EXHIBIT C

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

85-ft Ballast Monopole

Proposed Temporary Antenna Installation

AT&T Site Ref: CT5990

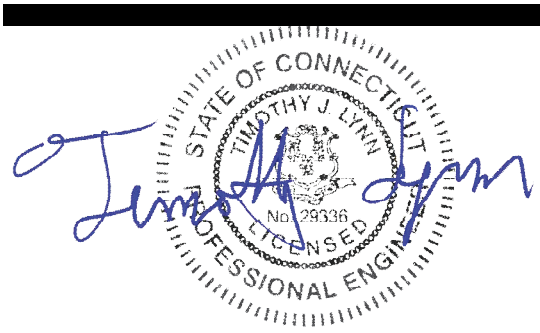
T-Mobile Site Ref: CTNL010A

Ancient Highway
East Lyme, CT

Centek Project No. 15021.000

Date: March 13, 2015

[redacted]



Prepared for:

AT&T Mobility
500 Enterprise Drive,
Suite 3A
Rocky Hill, CT 06067

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the temporary antenna installation proposed by AT&T Mobility and T-Mobile on the ballast monopole (tower) located in East Lyme, CT.

The host tower is a 85-ft tall, three-section, ballasted monopole. Original design information was unavailable for use in this report. The tower geometry was obtained from a previous structural analysis prepared by Centek job no 14071.000 dated April 29, 2014.

Antenna and appurtenance information were obtained from AT&T and T-Mobile RF data sheets.

The tower consists of three (3) vertical steel pipe sections conforming to ASTM A53 Grade B (35ksi). The diameter of the pole (flat-flat) is 6.00-in at the top and 24.00-in at the base.

AT&T proposes the installation of three (3) panel antennas and three (3) TMA's on the temporary ballast monopole. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

T-Mobile proposes the installation of three (3) panel antennas and six (6) TMA's on the temporary ballast monopole. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

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

- **AT&T (Proposed):**
  Antennas: Three (3) KMW AM-X-CD-16-65-00T panel antennas and three (3) CCI DTMABP7819VG12A TMA's flush mounted with a RAD center elevation of 82-ft above grade level.
  Coax Cables: Six (6) 7/8" ∅ coax cables running on the inside of the monopole.
- **T-MOBILE (Proposed):**
  Antennas: Three (3) RFS APX16DWV-16DWVS panel antennas and six (6) RFS ATMAA1412D-1A20 TMA's flush mounted with a RAD center elevation of 72-ft above grade level.
  Coax Cables: Twelve (12) 7/8" ∅ coax cables running on the inside of the monopole.

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.**

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 shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation on the tower analysis.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice on the tower structure and its components.

Basic Wind Speed:	New London; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	East Lyme; v = 115 mph (3 second gust) equivalent to v = 95 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	Appendix-K wind speed controls.	
Load Cases:	Load Case 1; 95 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 82 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 82 mph wind speed velocity represents 75% of the wind pressure generated by the 95 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

[1] The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses were found to be within allowable limits. In Load Case 1, per tnxTower "Section Capacity Table", this tower was found to be at **87.3%** of its total capacity.

Tower Section	Elevation (AGL)	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L1)	66.5'-86.5'	87.3%	**PASS**
Pole Shaft (L2)	36.5'-66.5'	32.0%	**PASS**
Pole Shaft (L3)	1.5'-36.5'	74.8%	**PASS**

Anchors and Ballast

The base of the tower is connected to the ballast frame by means of (20) 1.00"∅, ASTM A325 anchor bolts on a 27" ∅ bolt circle.

- The tower reactions developed from the governing Load Case 1 were used in the verification of the foundation:

Reactions	Vector	Proposed Base Reactions
Base	Shear	6 kips
	Compression	8 kips
	Moment	306 kip-ft

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

Tower Component	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Compression and Shear	82.3%	**PASS**
Base Plate	Bending	71.4%	**PASS**

- The ballast frame was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS)[1]	Proposed Loading (FS)[1]	Result
Ballast frame w/ 83,500 lbs of conc. blocks	OTM[2]	2.0	2.25	**PASS**

Note 1: FS denotes Factor of Safety.
Note 2: OTM denotes Overturning Moment

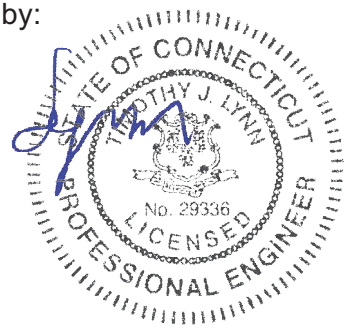
Conclusion

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 AT&T and 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 provide 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.

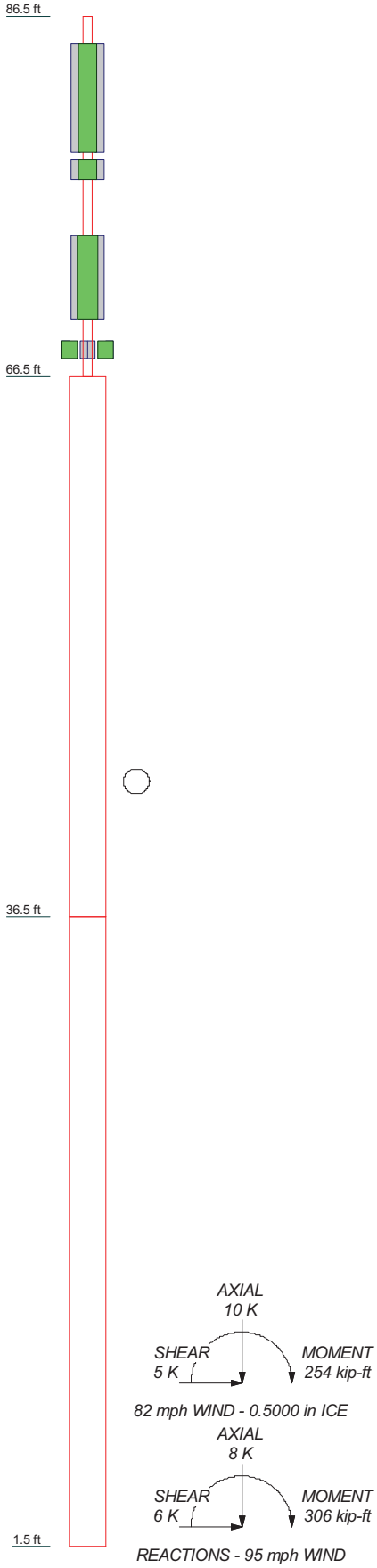
General Description of Structural Analysis Program

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	Size	Length (ft)	Grade	Weight (K)
1	P6x.432	20.00	A53-B-35	0.6
2	P24x3/8	30.00		2.8
3	P24x3/8	35.00		3.3
				6.7



82 mph WIND - 0.5000 in ICE

REACTIONS - 95 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
AM-X-CD-16-65-00T-RET(72") (AT⌶ Proposed)	82	APX16DWV-16DWVS-E-A20 (T-Mobile Proposed)	72
AM-X-CD-16-65-00T-RET(72") (AT⌶ Proposed)	82	Valmont Uni-Tri Bracket (T-Mobile Proposed)	72
AM-X-CD-16-65-00T-RET(72") (AT⌶ Proposed)	82	ATMAA1412D-1A20 TMA (T-Mobile Proposed)	68
Valmont Uni-Tri Bracket (AT⌶ Proposed)	82	ATMAA1412D-1A20 TMA (T-Mobile Proposed)	68
DTMABP7819VG12A TMA (AT⌶ Proposed)	78	ATMAA1412D-1A20 TMA (T-Mobile Proposed)	68
DTMABP7819VG12A TMA (AT⌶ Proposed)	78	ATMAA1412D-1A20 TMA (T-Mobile Proposed)	68
DTMABP7819VG12A TMA (AT⌶ Proposed)	78	ATMAA1412D-1A20 TMA (T-Mobile Proposed)	68
APX16DWV-16DWVS-E-A20 (T-Mobile Proposed)	72	ATMAA1412D-1A20 TMA (T-Mobile Proposed)	68
APX16DWV-16DWVS-E-A20 (T-Mobile Proposed)	72		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower designed for a 95 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 82 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 87.3%

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

Job: ***15021.000 - CT5990/CTNL010A***		
Project: ***85-ft Temporary Monopole - East Lyme, CT***		
Client: AT&T/T-Mobile	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 03/13/15	Scale: NTS
Path: J:\Jobs\1502100.WI\04 Structural\Backup Documentation\CalcsER\85' Monopole - West Hartford CT.eri		Dwg No. E-1

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 95 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 82 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	86.50-66.50	20.00	P6x.432	A53-B-35 (35 ksi)	
L2	66.50-36.50	30.00	P24x3/8	A53-B-35 (35 ksi)	
L3	36.50-1.50	35.00	P24x3/8	A53-B-35 (35 ksi)	

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 86.50-66.50				1	1	1		
L2 66.50-36.50				1	1	1		
L3 36.50-1.50				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight plf
7/8	C	No	Inside Pole	83.50 - 4.50	6	No Ice	0.00	0.54
(AT&T Proposed)						1/2" Ice	0.00	0.54
7/8	C	No	Inside Pole	73.50 - 4.50	12	No Ice	0.00	0.54
(T-Mobile Proposed)						1/2" Ice	0.00	0.54

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L1	86.50-66.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.10
L2	66.50-36.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.29
L3	36.50-1.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.31

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L1	86.50-66.50	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.10
L2	66.50-36.50	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.29
L3	36.50-1.50	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.31

