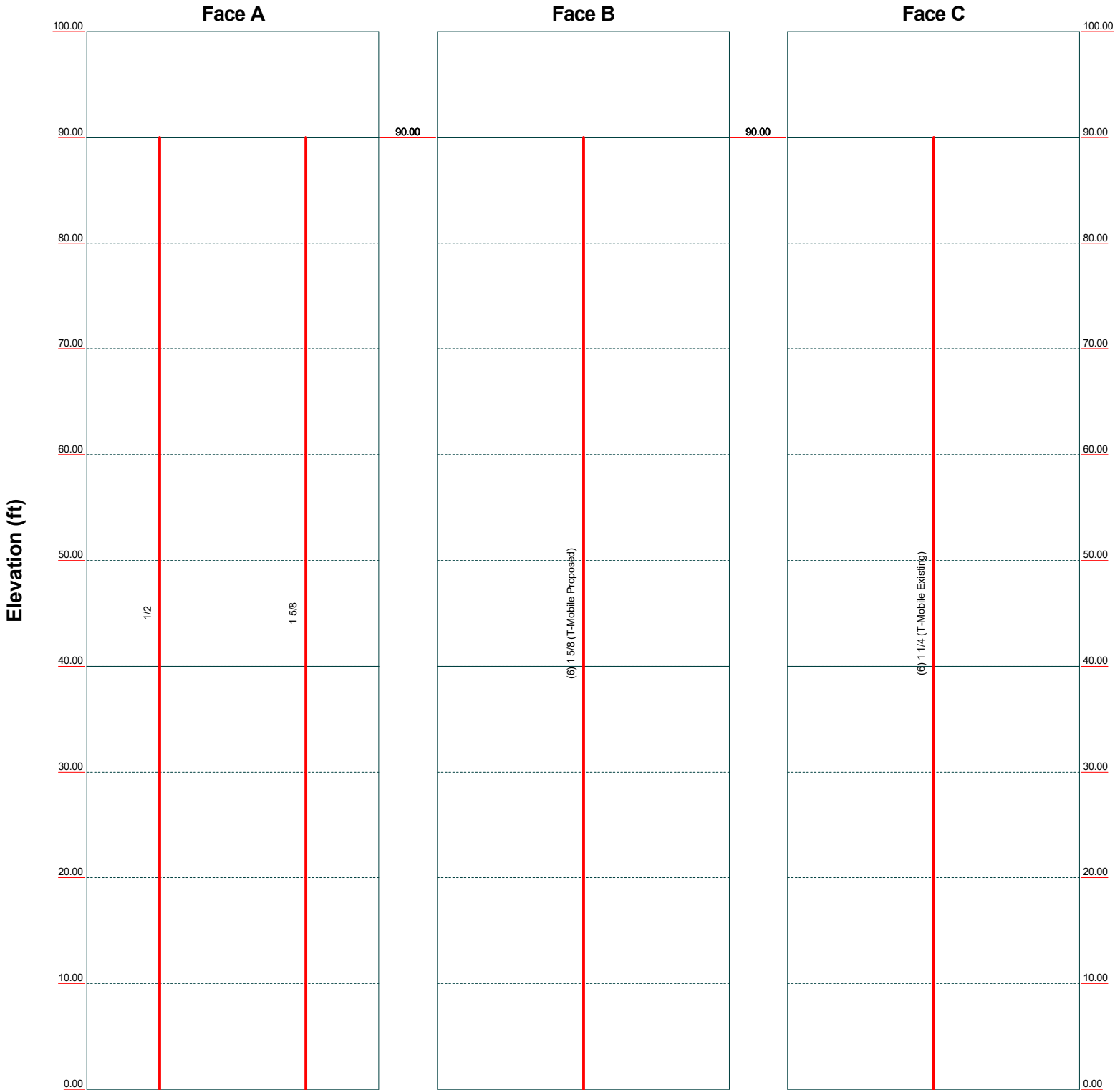
Job: 16119.00 - CT11358A		
Project: 90' Tylon Guyed Tower - Wildcat Hill Road, Harwington, CT		
Client: T-Mobile	Drawn by: T.JL	App'd:
Code: TIA-222-G	Date: 10/21/16	Scale: NTS
Path:	Dwg No: E-7	

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Feed Line Distribution Chart

0' - 100'

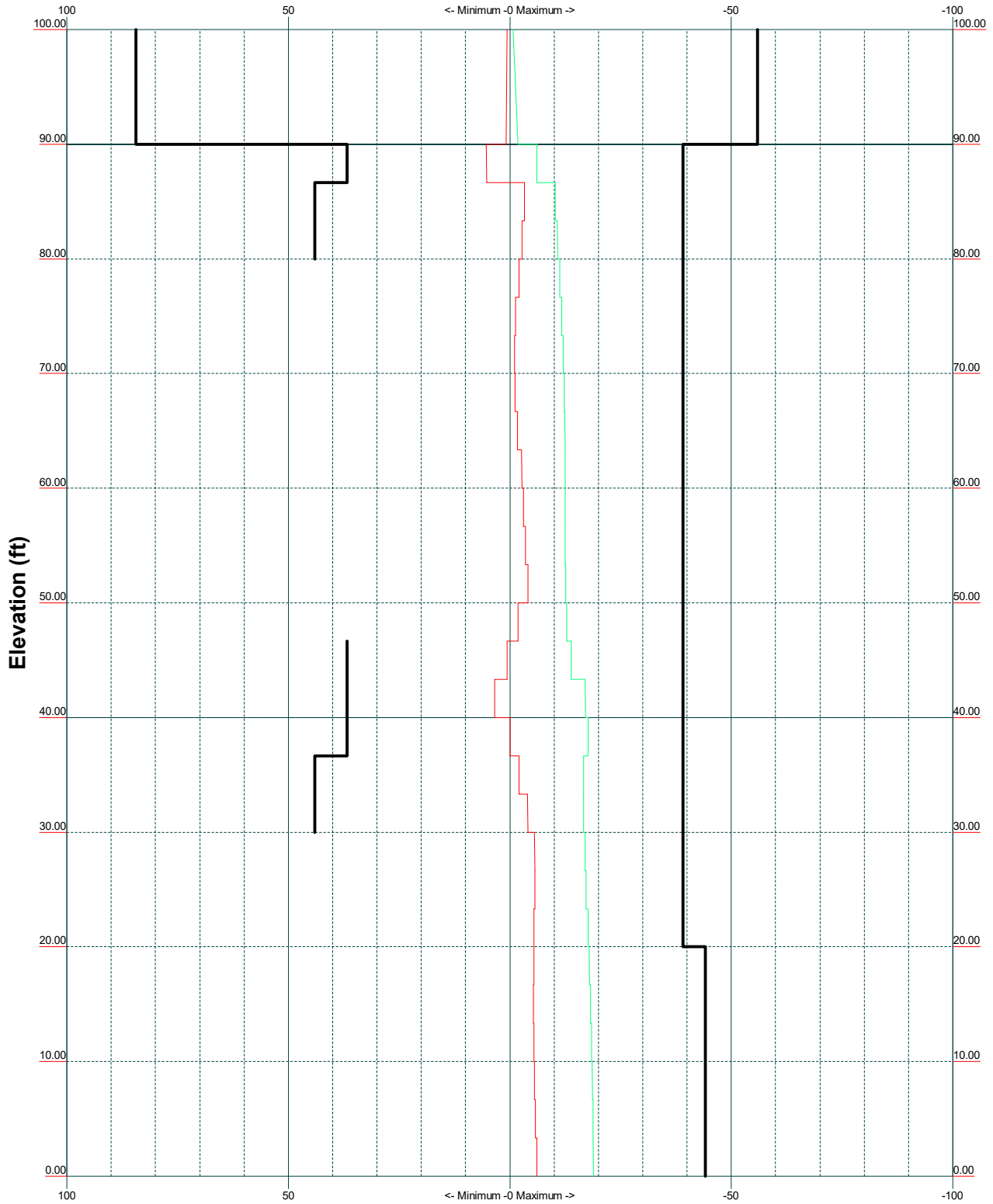
— Round
 — Flat
 — App In Face
 — App Out Face
 — Truss Leg



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587		Job: 16119.00 - CT11358A		
		Project: 90' Trylon Guyed Tower - Wildcat Hill Road, Harwington, CT		
Client:	T-Mobile	Drawn by:	TJL	App'd:
Code:	TIA-222-G	Date:	10/21/16	Scale:
Path:	J:\Users\1611900\1611900_004_Structural\Backup_Documentation\Calcs\EP\New\1611900-004_Trylon_Guyed_Tower - Harwington, CT.dwg			Dwg No:
				E-7

TIA-222-G - 93 mph/40 mph 1.0000 in Ice Exposure C

Leg Capacity ——— Leg Compression (K)



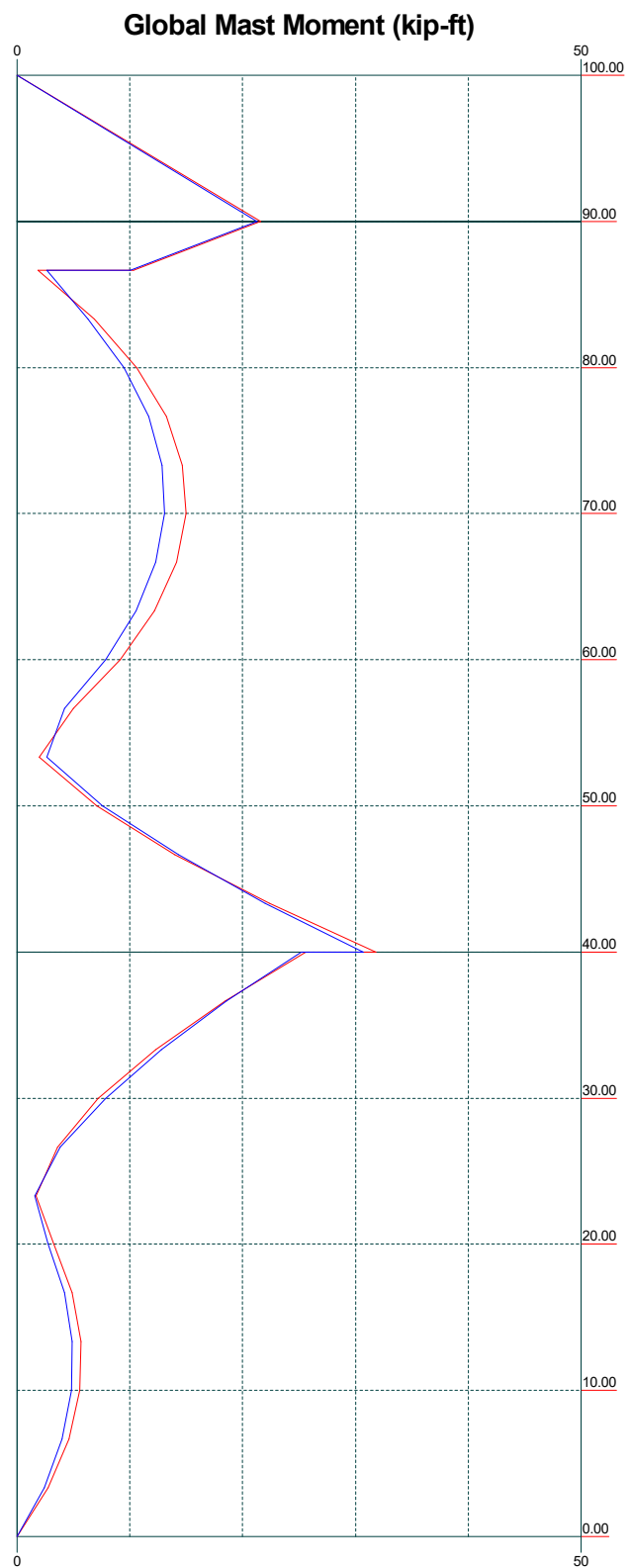
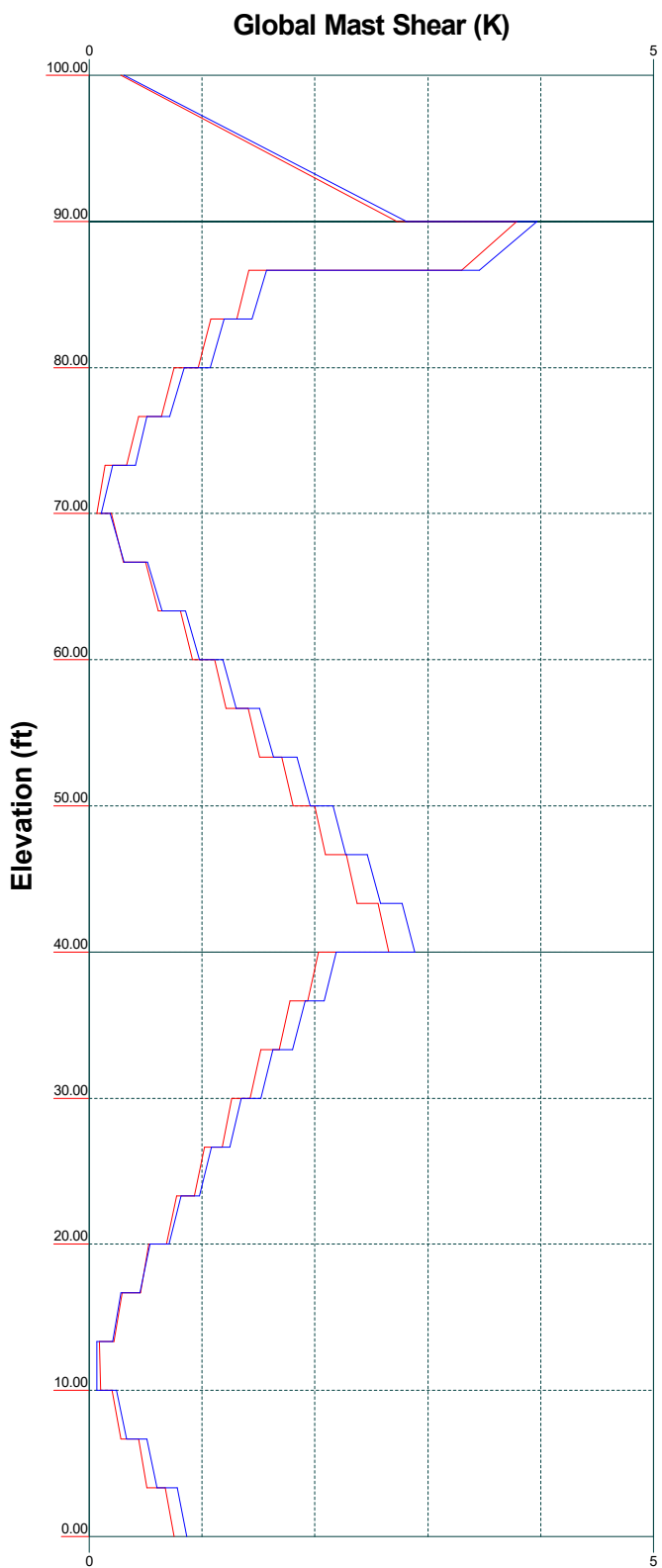
Centek Engineering Inc.
 63-2 North Branford Rd.
 Branford, CT 06405
 Phone: (203) 488-0580
 FAX: (203) 488-8587