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
AM-X-CD-16-65-00T-RET(72")	A	From Face	0.50 0.00	0.0000	82.00	No Ice 1/2" Ice	8.26 8.81	4.64 5.09	0.05 0.10
(AT&T Proposed)			0.00						
AM-X-CD-16-65-00T-RET(72")	B	From Face	0.50 0.00	0.0000	82.00	No Ice 1/2" Ice	8.26 8.81	4.64 5.09	0.05 0.10
(AT&T Proposed)			0.00						
AM-X-CD-16-65-00T-RET(72")	C	From Face	0.50 0.00	0.0000	82.00	No Ice 1/2" Ice	8.26 8.81	4.64 5.09	0.05 0.10
(AT&T Proposed)			0.00						
DTMABP7819VG12A TMA	A	From Face	0.50	0.0000	78.00	No Ice	1.59	0.58	0.02
(AT&T Proposed)			0.00 0.00			1/2" Ice	1.76	0.70	0.03
DTMABP7819VG12A TMA	B	From Face	0.50	0.0000	78.00	No Ice	1.59	0.58	0.02
(AT&T Proposed)			0.00 0.00			1/2" Ice	1.76	0.70	0.03
DTMABP7819VG12A TMA	C	From Face	0.50	0.0000	78.00	No Ice	1.59	0.58	0.02
(AT&T Proposed)			0.00 0.00			1/2" Ice	1.76	0.70	0.03
Valmont Uni-Tri Bracket	C	None		0.0000	82.00	No Ice	1.75	1.75	0.29
(AT&T Proposed)						1/2" Ice	1.94	1.94	0.31
APX16DWV-16DWVS-E-A20	A	From Face	0.50 0.00	0.0000	72.00	No Ice 1/2" Ice	7.07 7.52	2.15 2.49	0.04 0.07
(T-Mobile Proposed)			0.00						
APX16DWV-16DWVS-E-A20	B	From Face	0.50 0.00	0.0000	72.00	No Ice 1/2" Ice	7.07 7.52	2.15 2.49	0.04 0.07
(T-Mobile Proposed)			0.00						
APX16DWV-16DWVS-E-A20	C	From Face	0.50 0.00	0.0000	72.00	No Ice 1/2" Ice	7.07 7.52	2.15 2.49	0.04 0.07
(T-Mobile Proposed)			0.00						
ATMAA1412D-1A20 TMA	A	From Face	0.50	0.0000	68.00	No Ice	1.17	0.47	0.01
(T-Mobile Proposed)			1.00 0.00			1/2" Ice	1.31	0.57	0.02
ATMAA1412D-1A20 TMA	B	From Face	0.50	0.0000	68.00	No Ice	1.17	0.47	0.01
(T-Mobile Proposed)			1.00 0.00			1/2" Ice	1.31	0.57	0.02
ATMAA1412D-1A20 TMA	C	From Face	0.50	0.0000	68.00	No Ice	1.17	0.47	0.01
(T-Mobile Proposed)			1.00 0.00			1/2" Ice	1.31	0.57	0.02
ATMAA1412D-1A20 TMA	A	From Face	0.50	0.0000	68.00	No Ice	1.17	0.47	0.01
(T-Mobile Proposed)			-1.00 0.00			1/2" Ice	1.31	0.57	0.02
ATMAA1412D-1A20 TMA	B	From Face	0.50	0.0000	68.00	No Ice	1.17	0.47	0.01
(T-Mobile Proposed)			-1.00 0.00			1/2" Ice	1.31	0.57	0.02
ATMAA1412D-1A20 TMA	C	From Face	0.50	0.0000	68.00	No Ice	1.17	0.47	0.01
(T-Mobile Proposed)			-1.00 0.00			1/2" Ice	1.31	0.57	0.02
Valmont Uni-Tri Bracket	C	None		0.0000	72.00	No Ice	1.75	1.75	0.29
(T-Mobile Proposed)						1/2" Ice	1.94	1.94	0.31

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 86.50-66.50	76.50	1.272	29	11.042	A	0.000	11.042	11.042	100.00	0.000	0.000
					B	0.000	11.042		100.00	0.000	0.000
					C	0.000	11.042		100.00	0.000	0.000
L2 66.50-36.50	51.50	1.136	26	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	0.000
L3 36.50-1.50	19.00	1	23	70.000	A	0.000	70.000	70.000	100.00	0.000	0.000
					B	0.000	70.000		100.00	0.000	0.000
					C	0.000	70.000		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 86.50-66.50	76.50	1.272	22	0.5000	12.708	A	0.000	12.708	12.708	100.00	0.000	0.000
						B	0.000	12.708		100.00	0.000	0.000
						C	0.000	12.708		100.00	0.000	0.000
L2 66.50-36.50	51.50	1.136	20	0.5000	62.500	A	0.000	62.500	62.500	100.00	0.000	0.000
						B	0.000	62.500		100.00	0.000	0.000
						C	0.000	62.500		100.00	0.000	0.000
L3 36.50-1.50	19.00	1	17	0.5000	72.917	A	0.000	72.917	72.917	100.00	0.000	0.000
						B	0.000	72.917		100.00	0.000	0.000
						C	0.000	72.917		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 86.50-66.50	76.50	1.272	8	11.042	A	0.000	11.042	11.042	100.00	0.000	0.000
					B	0.000	11.042		100.00	0.000	0.000
					C	0.000	11.042		100.00	0.000	0.000
L2 66.50-36.50	51.50	1.136	7	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	0.000
L3 36.50-1.50	19.00	1	6	70.000	A	0.000	70.000	70.000	100.00	0.000	0.000
					B	0.000	70.000		100.00	0.000	0.000
					C	0.000	70.000		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.10	0.57	A	1	0.646	1	1	1	11.042	0.35	17.72	C
86.50-66.50			B	1	0.646	1	1	1	11.042			
			C	1	0.646	1	1	1	11.042			
L2	0.29	2.84	A	1	0.59	1	1	1	60.000	1.57	52.32	C
66.50-36.50			B	1	0.59	1	1	1	60.000			
			C	1	0.59	1	1	1	60.000			
L3 36.50-1.50	0.31	3.31	A	1	0.59	1	1	1	70.000	1.61	46.07	C
			B	1	0.59	1	1	1	70.000			
			C	1	0.59	1	1	1	70.000			
Sum Weight:	0.70	6.73						OTM	133.28 kip-ft	3.54		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.10	0.57	A	1	0.646	1	1	1	11.042	0.35	17.72	C
86.50-66.50			B	1	0.646	1	1	1	11.042			
			C	1	0.646	1	1	1	11.042			
L2	0.29	2.84	A	1	0.59	1	1	1	60.000	1.57	52.32	C
66.50-36.50			B	1	0.59	1	1	1	60.000			
			C	1	0.59	1	1	1	60.000			
L3 36.50-1.50	0.31	3.31	A	1	0.59	1	1	1	70.000	1.61	46.07	C
			B	1	0.59	1	1	1	70.000			
			C	1	0.59	1	1	1	70.000			
Sum Weight:	0.70	6.73						OTM	133.28 kip-ft	3.54		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.10	0.57	A	1	0.646	1	1	1	11.042	0.35	17.72	C
86.50-66.50			B	1	0.646	1	1	1	11.042			
			C	1	0.646	1	1	1	11.042			
L2	0.29	2.84	A	1	0.59	1	1	1	60.000	1.57	52.32	C
66.50-36.50			B	1	0.59	1	1	1	60.000			
			C	1	0.59	1	1	1	60.000			
L3 36.50-1.50	0.31	3.31	A	1	0.59	1	1	1	70.000	1.61	46.07	C
			B	1	0.59	1	1	1	70.000			
			C	1	0.59	1	1	1	70.000			
Sum Weight:	0.70	6.73						OTM	133.28 kip-ft	3.54		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.10	0.57	A	1	0.646	1	1	1	11.042	0.35	17.72	C
86.50-66.50			B	1	0.646	1	1	1	11.042			
			C	1	0.646	1	1	1	11.042			
L2	0.29	2.84	A	1	0.59	1	1	1	60.000	1.57	52.32	C
66.50-36.50			B	1	0.59	1	1	1	60.000			
			C	1	0.59	1	1	1	60.000			
L3 36.50-1.50	0.31	3.31	A	1	0.59	1	1	1	70.000	1.61	46.07	C
			B	1	0.59	1	1	1	70.000			
			C	1	0.59	1	1	1	70.000			
Sum Weight:	0.70	6.73						OTM	133.28 kip-ft	3.54		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.10	0.66	A	1	0.779	1	1	1	12.708	0.37	18.44	C
86.50-66.50			B	1	0.779	1	1	1	12.708			
			C	1	0.779	1	1	1	12.708			
L2	0.29	3.29	A	1	0.59	1	1	1	62.500	1.23	40.88	C
66.50-36.50			B	1	0.59	1	1	1	62.500			
			C	1	0.59	1	1	1	62.500			
L3 36.50-1.50	0.31	3.84	A	1	0.59	1	1	1	72.917	1.26	36.00	C
			B	1	0.59	1	1	1	72.917			
			C	1	0.59	1	1	1	72.917			
Sum Weight:	0.70	7.79						OTM	111.02 kip-ft	2.85		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.10	0.66	A	1	0.779	1	1	1	12.708	0.37	18.44	C
86.50-66.50			B	1	0.779	1	1	1	12.708			
			C	1	0.779	1	1	1	12.708			
L2	0.29	3.29	A	1	0.59	1	1	1	62.500	1.23	40.88	C
66.50-36.50			B	1	0.59	1	1	1	62.500			
			C	1	0.59	1	1	1	62.500			
L3 36.50-1.50	0.31	3.84	A	1	0.59	1	1	1	72.917	1.26	36.00	C
			B	1	0.59	1	1	1	72.917			
			C	1	0.59	1	1	1	72.917			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
Sum Weight:	0.70	7.79						OTM	111.02 kip-ft	2.85		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.10	0.66	A	1	0.779	1	1	1	12.708	0.37	18.44	C
86.50-66.50			B	1	0.779	1	1	1	12.708			
			C	1	0.779	1	1	1	12.708			
L2	0.29	3.29	A	1	0.59	1	1	1	62.500	1.23	40.88	C
66.50-36.50			B	1	0.59	1	1	1	62.500			
			C	1	0.59	1	1	1	62.500			
L3 36.50-1.50	0.31	3.84	A	1	0.59	1	1	1	72.917	1.26	36.00	C
			B	1	0.59	1	1	1	72.917			
			C	1	0.59	1	1	1	72.917			
Sum Weight:	0.70	7.79						OTM	111.02 kip-ft	2.85		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.10	0.66	A	1	0.779	1	1	1	12.708	0.37	18.44	C
86.50-66.50			B	1	0.779	1	1	1	12.708			
			C	1	0.779	1	1	1	12.708			
L2	0.29	3.29	A	1	0.59	1	1	1	62.500	1.23	40.88	C
66.50-36.50			B	1	0.59	1	1	1	62.500			
			C	1	0.59	1	1	1	62.500			
L3 36.50-1.50	0.31	3.84	A	1	0.59	1	1	1	72.917	1.26	36.00	C
			B	1	0.59	1	1	1	72.917			
			C	1	0.59	1	1	1	72.917			
Sum Weight:	0.70	7.79						OTM	111.02 kip-ft	2.85		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.10	0.57	A	1	1.2	1	1	1	11.042	0.18	9.11	C
86.50-66.50			B	1	1.2	1	1	1	11.042			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	1	1.2	1	1	1	11.042			
L2	0.29	2.84	A	1	0.59	1	1	1	60.000	0.43	14.49	C
66.50-36.50			B	1	0.59	1	1	1	60.000			
			C	1	0.59	1	1	1	60.000			
L3 36.50-1.50	0.31	3.31	A	1	0.59	1	1	1	70.000	0.45	12.76	C
			B	1	0.59	1	1	1	70.000			
			C	1	0.59	1	1	1	70.000			
Sum Weight:	0.70	6.73						OTM	43.22 kip-ft	1.06		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.10	0.57	A	1	1.2	1	1	1	11.042	0.18	9.11	C
86.50-66.50			B	1	1.2	1	1	1	11.042			
			C	1	1.2	1	1	1	11.042			
L2	0.29	2.84	A	1	0.59	1	1	1	60.000	0.43	14.49	C
66.50-36.50			B	1	0.59	1	1	1	60.000			
			C	1	0.59	1	1	1	60.000			
L3 36.50-1.50	0.31	3.31	A	1	0.59	1	1	1	70.000	0.45	12.76	C
			B	1	0.59	1	1	1	70.000			
			C	1	0.59	1	1	1	70.000			
Sum Weight:	0.70	6.73						OTM	43.22 kip-ft	1.06		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.10	0.57	A	1	1.2	1	1	1	11.042	0.18	9.11	C
86.50-66.50			B	1	1.2	1	1	1	11.042			
			C	1	1.2	1	1	1	11.042			
L2	0.29	2.84	A	1	0.59	1	1	1	60.000	0.43	14.49	C
66.50-36.50			B	1	0.59	1	1	1	60.000			
			C	1	0.59	1	1	1	60.000			
L3 36.50-1.50	0.31	3.31	A	1	0.59	1	1	1	70.000	0.45	12.76	C
			B	1	0.59	1	1	1	70.000			
			C	1	0.59	1	1	1	70.000			
Sum Weight:	0.70	6.73						OTM	43.22 kip-ft	1.06		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.10	0.57	A	1	1.2	1	1	1	11.042	0.18	9.11	C
86.50-66.50			B	1	1.2	1	1	1	11.042			
			C	1	1.2	1	1	1	11.042			
L2	0.29	2.84	A	1	0.59	1	1	1	60.000	0.43	14.49	C
66.50-36.50			B	1	0.59	1	1	1	60.000			
			C	1	0.59	1	1	1	60.000			
L3 36.50-1.50	0.31	3.31	A	1	0.59	1	1	1	70.000	0.45	12.76	C
			B	1	0.59	1	1	1	70.000			
			C	1	0.59	1	1	1	70.000			
Sum Weight:	0.70	6.73						OTM	43.22 kip-ft	1.06		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	6.73					
Bracing Weight	0.00					
Total Member Self-Weight	6.73			0.00	0.00	
Total Weight	8.40			0.00	0.00	
Wind 0 deg - No Ice		0.00	-5.76	-300.93	0.00	0.00
Wind 30 deg - No Ice		2.88	-4.99	-260.61	-150.46	0.00
Wind 45 deg - No Ice		4.07	-4.07	-212.79	-212.79	0.00
Wind 60 deg - No Ice		4.99	-2.88	-150.46	-260.61	0.00
Wind 90 deg - No Ice		5.76	0.00	0.00	-300.93	0.00
Wind 120 deg - No Ice		4.99	2.88	150.46	-260.61	0.00
Wind 135 deg - No Ice		4.07	4.07	212.79	-212.79	0.00
Wind 150 deg - No Ice		2.88	4.99	260.61	-150.46	0.00
Wind 180 deg - No Ice		0.00	5.76	300.93	0.00	0.00
Wind 210 deg - No Ice		-2.88	4.99	260.61	150.46	0.00
Wind 225 deg - No Ice		-4.07	4.07	212.79	212.79	0.00
Wind 240 deg - No Ice		-4.99	2.88	150.46	260.61	0.00
Wind 270 deg - No Ice		-5.76	0.00	0.00	300.93	0.00
Wind 300 deg - No Ice		-4.99	-2.88	-150.46	260.61	0.00
Wind 315 deg - No Ice		-4.07	-4.07	-212.79	212.79	0.00
Wind 330 deg - No Ice		-2.88	-4.99	-260.61	150.46	0.00
Member Ice	1.06					
Total Weight Ice	9.83			0.00	0.00	
Wind 0 deg - Ice		0.00	-4.68	-248.54	0.00	0.00
Wind 30 deg - Ice		2.34	-4.06	-215.24	-124.27	0.00
Wind 45 deg - Ice		3.31	-3.31	-175.75	-175.75	0.00
Wind 60 deg - Ice		4.06	-2.34	-124.27	-215.24	0.00
Wind 90 deg - Ice		4.68	0.00	0.00	-248.54	0.00
Wind 120 deg - Ice		4.06	2.34	124.27	-215.24	0.00
Wind 135 deg - Ice		3.31	3.31	175.75	-175.75	0.00
Wind 150 deg - Ice		2.34	4.06	215.24	-124.27	0.00
Wind 180 deg - Ice		0.00	4.68	248.54	0.00	0.00
Wind 210 deg - Ice		-2.34	4.06	215.24	124.27	0.00
Wind 225 deg - Ice		-3.31	3.31	175.75	175.75	0.00
Wind 240 deg - Ice		-4.06	2.34	124.27	215.24	0.00
Wind 270 deg - Ice		-4.68	0.00	0.00	248.54	0.00
Wind 300 deg - Ice		-4.06	-2.34	-124.27	215.24	0.00
Wind 315 deg - Ice		-3.31	-3.31	-175.75	175.75	0.00
Wind 330 deg - Ice		-2.34	-4.06	-215.24	124.27	0.00

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Total Weight	8.40			0.00	0.00	
Wind 0 deg - Service		0.00	-1.68	-89.66	0.00	0.00
Wind 30 deg - Service		0.84	-1.46	-77.65	-44.83	0.00
Wind 45 deg - Service		1.19	-1.19	-63.40	-63.40	0.00
Wind 60 deg - Service		1.46	-0.84	-44.83	-77.65	0.00
Wind 90 deg - Service		1.68	0.00	0.00	-89.66	0.00
Wind 120 deg - Service		1.46	0.84	44.83	-77.65	0.00
Wind 135 deg - Service		1.19	1.19	63.40	-63.40	0.00
Wind 150 deg - Service		0.84	1.46	77.65	-44.83	0.00
Wind 180 deg - Service		0.00	1.68	89.66	0.00	0.00
Wind 210 deg - Service		-0.84	1.46	77.65	44.83	0.00
Wind 225 deg - Service		-1.19	1.19	63.40	63.40	0.00
Wind 240 deg - Service		-1.46	0.84	44.83	77.65	0.00
Wind 270 deg - Service		-1.68	0.00	0.00	89.66	0.00
Wind 300 deg - Service		-1.46	-0.84	-44.83	77.65	0.00
Wind 315 deg - Service		-1.19	-1.19	-63.40	63.40	0.00
Wind 330 deg - Service		-0.84	-1.46	-77.65	44.83	0.00

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp

Comb. No.	Description
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	86.5 - 66.5	Pole	Max Tension	23	0.00	0.00	0.00
			Max. Compression	18	-2.10	0.00	0.00
			Max. Mx	6	-1.57	-27.12	0.00
			Max. My	2	-1.57	0.00	27.12
			Max. Vy	6	2.62	-27.12	0.00
			Max. Vx	2	-2.62	0.00	27.12
			Max. Torque	7			-0.00
L2	66.5 - 36.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-5.68	0.00	0.00
			Max. Mx	6	-4.69	-130.18	0.00
			Max. My	2	-4.69	0.00	130.18
			Max. Vy	6	4.24	-130.18	0.00
			Max. Vx	2	-4.24	0.00	130.18
			Max. Torque	5			0.00
L3	36.5 - 1.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-9.83	0.00	0.00
			Max. Mx	6	-8.40	-305.94	0.00
			Max. My	2	-8.40	0.00	305.94
			Max. Vy	6	5.77	-305.94	0.00
			Max. Vx	2	-5.77	0.00	305.94
			Max. Torque	15			-0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	19	9.83	0.00	4.68
	Max. H_x	14	8.40	5.76	0.00
	Max. H_z	2	8.40	0.00	5.76
	Max. M_x	2	305.94	0.00	5.76
	Max. M_z	6	305.94	-5.76	0.00
	Max. Torsion	5	0.00	-4.99	2.88