Job: 16119.00 - CT11358A		
Project: 90' Trylon Guyed Tower - Wildcat Hill Road, Harwington, CT		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 10/21/16	Scale: NTS
Path:	Dwg No: E-3	

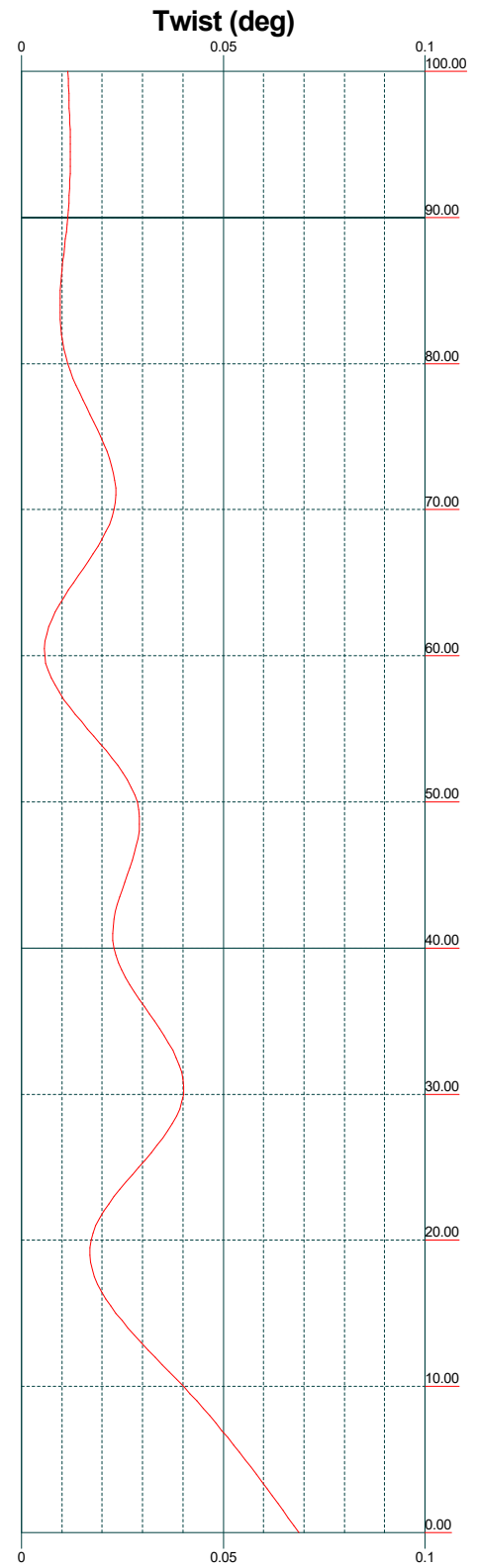
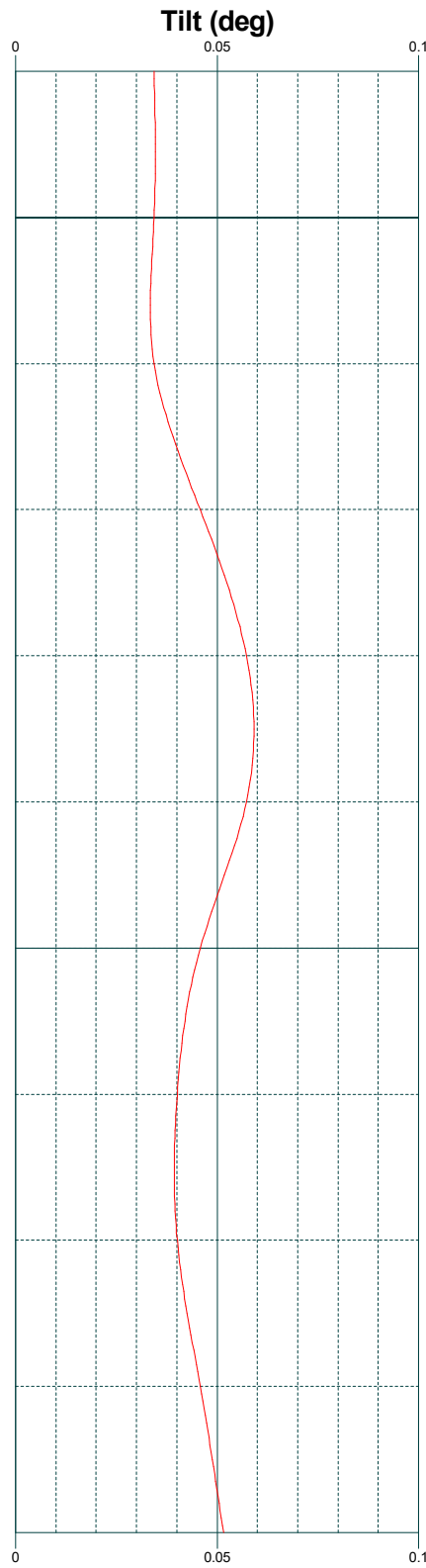
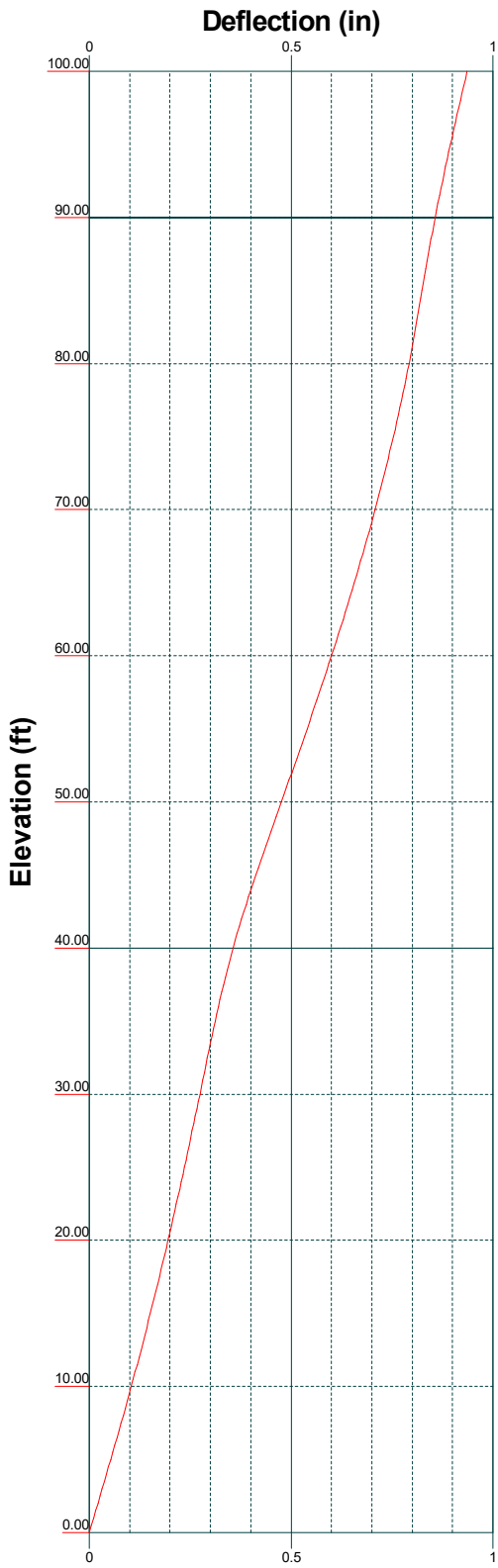
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Vx Vz

Mx Mz



Centek Engineering Inc.		
63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587		
Job: 16119.00 - CT11358A		
Project: 90' Trylon Guyed Tower - Wildcat Hill Road, Harwington, CT		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 10/21/16	Scale: NTS
Path:	Dwg No: E-4	