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Vert	1	8.40	0.00	0.00
	Min. H_x	6	8.40	-5.76	0.00
	Min. H_z	10	8.40	0.00	-5.76
	Min. M_x	10	-305.94	0.00	-5.76
	Min. M_z	14	-305.94	5.76	0.00
	Min. Torsion	15	-0.00	4.99	2.88

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	8.40	0.00	0.00	0.00	0.00	0.00
Dead+Wind 0 deg - No Ice	8.40	0.00	-5.76	-305.94	0.00	0.00
Dead+Wind 30 deg - No Ice	8.40	2.88	-4.99	-264.95	-152.97	0.00
Dead+Wind 45 deg - No Ice	8.40	4.07	-4.07	-216.33	-216.33	0.00
Dead+Wind 60 deg - No Ice	8.40	4.99	-2.88	-152.97	-264.95	-0.00
Dead+Wind 90 deg - No Ice	8.40	5.76	0.00	0.00	-305.94	0.00
Dead+Wind 120 deg - No Ice	8.40	4.99	2.88	152.97	-264.95	0.00
Dead+Wind 135 deg - No Ice	8.40	4.07	4.07	216.33	-216.33	0.00
Dead+Wind 150 deg - No Ice	8.40	2.88	4.99	264.95	-152.97	-0.00
Dead+Wind 180 deg - No Ice	8.40	0.00	5.76	305.94	0.00	0.00
Dead+Wind 210 deg - No Ice	8.40	-2.88	4.99	264.95	152.97	0.00
Dead+Wind 225 deg - No Ice	8.40	-4.07	4.07	216.33	216.33	0.00
Dead+Wind 240 deg - No Ice	8.40	-4.99	2.88	152.97	264.95	-0.00
Dead+Wind 270 deg - No Ice	8.40	-5.76	0.00	0.00	305.94	0.00
Dead+Wind 300 deg - No Ice	8.40	-4.99	-2.88	-152.97	264.95	0.00
Dead+Wind 315 deg - No Ice	8.40	-4.07	-4.07	-216.33	216.33	0.00
Dead+Wind 330 deg - No Ice	8.40	-2.88	-4.99	-264.95	152.97	-0.00
Dead+Ice+Temp	9.83	0.00	0.00	0.00	0.00	0.00
Dead+Wind 0 deg+Ice+Temp	9.83	0.00	-4.68	-253.60	0.00	0.00
Dead+Wind 30 deg+Ice+Temp	9.83	2.34	-4.06	-219.63	-126.80	0.00
Dead+Wind 45 deg+Ice+Temp	9.83	3.31	-3.31	-179.33	-179.33	0.00
Dead+Wind 60 deg+Ice+Temp	9.83	4.06	-2.34	-126.80	-219.63	-0.00
Dead+Wind 90 deg+Ice+Temp	9.83	4.68	0.00	0.00	-253.60	0.00
Dead+Wind 120 deg+Ice+Temp	9.83	4.06	2.34	126.80	-219.63	0.00
Dead+Wind 135 deg+Ice+Temp	9.83	3.31	3.31	179.33	-179.33	0.00
Dead+Wind 150 deg+Ice+Temp	9.83	2.34	4.06	219.63	-126.80	-0.00
Dead+Wind 180 deg+Ice+Temp	9.83	0.00	4.68	253.60	0.00	0.00
Dead+Wind 210 deg+Ice+Temp	9.83	-2.34	4.06	219.63	126.80	0.00
Dead+Wind 225 deg+Ice+Temp	9.83	-3.31	3.31	179.33	179.33	0.00
Dead+Wind 240 deg+Ice+Temp	9.83	-4.06	2.34	126.80	219.63	-0.00
Dead+Wind 270 deg+Ice+Temp	9.83	-4.68	0.00	0.00	253.60	0.00
Dead+Wind 300 deg+Ice+Temp	9.83	-4.06	-2.34	-126.80	219.63	0.00
Dead+Wind 315 deg+Ice+Temp	9.83	-3.31	-3.31	-179.33	179.33	0.00
Dead+Wind 330 deg+Ice+Temp	9.83	-2.34	-4.06	-219.63	126.80	-0.00
Dead+Wind 0 deg - Service	8.40	0.00	-1.68	-91.19	0.00	0.00
Dead+Wind 30 deg - Service	8.40	0.84	-1.46	-78.97	-45.59	0.00
Dead+Wind 45 deg - Service	8.40	1.19	-1.19	-64.48	-64.48	0.00
Dead+Wind 60 deg - Service	8.40	1.46	-0.84	-45.59	-78.97	0.00
Dead+Wind 90 deg - Service	8.40	1.68	0.00	0.00	-91.19	0.00
Dead+Wind 120 deg - Service	8.40	1.46	0.84	45.59	-78.97	0.00
Dead+Wind 135 deg - Service	8.40	1.19	1.19	64.48	-64.48	0.00
Dead+Wind 150 deg - Service	8.40	0.84	1.46	78.97	-45.59	0.00
Dead+Wind 180 deg - Service	8.40	0.00	1.68	91.19	0.00	0.00
Dead+Wind 210 deg - Service	8.40	-0.84	1.46	78.97	45.59	0.00
Dead+Wind 225 deg - Service	8.40	-1.19	1.19	64.48	64.48	0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 240 deg - Service	8.40	-1.46	0.84	45.59	78.97	0.00
Dead+Wind 270 deg - Service	8.40	-1.68	0.00	0.00	91.19	0.00
Dead+Wind 300 deg - Service	8.40	-1.46	-0.84	-45.59	78.97	0.00
Dead+Wind 315 deg - Service	8.40	-1.19	-1.19	-64.48	64.48	0.00
Dead+Wind 330 deg - Service	8.40	-0.84	-1.46	-78.97	45.59	0.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-8.40	0.00	0.00	8.40	0.00	0.000%
2	0.00	-8.40	-5.76	0.00	8.40	5.76	0.000%
3	2.88	-8.40	-4.99	-2.88	8.40	4.99	0.000%
4	4.07	-8.40	-4.07	-4.07	8.40	4.07	0.000%
5	4.99	-8.40	-2.88	-4.99	8.40	2.88	0.000%
6	5.76	-8.40	0.00	-5.76	8.40	0.00	0.000%
7	4.99	-8.40	2.88	-4.99	8.40	-2.88	0.000%
8	4.07	-8.40	4.07	-4.07	8.40	-4.07	0.000%
9	2.88	-8.40	4.99	-2.88	8.40	-4.99	0.000%
10	0.00	-8.40	5.76	0.00	8.40	-5.76	0.000%
11	-2.88	-8.40	4.99	2.88	8.40	-4.99	0.000%
12	-4.07	-8.40	4.07	4.07	8.40	-4.07	0.000%
13	-4.99	-8.40	2.88	4.99	8.40	-2.88	0.000%
14	-5.76	-8.40	0.00	5.76	8.40	0.00	0.000%
15	-4.99	-8.40	-2.88	4.99	8.40	2.88	0.000%
16	-4.07	-8.40	-4.07	4.07	8.40	4.07	0.000%
17	-2.88	-8.40	-4.99	2.88	8.40	4.99	0.000%
18	0.00	-9.83	0.00	0.00	9.83	0.00	0.000%
19	0.00	-9.83	-4.68	0.00	9.83	4.68	0.000%
20	2.34	-9.83	-4.06	-2.34	9.83	4.06	0.000%
21	3.31	-9.83	-3.31	-3.31	9.83	3.31	0.000%
22	4.06	-9.83	-2.34	-4.06	9.83	2.34	0.000%
23	4.68	-9.83	0.00	-4.68	9.83	0.00	0.000%
24	4.06	-9.83	2.34	-4.06	9.83	-2.34	0.000%
25	3.31	-9.83	3.31	-3.31	9.83	-3.31	0.000%
26	2.34	-9.83	4.06	-2.34	9.83	-4.06	0.000%
27	0.00	-9.83	4.68	0.00	9.83	-4.68	0.000%
28	-2.34	-9.83	4.06	2.34	9.83	-4.06	0.000%
29	-3.31	-9.83	3.31	3.31	9.83	-3.31	0.000%
30	-4.06	-9.83	2.34	4.06	9.83	-2.34	0.000%
31	-4.68	-9.83	0.00	4.68	9.83	0.00	0.000%
32	-4.06	-9.83	-2.34	4.06	9.83	2.34	0.000%
33	-3.31	-9.83	-3.31	3.31	9.83	3.31	0.000%
34	-2.34	-9.83	-4.06	2.34	9.83	4.06	0.000%
35	0.00	-8.40	-1.68	0.00	8.40	1.68	0.000%
36	0.84	-8.40	-1.46	-0.84	8.40	1.46	0.000%
37	1.19	-8.40	-1.19	-1.19	8.40	1.19	0.000%
38	1.46	-8.40	-0.84	-1.46	8.40	0.84	0.000%
39	1.68	-8.40	0.00	-1.68	8.40	0.00	0.000%
40	1.46	-8.40	0.84	-1.46	8.40	-0.84	0.000%
41	1.19	-8.40	1.19	-1.19	8.40	-1.19	0.000%
42	0.84	-8.40	1.46	-0.84	8.40	-1.46	0.000%
43	0.00	-8.40	1.68	0.00	8.40	-1.68	0.000%
44	-0.84	-8.40	1.46	0.84	8.40	-1.46	0.000%
45	-1.19	-8.40	1.19	1.19	8.40	-1.19	0.000%
46	-1.46	-8.40	0.84	1.46	8.40	-0.84	0.000%
47	-1.68	-8.40	0.00	1.68	8.40	0.00	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
48	-1.46	-8.40	-0.84	1.46	8.40	0.84	0.000%
49	-1.19	-8.40	-1.19	1.19	8.40	1.19	0.000%
50	-0.84	-8.40	-1.46	0.84	8.40	1.46	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00043599
4	Yes	4	0.00000001	0.00050062
5	Yes	4	0.00000001	0.00043599
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00043599
8	Yes	4	0.00000001	0.00050062
9	Yes	4	0.00000001	0.00043599
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00043599
12	Yes	4	0.00000001	0.00050062
13	Yes	4	0.00000001	0.00043599
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00043599
16	Yes	4	0.00000001	0.00050062
17	Yes	4	0.00000001	0.00043599
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00071694
20	Yes	5	0.00000001	0.00002390
21	Yes	5	0.00000001	0.00002578
22	Yes	5	0.00000001	0.00002390
23	Yes	4	0.00000001	0.00071694
24	Yes	5	0.00000001	0.00002390
25	Yes	5	0.00000001	0.00002578
26	Yes	5	0.00000001	0.00002390
27	Yes	4	0.00000001	0.00071694
28	Yes	5	0.00000001	0.00002390
29	Yes	5	0.00000001	0.00002578
30	Yes	5	0.00000001	0.00002390
31	Yes	4	0.00000001	0.00071694
32	Yes	5	0.00000001	0.00002390
33	Yes	5	0.00000001	0.00002578
34	Yes	5	0.00000001	0.00002390
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001

49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	86.5 - 66.5	6.848	35	0.8177	0.0000
L2	66.5 - 36.5	3.819	35	0.4290	0.0000
L3	36.5 - 1.5	1.367	35	0.3287	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
82.00	AM-X-CD-16-65-00T-RET(72")	35	6.112	0.7142	0.0000	12434
78.00	DTMABP7819VG12A TMA	35	5.471	0.6263	0.0000	7314
72.00	APX16DWV-16DWVS-E-A20	35	4.563	0.5100	0.0000	4287
68.00	ATMAA1412D-1A20 TMA	35	4.012	0.4481	0.0000	3439

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	86.5 - 66.5	22.660	2	2.6800	0.0000
L2	66.5 - 36.5	12.711	2	1.4229	0.0000
L3	36.5 - 1.5	4.564	2	1.0951	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
82.00	AM-X-CD-16-65-00T-RET(72")	2	20.244	2.3452	0.0000	3864
78.00	DTMABP7819VG12A TMA	2	18.142	2.0610	0.0000	2273
72.00	APX16DWV-16DWVS-E-A20	2	15.162	1.6849	0.0000	1332
68.00	ATMAA1412D-1A20 TMA	2	13.347	1.4847	0.0000	1068

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	86.5 - 66.5 (1)	P6x.432	20.00	0.00	0.0	21.000	8.4049	-1.57	176.50	0.009
L2	66.5 - 36.5 (2)	P24x3/8	30.00	0.00	0.0	21.000	27.8325	-4.69	584.48	0.008
L3	36.5 - 1.5 (3)	P24x3/8	35.00	0.00	0.0	21.000	27.8325	-8.40	584.48	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	86.5 - 66.5 (1)	P6x.432	27.12	26.620	23.100	1.152	0.00	0.000	23.100	0.000
L2	66.5 - 36.5 (2)	P24x3/8	130.18	9.651	23.100	0.418	0.00	0.000	23.100	0.000
L3	36.5 - 1.5 (3)	P24x3/8	305.94	22.682	23.100	0.982	0.00	0.000	23.100	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	86.5 - 66.5 (1)	P6x.432	2.62	0.624	14.000	0.045	0.00	0.000	14.000	0.000
L2	66.5 - 36.5 (2)	P24x3/8	4.24	0.305	14.000	0.022	0.00	0.000	14.000	0.000
L3	36.5 - 1.5 (3)	P24x3/8	5.77	0.414	14.000	0.030	0.00	0.000	14.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	86.5 - 66.5 (1)	0.009	1.152	0.000	0.045	0.000	1.163 ✔	1.333	H1-3+VT ✔
L2	66.5 - 36.5 (2)	0.008	0.418	0.000	0.022	0.000	0.426 ✔	1.333	H1-3+VT ✔
L3	36.5 - 1.5 (3)	0.014	0.982	0.000	0.030	0.000	0.997 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	86.5 - 66.5	Pole	P6x.432	1	-1.57	235.28	87.3	Pass
L2	66.5 - 36.5	Pole	P24x3/8	2	-4.69	779.12	32.0	Pass
L3	36.5 - 1.5	Pole	P24x3/8	3	-8.40	779.12	74.8	Pass
							Summary	
						Pole (L1)	87.3	Pass
						RATING =	**87.3**	**Pass**

CENTEK engineering
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Subject:	Anchor Bolt and Base Plate Anlaysis
Location:	85-ft Temporary Ballast Monopole East Lyme, CT
Rev. 0: 3/13/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15021.000

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 306·ft·kips	(Input From tnxTower)
Shear Force =	Shear := 6·kips	(Input From tnxTower)
Axial Force =	Axial := 8·kips	(Input From tnxTower)

Anchor Bolt Data:

Use ASTM A325

Number of Anchor Bolts =	N := 20	(User Input)
Diameter of Bolt Circle =	D_{bc} := 27.00·in	(User Input)
Bolt "Column" Distance =	l := 3.0·in	(User Input)
Bolt Ultimate Strength =	F_u := 120·ksi	(User Input)
Bolt Yield Strength =	F_y := 92·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 1.0·in	(User Input)
Threads per Inch =	n := 8	(User Input)

Base Plate Data:

Use ASTM A572-50

Plate Yield Strength =	Fy_{bp} := 50·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 1.00·in	(User Input)
Base Plate Diameter =	D_{bp} := 30·in	(User Input)
Outer Pole Diameter =	D_{pole} := 24·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 13.5 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N} \right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 4.17 \cdot in$ $d_7 = 10.92 \cdot in$

$d_2 = 7.94 \cdot in$ $d_8 = 7.94 \cdot in$

$d_3 = 10.92 \cdot in$ $d_9 = 4.17 \cdot in$

$d_4 = 12.84 \cdot in$ $d_{10} = 0.00 \cdot in$

$d_5 = 13.50 \cdot in$ $d_{11} = -4.17 \cdot in$

$d_6 = 12.84 \cdot in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 12 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 0.00 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 0.84 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 1.50 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 0.84 \cdot in$ etc

Effective Width of Baseplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 14.4 \cdot in$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 1.822 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.878 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.22 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.066 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 26.8 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u\right) = 41.5 \cdot kips$ (1.333 increase allowed per TIA/EIA)

$T_{ALL.Net} := 1.333 \cdot \left(0.60 \cdot A_n \cdot F_y\right) = 44.572 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} \cdot 100 = 60$ Bolts are "upset bolts". Use net area per AISC

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Check Anchor Bolt Bending Stress:

Maximum Bending Moment = $M_x := \left(\frac{Shear}{N}\right) \cdot l = 0.075 \cdot ft \cdot kips$

Maximum Bending Stress = $f_{bx} := \frac{M_x}{S_x} = 13.5 \cdot ksi$

Allowable Bending Stress = $F_{bx} := 1.333 \cdot 0.6 \cdot F_y = 73.6 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Check Combined Stress Requirement:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required.

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 3 \cdot in$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 13.5 \cdot ksi$$

Check Anchor Bolt Compression/Combined Stress:

Maximum Compressive Force =

$$C_{Max} := OM \cdot \frac{R_{bc}}{l_p} + \frac{Axial}{N} = 27.6 \cdot kips$$

Maximum Compressive Stress =

$$f_a := \frac{C_{Max}}{A_n} = 45.6 \cdot ksi$$

$$K := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 78.881$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^{\,2}}\right] \cdot F_y}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^{\,3}}} & \text{if } \dfrac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \dfrac{K \cdot l}{r} > C_c \end{cases} = 53.5 \cdot ksi$$

Allowable Compressive Stress =

$$F_a := 1.333 \cdot F_a = 71.3 \cdot ksi$$

(1.333 increase allowed per TIA/EIA)

Combined Stress % of Capacity =

$$\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}}\right) \cdot 100 = 82.3$$

Condition 2 =

$$Condition2 := if\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$$

Condition2 = "OK"

Base Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 8.8 \cdot kips$ $C_7 = 22.4 \cdot kips$

$C_2 = 16.4 \cdot kips$ $C_8 = 16.4 \cdot kips$

$C_3 = 22.4 \cdot kips$ $C_9 = 8.8 \cdot kips$

$C_4 = 26.3 \cdot kips$ $C_{10} = 0.4 \cdot kips$

$C_5 = 27.6 \cdot kips$ $C_{11} = -8.0 \cdot kips$

$C_6 = 26.3 \cdot kips$ etc.