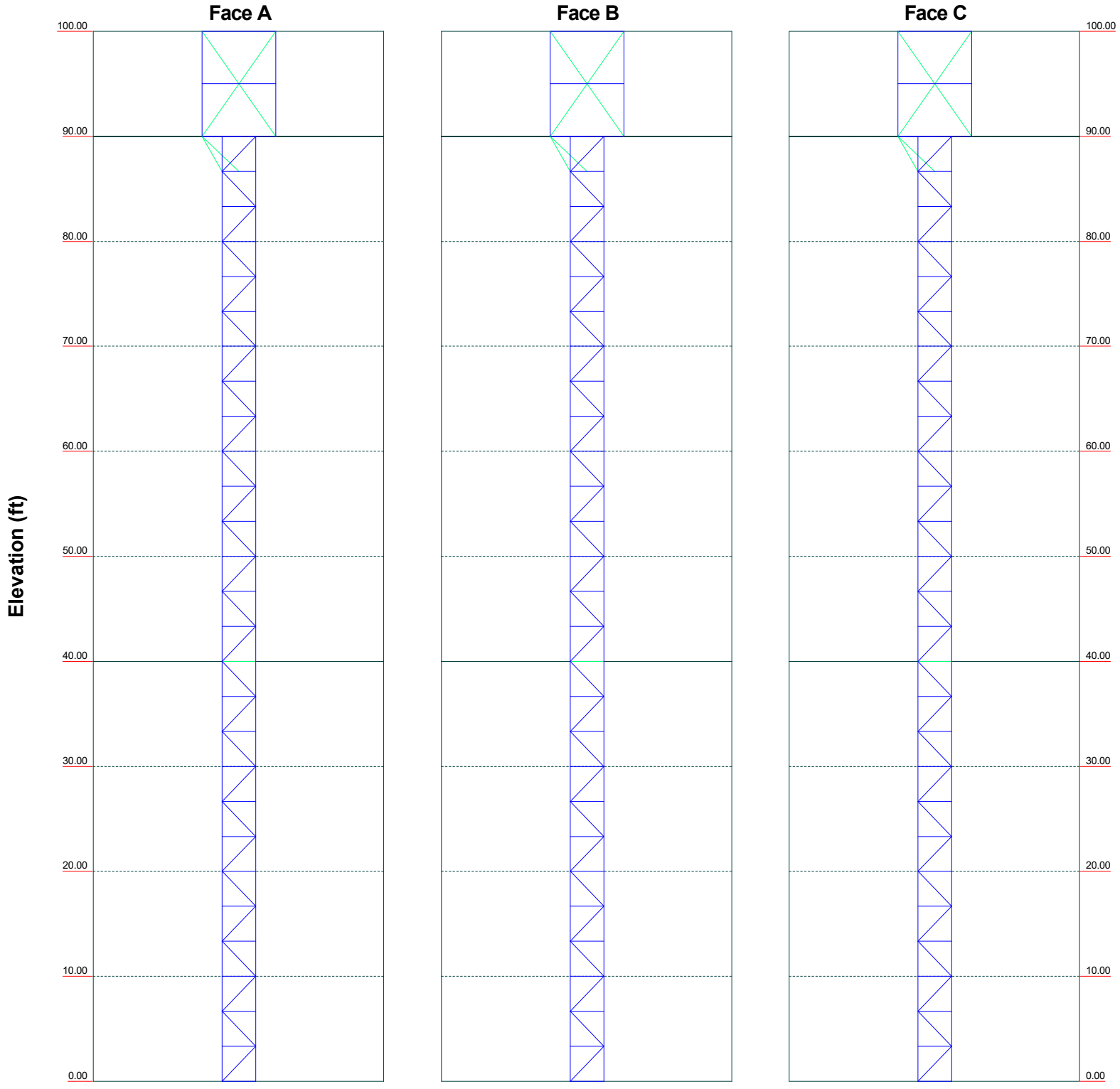
Centek Engineering Inc.
 63-2 North Branford Rd.
 Branford, CT 06405
 Phone: (203) 488-0580
 FAX: (203) 488-8587

Job: 16119.00 - CT11358A		
Project: 90' Trylon Guyed Tower - Wildcat Hill Road, Harwington, CT		
Client: T-Mobile	Drawn by: T.JL	App'd:
Code: TIA-222-G	Date: 10/21/16	Scale: NTS
Path:	Dwg No: E-5	

Stress Distribution Chart

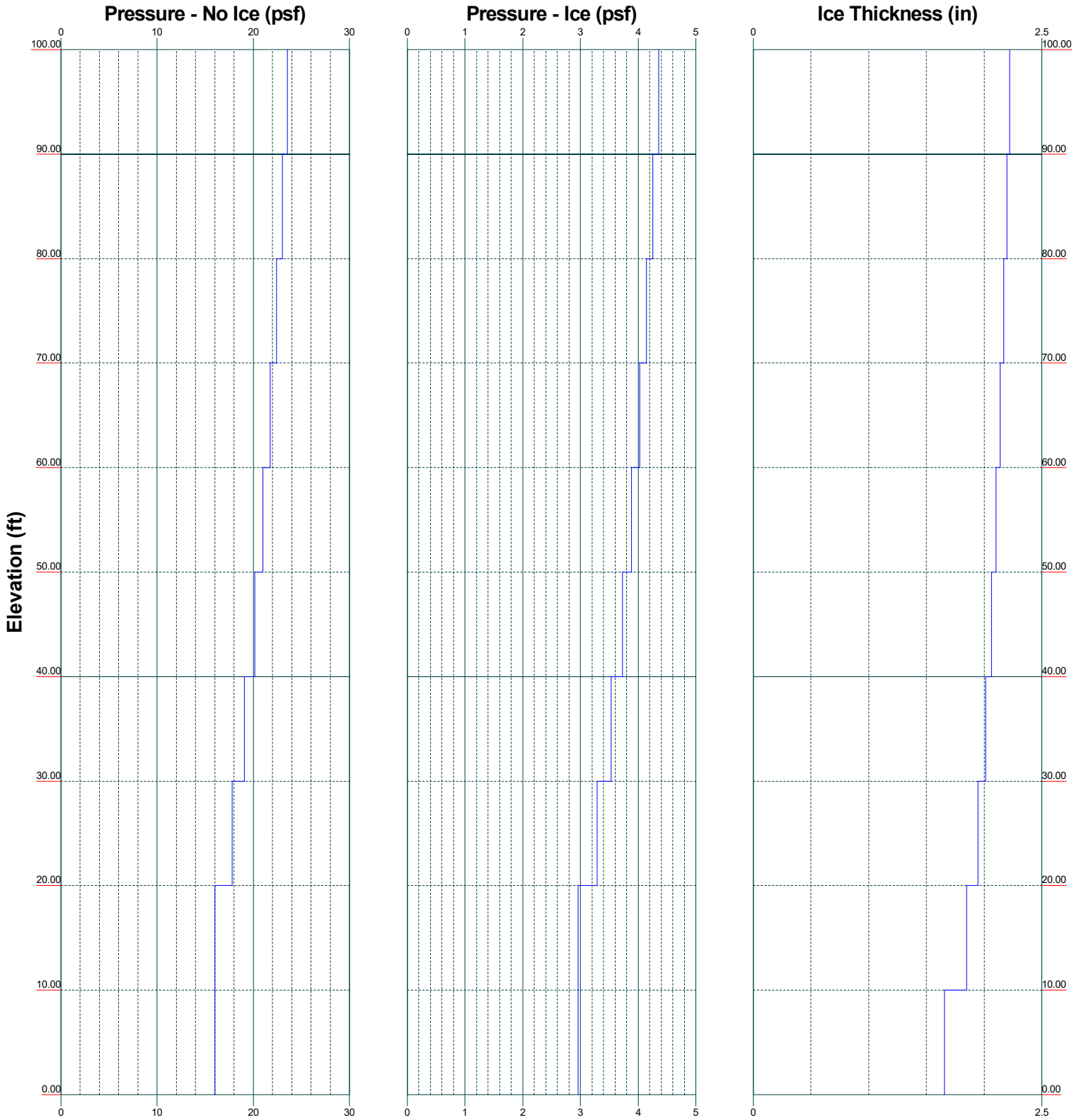
0' - 100'