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 35.6 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 49.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 71.4$

Condition3 = $Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

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Subject:	Ballast Calculation
Location:	85-ft Temporary Ballast Monopole East Lyme, CT
Rev. 0: 3/13/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15021.000

Ballast Calculation:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 306 \cdot ft \cdot kips$	(Input From tnxTower)
Shear Force =	$Shear := 6 \cdot kips$	(Input From tnxTower)
Axial Force =	$Axial := 8 \cdot kips$	(Input From tnxTower)
Overturning Factor of Safety Required =	$FS_{req} := 2.0$	(User Input)

Ballast Data:

Weight of Base Frame =	$WT_{frame} := 3kips$	(User Input)
Distance From Center of Monopole to Extreme Edge of Base Frame =	$c := 7.5 \cdot ft$	(User Input)
Distance From Frame Toe to Front Ballast String =	$d_1 := 3.0 \cdot ft$	(User Input)
Distance From Frame Toe to Back Ballast String =	$d_2 := 12 \cdot ft$	(User Input)
Depth of Ballast Frame =	$d_f := 1.50 \cdot ft$	(User Input)
Weight of Concrete =	$\gamma_c := 145 \cdot pcf$	(User Input)
Block Width =	$w_b := 6 \cdot ft$	(User Input)
Block Length =	$l_b := 6 \cdot ft$	(User Input)
Block Thickness =	$t_b := 1 \cdot ft$	(User Input)
Individual Block Weight =	$W_b := w_b \cdot l_b \cdot t_b \cdot \gamma_c = 5220 \cdot lb$	
Total Overturning Moment About Toe of Base Frame =	$M_{tot} := OM + Shear \cdot d_f = 315 \cdot ft \cdot kips$	
Total Dead Weight =	$P_{tot} := Axial + WT_{frame} = 11 \cdot kips$	
Net Resisting Moment Required =	$M_{rnet} := \left(FS_{req} \cdot M_{tot}\right) - \left(P_{tot} \cdot c\right) = 547.5 \cdot kip \cdot ft$	
Ballast Required Per Side of Base Frame =	$W_{req} := \frac{M_{rnet}}{(d_1 + d_2)} = 36.5 \cdot kips$	
Total Ballast Weight Required =	$W_{totreq} := W_{req} \cdot 2 = 73 \cdot kips$	
Ballast Weight Required Per Quadrant =	$W_{reqquad} := \frac{W_{req}}{2} = 18.25 \cdot kips$	
Number of Blocks Required per Quadrant =	$N_b := \frac{W_{totreq}}{W_b \cdot (4) \cdot (0.9)} = 3.88$	
	$N_{buse} := 4$	

Resisting Moment = $M_r := \left[\left(W_b\right)\cdot N_{buse}\cdot 2.0\cdot\left(d_1 + d_2\right)\right] + \left(P_{tot}\cdot c\right) = 708.9\cdot kip\cdot ft$

Actual Factor of Safety = $FS := \frac{M_r}{M_{tot}} = 2.25$

$FOS\_Check := if\left(FS \geq FS_{req}, "Okay", "No Good"\right)$

$FOS\_Check = "Okay"$

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CT5990	DATE:	2/12/2015 0:00	RF DESIGN ENG:	Radu Alecsandru	RF PERF ENG:
ISSUE:	Final	Approved? (Y/N)	Y	RF DESIGN PHONE:	8605137598	RF PERF PHONE:
REVISION:	V02	RF MANAGER:	Cameron Syme	RF DESIGN EMAIL:		RF PERF EMAIL:
INITIATIVE / PROJECT:	Temporary COW					TRIDENT:
						GSM FREQUENCY:
						UMTS FREQUENCY:
						LTE FREQUENCY:
						I-PLAN JOB # 1:
						I-PLAN JOB # 2:
						I-PLAN JOB # 3:
						I-PLAN JOB # 4:

Section 2 - LOCATION INFORMATION

USID:	168399	FA LOCATION CODE:	13068061	LOCATION NAME:	N Main Street	ORACLE PRJT # 1:
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CT	ORACLE PRJT # 2:
ADDRESS:.	ANCIENT WAY	CITY:	EAST LYME	STATE:	CT	ORACLE PRJT # 3:
ZIP CODE:	06107	COUNTY:	NEW LONDON	MSA/RSA:	TBD	ORACLE PRJT # 4:
LATITUDE (D-M-S):	41 21' 36.2"	LONGITUDE (D-M-S):	72° 13' 35.4"	LAT (DEC. DEG.):		SEARCH RING NAME:
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	TBD					SEARCH RING ID:
						BTA:
						LONG (DEC. DEG.):
						BORDER CELL WITH CON
						AM STUDY REQ'D (Y/N):
						FREQ COORD:

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED:	TBD	CGSA LOSS:	TBD	PCS REDUCED - UPS ZIP:	TBD
CGSA - MINOR FILING NEEDED:	TBD	CGSA EXT AGMT NEEDED:	TBD	PCS POPS REDUCED:	TBD
CGSA - MAJOR FILING NEEDED:	TBD	CGSA SCORECARD UPDATED:	TBD		

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	TBD	GROUND ELEVATION (ft):		STRUCTURE TYPE:	MONOPOLE	MKT LOCATION 850 MHZ CALL SIGN(S):
ADDTIONAL REGULATORY?:	TBD	HEIGHT OVERALL (ft):		FCC ASR NUMBER:	TBD	MKT LOCATION 1900 MHZ CALL SIGN(S):
SUB-LEASE RIGHTS?:	TBD	STRUCTURE HEIGHT (ft):				MKT LOCATION 700 MHZ CALL SIGN(S):
LIGHTING TYPE:	TBD					MKT LOCATION AWS MHZ CALL SIGN(S):

Section 5 - E-911 INFORMATION

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:
ALPHA	TBD	TBD	TBD	TBD	TBD	TBD
BETA	TBD	TBD	TBD	TBD	TBD	TBD
GAMMA	TBD	TBD	TBD	TBD	TBD	TBD
DELTA						
EPSILON						
PSI						

Section 6 - RBS GENERAL INFORMATION

4-DIGIT SITE ID:	1173	COW OR TOY?:	NO	CELLULAR NETWORK:	GO
CELL SITE TYPE:	SECTORIZED	SITE TYPE:	COW	OPS DISTRICT:	TB
BTS LOCATION ID:	TBD	ORIGINATING CO:	ATT	RF DISTRICT:	TB

Section 7 - RBS SPECIFIC INFORMATION

	GSM RBSs	UMTS 1ST CARRIER RBSs	UMTS 2ND CARRIER RBSs	UMTS 3RD CARRIER RBSs	UMTS 4TH CARRIER RBSs
MSC	TBD	TBD	TBD	TBD	N/A
BSC/RNC	TBD	MDTWCTNICRBR05	MDTWCTNICRBR05	MDTWCTNICRBR05	N/A
LAC	TBD	5990	5990	5990	N/A
RAC	TBD	255	255	255	N/A
EQUIPMENT VENDOR	NOKIA	ERICSSON	ERICSSON	ERICSSON	N/A
EQUIPMENT TYPE	TBD	RBS3206	1900 Radio Kit	850 RRUW OBIF	N/A
LOCATION	TBD	TBD	TBD	TBD	N/A
CABINET LOCATION	TBD	TBD	TBD	N/A	N/A

Section 8 - RBS INDIVIDUAL INFORMATION

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
CELL ID/BCF	184G5990	NA	CTV5990	NA	NA	CTU5990	CTU5990	N/A	N/A	N/A
CTS COMMON ID	184G5990	NA	CTV5990	NA	NA	CTU5990	CTU5990	N/A	N/A	N/A

Section 9 - SOFT SECTOR ID

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
ALPHA (OR OMNI)	184G59901	TBD	CTV59901	NA	NA	CTU59907	CTV5990A	N/A	N/A	N/A
BETA	184G59902	TBD	CTV59902	NA	NA	CTU59908	CTV5990B	N/A	N/A	N/A
GAMMA	184G59903	TBD	CTV59903	NA	NA	CTU59909	CTV5990C	N/A	N/A	N/A
DELTA										
EPSILON										
PSI										

Section 10 - CID/SAC

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
ALPHA (OR OMNI)	59901	TBD	59901	NA	NA	59907	49901	N/A	NA	NA
BETA	59902	TBD	59902	NA	NA	59908	49902	N/A	NA	NA
GAMMA	59903	TBD	59903	NA	NA	59909	49903	N/A	NA	NA
DELTA										
EPSILON										
PSI										

Section 11 - CURRENT RADIO COUNTS (Existing)

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
ALPHA (OR OMNI)	3	NA	1	NA	NA	1	NA	NA	NA	NA
BETA	2	NA	1	NA	NA	1	NA	NA	NA	NA
GAMMA	2	NA	1	NA	NA	1	NA	NA	NA	NA
DELTA										
EPSILON										
PSI										

Section 12 - CURRENT BASE BAND CONFIGURATION (Existing)

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	UMTS 3rd Cabinet
# T1s	TBD	TBD	TBD	N/A	
LINK PROFILE	TBD	TBD	TBD	TBD	
RF Combining					
Fiber or Ethernet?	TBD	TBD	TBD	TBD	
Tx Board Model					
Tx Board QTY					
RAX/ECU Board Model					
RAX/ECU Board QTY					
BBU Board Model					
BBU Board QTY					
RRU - Type(Qty-Model)					
Fiber Jumper					
DC Cable					
DC/Fiber Dem. Box					
Bundled Fiber Cable					
Bundled DC Cable					

Section 13 - NEW/PROPOSED RADIO COUNTS

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
ALPHA (OR OMNI)	1	NA	1	NA	NA	1	1	N/A	N/A	N/A
BETA	1	NA	1	NA	NA	1	1	N/A	N/A	N/A
GAMMA	1	NA	1	NA	NA	1	1	N/A	N/A	N/A
DELTA										
EPSILON										
PSI										

Section 14 - NEW/PROPOSED BASE BAND CONFIGURATION

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	UMTS 3rd Cabinet
# T1s	TBD	TBD	TBD	N/A	
LINK PROFILE					
RF Combining					
Fiber or Ethernet?					
Tx Board Model					
Tx Board QTY					
RAX/ECU Board Model					
RAX/ECU Board QTY					
BBU Board Model					
BBU Board QTY					
RRU - Type(Qty-Model)					
Fiber Jumper					
DC Cable					
DC/Fiber Dem. Box					
Bundled Fiber Cable					
Bundled DC Cable					

Section 15A - CURRENT SECTOR/CELL INFORMATION - ALPHA (OR OMNI)				
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?				
TECHNOLOGY				
RRH LOCATION (Top/Bottom/None)				
FEEDERS TYPE				
Feeder Length (feet)				
ANTENNA ATOLL				
ANTENNA MAKE - MODEL				
ANTENNA VENDOR				
ANTENNA SIZE (H x W x D)				
ANTENNA WEIGHT				
ANTENNA GAIN				
AZIMUTH				
RADIATION CENTER (feet)				
ANTENNA TIP HEIGHT				
ELECTRICAL TILT (700/850/1900/AWS)				
MECHANICAL DOWNTILT				
FEEDER AMOUNT				
Antenna RET Motor (QTY/MODEL)				
Antenna RET Splitter (QTY/MODEL)				
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)				
Antenna RET Surge Arrestor (QTY/MODEL)				
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site				
DC BLOCK (QTY/MODEL)				
TMA/LNA (TYPE/MODEL)				
CURRENT INJECTORS FOR TMA (QTY/MODEL)				
PDU FOR TMAS (QTY/MODEL) usually per site				
SURGE ARRESTOR (QTY/MODEL)				
DIPLEXER (QTY/MODEL)				
HYBRID COMBINER (QTY/MODEL)				
DUPLEXER (QTY/MODEL)				
FILTER (QTY/MODEL)				
RXAIT KIT MODULE?				
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)				
SCPA/MCPA MODULE?				
Additional Component1				
Additional Component2				
Additional Component3				
MAGNETIC DECLINATION				
HATCHPLATE POWER (Watts)				
ERP (Watts)				
Local Market Note1				
Local Market Note2				
Local Market Note3				

Section 15B - CURRENT SECTOR/CELL INFORMATION - BETA				
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?				
TECHNOLOGY				
RRH LOCATION (Top/Bottom/None)				
FEEDERS TYPE				
Feeder Length (feet)				
ANTENNA ATOLL				
ANTENNA MAKE - MODEL				
ANTENNA VENDOR				
ANTENNA SIZE (H x W x D)				
ANTENNA WEIGHT				
ANTENNA GAIN				
AZIMUTH				
RADIATION CENTER (feet)				
ANTENNA TIP HEIGHT				
ELECTRICAL TILT (700/850/1900/AWS)				
MECHANICAL DOWNTILT				
FEEDER AMOUNT				
Antenna RET Motor (QTY/MODEL)				
Antenna RET Splitter (QTY/MODEL)				
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)				
Antenna RET Surge Arrestor (QTY/MODEL)				
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site				
DC BLOCK (QTY/MODEL)				
TMA/LNA (TYPE/MODEL)				
CURRENT INJECTORS FOR TMA (QTY/MODEL)				
PDU FOR TMAS (QTY/MODEL) usually per site				
SURGE ARRESTOR (QTY/MODEL)				
DIPLEXER (QTY/MODEL)				
HYBRID COMBINER (QTY/MODEL)				
DUPLEXER (QTY/MODEL)				
FILTER (QTY/MODEL)				
RXAIT KIT MODULE?				
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)				
SCPA/MCPA MODULE?				
Additional Component1				
Additional Component2				
Additional Component3				
MAGNETIC DECLINATION				
HATCHPLATE POWER (Watts)				
ERP (Watts)				
Local Market Note1				
Local Market Note2				
Local Market Note3				

Section 15C - CURRENT SECTOR/CELL INFORMATION - GAMMA				
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?				
TECHNOLOGY				
RRH LOCATION (Top/Bottom/None)				
FEEDERS TYPE				
Feeder Length (feet)				
ANTENNA ATOLL				
ANTENNA MAKE - MODEL				
ANTENNA VENDOR				
ANTENNA SIZE (H x W x D)				
ANTENNA WEIGHT				
ANTENNA GAIN				
AZIMUTH				
RADIATION CENTER (feet)				
ANTENNA TIP HEIGHT				
ELECTRICAL TILT (700/850/1900/AWS)				
MECHANICAL DOWNTILT				
FEEDER AMOUNT				
Antenna RET Motor (QTY/MODEL)				
Antenna RET Splitter (QTY/MODEL)				
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)				
Antenna RET Surge Arrestor (QTY/MODEL)				
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site				
DC BLOCK (QTY/MODEL)				
TMA/LNA (TYPE/MODEL)				
CURRENT INJECTORS FOR TMA (QTY/MODEL)				
PDU FOR TMAS (QTY/MODEL) usually per site				
SURGE ARRESTOR (QTY/MODEL)				
DIPLEXER (QTY/MODEL)				
HYBRID COMBINER (QTY/MODEL)				
DUPLEXER (QTY/MODEL)				
FILTER (QTY/MODEL)				
RXAIT KIT MODULE?				
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)				
SCPA/MCPA MODULE?				
Additional Component1				
Additional Component2				
Additional Component3				
MAGNETIC DECLINATION				
HATCHPLATE POWER (Watts)				
ERP (Watts)				
Local Market Note1				
Local Market Note2				
Local Market Note3				

Section 15D - CURRENT SECTOR/CELL INFORMATION - DELTA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?								
TECHNOLOGY								
RRH LOCATION (Top/Bottom/None)								
FEEDERS TYPE								
Feeder Length (feet)								
ANTENNA ATOLL								
ANTENNA MAKE - MODEL								
ANTENNA VENDOR								
ANTENNA SIZE (H x W x D)								
ANTENNA WEIGHT								
ANTENNA GAIN								
AZIMUTH								
RADIATION CENTER (feet)								
ANTENNA TIP HEIGHT								
ELECTRICAL TILT (700/850/1900/AWS)								
MECHANICAL DOWNTILT								
FEEDER AMOUNT								
Antenna RET Motor (QTY/MODEL)								
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)								
TMA/LNA (TYPE/MODEL)								
CURRENT INJECTORS FOR TMA (QTY/MODEL)								
PDU FOR TMAS (QTY/MODEL) usually per site								
SURGE ARRESTOR (QTY/MODEL)								
DIPLEXER (QTY/MODEL)								
HYBRID COMBINER (QTY/MODEL)								
DUPLEXER (QTY/MODEL)								
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?								
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)								
SCPA/MCPA MODULE?								
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION								
HATCHPLATE POWER (Watts)								
ERP (Watts)								
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 15E - CURRENT SECTOR/CELL INFORMATION - EPSILON

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?								
TECHNOLOGY								
RRH LOCATION (Top/Bottom/None)								
FEEDERS TYPE								
Feeder Length (feet)								
ANTENNA ATOLL								
ANTENNA MAKE - MODEL								
ANTENNA VENDOR								
ANTENNA SIZE (H x W x D)								
ANTENNA WEIGHT								
ANTENNA GAIN								
AZIMUTH								
RADIATION CENTER (feet)								
ANTENNA TIP HEIGHT								
ELECTRICAL TILT (700/850/1900/AWS)								
MECHANICAL DOWNTILT								
FEEDER AMOUNT								
Antenna RET Motor (QTY/MODEL)								
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)								
TMA/LNA (TYPE/MODEL)								
CURRENT INJECTORS FOR TMA (QTY/MODEL)								
PDU FOR TMAS (QTY/MODEL) usually per site								
SURGE ARRESTOR (QTY/MODEL)								
DIPLEXER (QTY/MODEL)								
HYBRID COMBINER (QTY/MODEL)								
DUPLEXER (QTY/MODEL)								
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?								
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)								
SCPA/MCPA MODULE?								
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION								
HATCHPLATE POWER (Watts)								
ERP (Watts)								
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 15F - CURRENT SECTOR/CELL INFORMATION - ZETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?								
TECHNOLOGY								
RRH LOCATION (Top/Bottom/None)								
FEEDERS TYPE								
Feeder Length (feet)								
ANTENNA ATOLL								
ANTENNA MAKE - MODEL								
ANTENNA VENDOR								
ANTENNA SIZE (H x W x D)								
ANTENNA WEIGHT								
ANTENNA GAIN								
AZIMUTH								
RADIATION CENTER (feet)								
ANTENNA TIP HEIGHT								
ELECTRICAL TILT (700/850/1900/AWS)								
MECHANICAL DOWNTILT								
FEEDER AMOUNT								
Antenna RET Motor (QTY/MODEL)								
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)								
TMA/LNA (TYPE/MODEL)								
CURRENT INJECTORS FOR TMA (QTY/MODEL)								
PDU FOR TMAS (QTY/MODEL) usually per site								
SURGE ARRESTOR (QTY/MODEL)								
DIPLEXER (QTY/MODEL)								
HYBRID COMBINER (QTY/MODEL)								
DUPLEXER (QTY/MODEL)								
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?								
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)								
SCPA/MCPA MODULE?								
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION								
HATCHPLATE POWER (Watts)								
ERP (Watts)								
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 16A - NEW/PROPOSED SECTOR/CELL INFORMATION - ALPHA (OR OMNI)