■ > 100%
 ■ 90%-100%
 ■ 75%-90%
 ■ 50%-75%
 ■ < 50% Overstress



Centek Engineering Inc.			Job: 16119.00 - CT11358A		
63-2 North Branford Rd. Branford, CT 06405			Project: 90' Trylon Guyed Tower - Wildcat Hill Road, Harwington, CT		
Phone: (203) 488-0580			Client: T-Mobile	Drawn by: T.JL	App'd:
FAX: (203) 488-8587			Code: TIA-222-G	Date: 10/21/16	Scale: NTS
			Path:	Dwg No: E-8	

Wind Pressures and Ice Thickness
TIA-222-G - 93 mph/40 mph 1.0000 in Ice Exposure C



Centek Engineering Inc.			Job: 16119.00 - CT11358A		
63-2 North Branford Rd. Branford, CT 06405			Project: 90' Trylon Guyed Tower - Wildcat Hill Road, Harwington, CT		
Phone: (203) 488-0580		Fax: (203) 488-8587	Client: T-Mobile	Drawn by: T.JL	App'd:
Code: TIA-222-G		Date: 10/21/16	Scale: NTS		Dwg No: E-9
<small>J:\Users\111920\16119.00_Storage\Backup_Documentation\Calcs\EP\New\Bldg\90A Trylon Guyed Tower - Harwington, CT.dwg</small>					

RAN Template: 704G	A&L Template: 704G_Unconstrained
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Section 1 - Site Information

Site ID: CT11358A
Status: Draft
Version: 1.1
Project Type: L700
Approved: Not Approved
Approved By: Not Approved
Last Modified: 7/19/2016 1:40:03 PM
Last Modified By: GSM1900MLucey

Site Name: Harwinton SNET_1
Site Class: Self Support Tower
Site Type: Structure Non Building
Solution Type:
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: SNET LL

Latitude: 41.75691500
Longitude: -73.09523400
Address: Wildcat Hill Rd
City, State: Harwinton, CT
Region: NORTHEAST

RAN Template: 704G		AL Template: 704G_Unconstrained		
Sector Count: 3	Antenna Count: 6	Coax Line Count: 12	TMA Count: 2	RRU Count: 0

Section 2 - Existing Template Images

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Section 3 - Proposed Template Images

AL_704G_Unconstrained.png

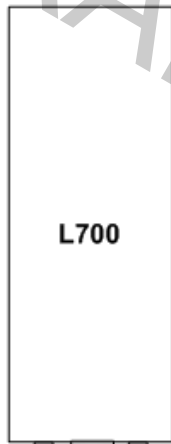
**704G Unconstrained
Alpha Sector
Antenna View**

Alpha
AntennaUnitGroup=1
Beta
AntennaUnitGroup=2
Gamma
AntennaUnitGroup=3

Alpha
AntennaUnitGroup=4
Beta
AntennaUnitGroup=5
Gamma
AntennaUnitGroup=6

Low band

Mid band



AntennaUnit=1
AntennaSubunit=1

AntennaUnit=1
AntennaSubunit=1

If PCS antenna doesn't support AISG2.0 connect low band antennas only

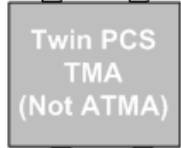
RET
AntennaUnitGroup=4/5/6
AntennaNearUnit=3
RetSubUnit=1

RET
AntennaUnitGroup=4/5/6
AntennaNearUnit=1
RetSubUnit=1

Connect to antenna on the next sector

Use "Top" SBT

*A TMA that supports AISG2.0 should be defined in L19. If that is the case the SBT isn't needed.



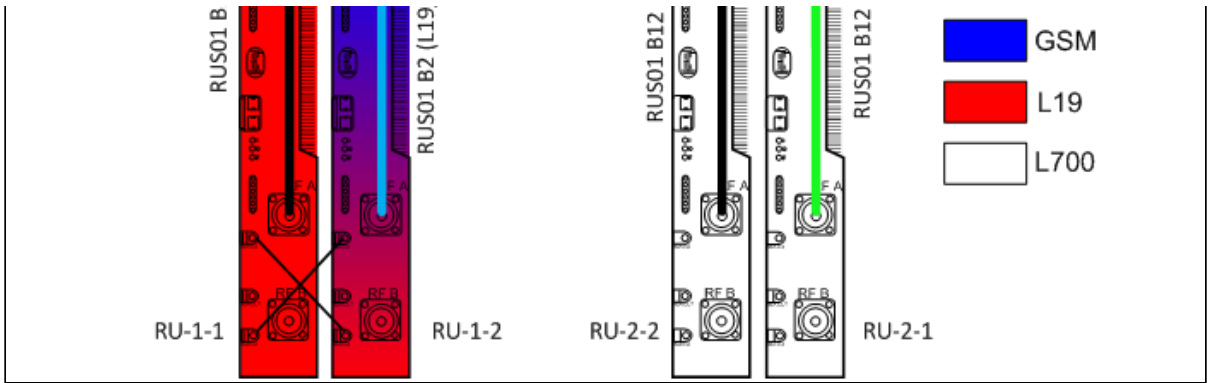
Antenna Ground

Cable legend

RF	Black line
RF+DC	Blue line
RF+DC+AISG	Green line
DC+AISG	Purple line

Define TMA in GSM. LTE doesn't support external TMA*





Notes:

Section 4 - Siteplan Images

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DRAFT

RAN Template: 704G	A&L Template: 704G_Unconstrained
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Section 5 - RAN Equipment

Existing RAN Equipment

Template: 4G

Enclosure	1
Enclosure Type	RBS 6201 ODE
Baseband	DUS41
Radio	RUS02 B2 (x6)

Proposed RAN Equipment

Template: 704G

Enclosure	1	2
Enclosure Type	RBS 6201	Battery Cabinet
Baseband	DUG20 DUL20	
Radio	RUS01 B2 (x3) RUS01 B2 (x3) RUS01 B12 (x6) L1900 L1900 L700 G1900	

RAN Scope of Work:

RAN Template: 704G	A&L Template: 704G_Unconstrained
------------------------------	--

Section 6 - A&L Equipment

Existing Template: 4G
Proposed Template: 704G_Unconstrained

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro
Antenna	1
Antenna Model	RR90-17-XXDP (Dual)
Azimuth	40
M. Tilt	0
Height	96
Ports	P1
Active Tech.	L1900 G1900
Dark Tech.	
Restricted Tech.	
Decomm. Tech.	
E. Tilt	2
Cables	1-1/4" Coax - 160 ft. 1-1/4" Coax - 160 ft.
TMA's	Generic Style 1A - Twin PCS
Diplexers / Combiners	
Radio	
Sector Equipment	
Unconnected Equipment:	
Scope of Work:	
<input type="text"/>	

RAN Template: 704G	A&L Template: 704G_Unconstrained
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Sector 1 (Proposed) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	2
Antenna Model	APXV18-206516S-A20 (Dual)	LNx-6515DS-A1M (Dual)
Azimuth	40	40
M. Tilt		
Height	96	96
Ports	P1	P2
Active Tech.	L1900 G1900	L700
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	2
Cables	1-1/4" Coax - 160 ft. 1-1/4" Coax - 160 ft.	1-5/8" Coax - 160 ft. 1-5/8" Coax - 160 ft.
TMA's	Generic Style 1A - Twin PCS	
Diplexers / Combiners		
Radio		
Sector Equipment		
Unconnected Equipment:		
Scope of Work:		

RAN Template: 704G	A&L Template: 704G_Unconstrained
------------------------------	--

Sector 2 (Existing) view from behind	
Coverage Type	A - Outdoor Macro
Antenna	1
Antenna Model	RR90-17-XXDP (Dual)
Azimuth	160
M. Tilt	0
Height	96
Ports	P1
Active Tech.	L1900 G1900
Dark Tech.	
Restricted Tech.	
Decomm. Tech.	
E. Tilt	2
Cables	1-1/4" Coax - 160 ft. 1-1/4" Coax - 160 ft.
TMA's	Generic Style 1A - Twin PCS
Diplexers / Combiners	
Radio	
Sector Equipment	
Unconnected Equipment:	
Scope of Work:	

RAN Template: 704G	A&L Template: 704G_Unconstrained
------------------------------	--

Sector 2 (Proposed) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	2
Antenna Model	APXV18-206516S-A20 (Dual)	LNx-6515DS-A1M (Dual)
Azimuth	160	160
M. Tilt		
Height	96	96
Ports	P1	P2
Active Tech.	L1900 G1900	L700
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	2
Cables	1-1/4" Coax - 160 ft. 1-1/4" Coax - 160 ft.	1-5/8" Coax - 160 ft. 1-5/8" Coax - 160 ft.
TMA's		
Diplexers / Combiners		
Radio		
Sector Equipment		
Unconnected Equipment:		
Scope of Work:		

RAN Template: 704G	A&L Template: 704G_Unconstrained
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Sector 3 (Existing) view from behind	
Coverage Type	A - Outdoor Macro
Antenna	1
Antenna Model	RR90-17-XXDP (Dual)
Azimuth	280
M. Tilt	0
Height	96
Ports	P1
Active Tech.	L1900 G1900
Dark Tech.	
Restricted Tech.	
Decomm. Tech.	
E. Tilt	2
Cables	1-1/4" Coax - 160 ft. 1-1/4" Coax - 160 ft.
TMA's	Generic Style 1A - Twin PCS
Diplexers / Combiners	
Radio	
Sector Equipment	
Unconnected Equipment:	
Scope of Work:	

RAN Template: 704G	A&L Template: 704G_Unconstrained
------------------------------	--

Sector 3 (Proposed) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	2
Antenna Model	APXV18-206516S-A20 (Dual)	LNx-6515DS-A1M (Dual)
Azimuth	280	280
M. Tilt		
Height	96	96
Ports	P1	P2
Active Tech.	L1900 G1900	L700
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	2
Cables	1-1/4" Coax - 160 ft. 1-1/4" Coax - 160 ft.	1-5/8" Coax - 160 ft. 1-5/8" Coax - 160 ft.
TMA's	Generic Style 1A - Twin PCS	
Diplexers / Combiners		
Radio		
Sector Equipment		
Unconnected Equipment:		
Scope of Work:		

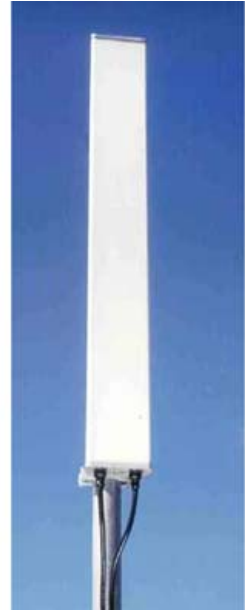
Optimizer® Panel Dual Polarized Antenna

Product Description

This X-Polarized variable tilt antenna provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range. This antenna is optimized for performance across the entire frequency band (1710-2200 MHz).

Features/Benefits

- **Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High Suppression of all Upper Sidelobes (Typically <-18dB).**
- **Gain tracking – difference between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz) <1dB.**
- **Azimuth horizontal beamwidth difference <6deg between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz)**
- **Low profile for low visual impact.**
- **Dual polarization; Broadband design.**



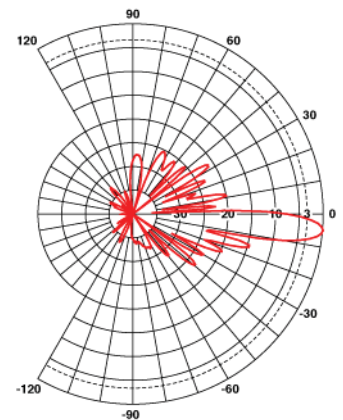
Technical Specifications

Electrical Specifications

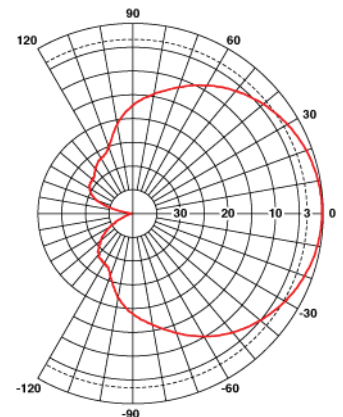
Frequency Range, MHz	1710-2200
Antenna Type	Panel Dual Polarized
Electrical Down Tilt Option	Variable
Gain, dBi (dBd)	18.4 (16.3)
Electrical Downtilt, deg	0-10
Horizontal Beamwidth, deg	65
VSWR	< 1.5:1
Vertical Beamwidth, deg	5.9 to 7.7
1st Upper Sidelobe Suppression, dB	> 18
Upper Sidelobe Suppression, dB	> 18 all
Polarization	Dual pol +/-45°
Front-To-Back Ratio, dB	>26 (typically 28)
Maximum Power Input, W	300
Isolation between Ports, dB	> 30
Lightning Protection	Direct Ground
3rd Order IMP @ 2 x 43 dBm, dBc	> 150 (155 Typical)

Mechanical Specifications

Rated Wind Speed, km/h (mph)	160 (100)
Survival Wind Speed, km/h (mph)	200 (125)
Max Wind Loading Area, m² (ft²)	0.29 (2.9)
Maximum Thrust @ Rated Wind, N (lbf)	380 (185)
Front Thrust @ Rated Wind, N (lbf)	380 (185)
Reflector Material	Aluminum
Radiating Element Material	Brass
Radome Material	Fiberglass
Connector Type	(2) 7-16 DIN Female
Connector Location	Bottom
Mount Type	Downtilt
Mounting Hardware	APM40-2
Weight w/o Mtg Hardware, kg (lb)	8.5 (18.7)
Packing Dimensions, HxWxD, mm (in)	1520 x 260 x 200 (59.8 x 10.2 x 7.8)
Dimensions - HxWxD, mm (in)	1349 x 175 x 80 (53.1 x 6.9 x 3.15)
Shipping Weight without mounting hardware, kg (lb)	8.5 (18.7)



Vertical Pattern



Horizontal Pattern

All information contained in the present datasheet is subject to confirmation at time of ordering.



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
	0 ° 16.6	0 ° 17.0
Gain by Beam Tilt, average, dBi	4 ° 16.6	4 ° 17.0
	8 ° 16.4	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

LNx-6515DS-VTM | LNx-6515DS-A1M

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

RoHS 2011/65/EU

China RoHS SJ/T 11364-2006

ISO 9001:2008

Classification

Compliant by Exemption

Above Maximum Concentration Value (MCV)

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

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

T-Mobile Existing Facility

Site ID: CT11358A

Harwinton SNET_1
Wildcat Hill Rd
Harwinton, CT 06791

November 18, 2016

EBI Project Number: 6216005120

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	4.46 %

November 18, 2016

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

Emissions Analysis for Site: **CT11358A – Harwinton SNET_1**

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

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

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

General population/uncontrolled exposure limits apply to situations in which the general 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 ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu\text{W}/\text{cm}^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is 1000 $\mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **Wildcat Hill Rd, Harwinton, 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 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.
- 3) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 4) Since all radios are ground mounted there are additional cabling losses accounted for. For each ground mounted RF path the following losses were calculated. 0.90 dB of additional cable loss for all ground mounted 700 MHz Channels and 1.65 dB of additional cable loss for all ground mounted 1900 MHz channels. This is based on manufacturers Specifications for 160 feet of 1-5/8" coax cable on each path.

- 5) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 6) For the following calculations the sample point was the top of a 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.
- 7) The antennas used in this modeling are the **RFS APXV18-206516S-C-A20** for 1900 MHz (PCS) 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 APXV18-206516S-C-A20** has a maximum gain of **16.3 dBd** at its main lobe at 1900 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.
- 8) The antenna mounting height centerline of the proposed antennas is **96 feet** above ground level (AGL).
- 9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 10) 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 APXV18-206516S-C-A20	Make / Model:	RFS APXV18-206516S-C-A20	Make / Model:	RFS APXV18-206516S-C-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	96	Height (AGL):	96	Height (AGL):	96
Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	5,251.37	ERP (W):	5,251.37	ERP (W):	5,251.37
Antenna A1 MPE%	2.33	Antenna B1 MPE%	2.33	Antenna C1 MPE%	2.33
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):	96	Height (AGL):	96	Height (AGL):	96
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):	703.27	ERP (W):	703.27	ERP (W):	703.27
Antenna A2 MPE%	0.67	Antenna B2 MPE%	0.67	Antenna C2 MPE%	0.67

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	3.00 %
PageNet	1.46 %
Site Total MPE %:	4.46 %

T-Mobile Sector A Total:	3.00 %
T-Mobile Sector B Total:	3.00 %
T-Mobile Sector C Total:	3.00 %
Site Total:	4.46 %

T-Mobile_per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile PCS - 1950 MHz LTE	2	1,750.46	96	15.54	PCS - 1950 MHz	1000	1.55%
T-Mobile PCS - 1950 MHz GSM	2	875.23	96	7.77	PCS - 1950 MHz	1000	0.78%
T-Mobile 700 MHz LTE	1	703.27	96	3.12	700 MHz	467	0.67%
Total:							3.00%

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:	3.00 %
Sector B:	3.00 %
Sector C:	3.00 %
T-Mobile Per Sector Maximum:	3.00 %
Site Total:	4.46 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **4.46%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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