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx						
TECHNOLOGY	LTE / UMTS / GSM	UMTS						
RRH LOCATION (Top/Bottom/None)	BOTTOM	N/A						
FEEDERS TYPE	7/8" - Andrew	7/8" - Andrew						
Feeder Length (feet)	95 '	95 '						
ANTENNA ATOLL								
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET							
ANTENNA VENDOR	KMW							
ANTENNA SIZE (H x W x D)	72.0 x 11.8 x 5.9							
ANTENNA WEIGHT	48.5							
ANTENNA GAIN		17.1 dBi						
AZIMUTH	0 °							
RADIATION CENTER (feet)	82 '							
ANTENNA TIP HEIGHT	85 '							
ELECTRICAL TILT (700/850/1900/AWS)	0 °	0 °						
MECHANICAL DOWNTILT	0 °							
FEEDER AMOUNT	2							
Antenna RET Motor (QTY/MODEL)	N/A / KMW / Built-in RET Equipment							
Antenna RET Splitter (QTY/MODEL)	N/A							
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)	N/A							
Antenna RET Surge Arrestor (QTY/MODEL)	N/A							
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site	N/A							
DC BLOCK (QTY/MODEL)	N/A							
TMA/LNA (TYPE/MODEL)	1 / CCI / DTMABP7819VG12A							
CURRENT INJECTORS FOR TMA (QTY/MODEL)	1 / Kathrein / 782-11055							
PDU FOR TMAS (QTY/MODEL) usually per site	Kathrein / 860-10006							
SURGE ARRESTOR (QTY/MODEL)	rew / APTDC-BDFDM-DBW(RRH BOTT							
DIPLEXER (QTY/MODEL)	NO Diplexer, use existing Triplexer							
HYBRID COMBINER (QTY/MODEL)	N/A							
DUPLEXER (QTY/MODEL)	use existing included with 850 LLC							
FILTER (QTY/MODEL)	N/A							
RXAIT KIT MODULE?	RxAIT - 850 Band							
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	2 / LLC - 850 Band PCS-AWS Triplexer, DC through to PCS-AWS Port, CCI							
SCPA/MCPA MODULE?	N/A	N/A						
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION	-14 °							
HATCHPLATE POWER (Watts)	N/A	N/A						
ERP (Watts)	N/A	N/A						
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 16B - NEW/PROPOSED SECTOR/CELL INFORMATION - BETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx						
TECHNOLOGY	LTE / UMTS / GSM	UMTS						
RRH LOCATION (Top/Bottom/None)	BOTTOM	N/A						
FEEDERS TYPE	7/8" - Andrew	7/8" - Andrew						
Feeder Length (feet)	95 '	95 '						
ANTENNA ATOLL								
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET							
ANTENNA VENDOR	KMW							
ANTENNA SIZE (H x W x D)	72.0 x 11.8 x 5.9							
ANTENNA WEIGHT	48.5							
ANTENNA GAIN		17.1 dBi						
AZIMUTH	120 °							
RADIATION CENTER (feet)	82 '							
ANTENNA TIP HEIGHT	85 '							
ELECTRICAL TILT (700/850/1900/AWS)	0 °	0 °						
MECHANICAL DOWNTILT	0 °							
FEEDER AMOUNT	2							
Antenna RET Motor (QTY/MODEL)	N/A / KMW / Built-in RET Equipment							
Antenna RET Splitter (QTY/MODEL)	N/A							
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)	N/A							
Antenna RET Surge Arrestor (QTY/MODEL)	N/A							
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site	N/A							
DC BLOCK (QTY/MODEL)	N/A							
TMA/LNA (TYPE/MODEL)	1 / CCI / DTMABP7819VG12A							
CURRENT INJECTORS FOR TMA (QTY/MODEL)	1 / Kathrein / 782-11055							
PDU FOR TMAS (QTY/MODEL) usually per site	Kathrein / 860-10006							
SURGE ARRESTOR (QTY/MODEL)	rew / APTDC-BDFDM-DBW(RRH BOTT							
DIPLEXER (QTY/MODEL)	NO Diplexer, use existing Triplexer							
HYBRID COMBINER (QTY/MODEL)	N/A							
DUPLEXER (QTY/MODEL)	use existing included with 850 LLC							
FILTER (QTY/MODEL)	N/A							
RXAIT KIT MODULE?	RxAIT - 850 Band							
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	2 / LLC - 850 Band PCS-AWS Triplexer, DC through to PCS-AWS Port, CCI							
SCPA/MCPA MODULE?	N/A	N/A						
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION	-14 °							
HATCHPLATE POWER (Watts)	N/A	N/A						
ERP (Watts)	N/A	N/A						
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 16C - NEW/PROPOSED SECTOR/CELL INFORMATION - GAMMA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx						
TECHNOLOGY	LTE / UMTS / GSM	UMTS						
RRH LOCATION (Top/Bottom/None)	BOTTOM	N/A						
FEEDERS TYPE	7/8" - Andrew	7/8" - Andrew						
Feeder Length (feet)	95 '	95 '						
ANTENNA ATOLL								
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET							
ANTENNA VENDOR	KMW							
ANTENNA SIZE (H x W x D)	72.0 x 11.8 x 5.9							
ANTENNA WEIGHT	48.5							
ANTENNA GAIN		17.1 dBi						
AZIMUTH	240 °							
RADIATION CENTER (feet)	82 '							
ANTENNA TIP HEIGHT	85 '							
ELECTRICAL TILT (700/850/1900/AWS)	0 °	0 °						
MECHANICAL DOWNTILT	0 °							
FEEDER AMOUNT	2							
Antenna RET Motor (QTY/MODEL)	N/A / KMW / Built-in RET Equipment							
Antenna RET Splitter (QTY/MODEL)	N/A							
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)	N/A							
Antenna RET Surge Arrestor (QTY/MODEL)	N/A							
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site	N/A							
DC BLOCK (QTY/MODEL)	N/A							
TMA/LNA (TYPE/MODEL)	1 / CCI / DTMABP7819VG12A							
CURRENT INJECTORS FOR TMA (QTY/MODEL)	1 / Kathrein / 782-11055							
PDU FOR TMAS (QTY/MODEL) usually per site	Kathrein / 860-10006							
SURGE ARRESTOR (QTY/MODEL)	rew / APTDC-BDFDM-DBW(RRH BOTT							
DIPLEXER (QTY/MODEL)	NO Diplexer, use existing Triplexer							
HYBRID COMBINER (QTY/MODEL)	N/A							
DUPLEXER (QTY/MODEL)	use existing included with 850 LLC							
FILTER (QTY/MODEL)	N/A							
RXAIT KIT MODULE?	RxAIT - 850 Band							
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	2 / LLC - 850 Band PCS-AWS Triplexer, DC through to PCS-AWS Port, CCI							
SCPA/MCPA MODULE?	N/A	N/A						
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION	-14 °							
HATCHPLATE POWER (Watts)	N/A	N/A						
ERP (Watts)	N/A	N/A						
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 16D - NEW/PROPOSED SECTOR/CELL INFORMATION - DELTA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?								
TECHNOLOGY								
RRH LOCATION (Top/Bottom/None)								
FEEDERS TYPE								
Feeder Length (feet)								
ANTENNA ATOLL								
ANTENNA MAKE - MODEL								
ANTENNA VENDOR								
ANTENNA SIZE (H x W x D)								
ANTENNA WEIGHT								
ANTENNA GAIN								
AZIMUTH								
RADIATION CENTER (feet)								
ANTENNA TIP HEIGHT								
ELECTRICAL TILT (700/850/1900/AWS)								
MECHANICAL DOWNTILT								
FEEDER AMOUNT								
Antenna RET Motor (QTY/MODEL)								
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)								
TMA/LNA (TYPE/MODEL)								
CURRENT INJECTORS FOR TMA (QTY/MODEL)								
PDU FOR TMAS (QTY/MODEL) usually per site								
SURGE ARRESTOR (QTY/MODEL)								
DIPLEXER (QTY/MODEL)								
HYBRID COMBINER (QTY/MODEL)								
DUPLEXER (QTY/MODEL)								
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?								
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)								
SCPA/MCPA MODULE?								
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION								
HATCHPLATE POWER (Watts)								
ERP (Watts)								
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 16E - NEW/PROPOSED SECTOR/CELL INFORMATION - EPSILON

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?								
TECHNOLOGY								
RRH LOCATION (Top/Bottom/None)								
FEEDERS TYPE								
Feeder Length (feet)								
ANTENNA ATOLL								
ANTENNA MAKE - MODEL								
ANTENNA VENDOR								
ANTENNA SIZE (H x W x D)								
ANTENNA WEIGHT								
ANTENNA GAIN								
AZIMUTH								
RADIATION CENTER (feet)								
ANTENNA TIP HEIGHT								
ELECTRICAL TILT (700/850/1900/AWS)								
MECHANICAL DOWNTILT								
FEEDER AMOUNT								
Antenna RET Motor (QTY/MODEL)								
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)								
TMA/LNA (TYPE/MODEL)								
CURRENT INJECTORS FOR TMA (QTY/MODEL)								
PDU FOR TMAS (QTY/MODEL) usually per site								
SURGE ARRESTOR (QTY/MODEL)								
DIPLEXER (QTY/MODEL)								
HYBRID COMBINER (QTY/MODEL)								
DUPLEXER (QTY/MODEL)								
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?								
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)								
SCPA/MCPA MODULE?								
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION								
HATCHPLATE POWER (Watts)								
ERP (Watts)								
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 16F - NEW/PROPOSED SECTOR/CELL INFORMATION - ZETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?								
TECHNOLOGY								
RRH LOCATION (Top/Bottom/None)								
FEEDERS TYPE								
Feeder Length (feet)								
ANTENNA ATOLL								
ANTENNA MAKE - MODEL								
ANTENNA VENDOR								
ANTENNA SIZE (H x W x D)								
ANTENNA WEIGHT								
ANTENNA GAIN								
AZIMUTH								
RADIATION CENTER (feet)								
ANTENNA TIP HEIGHT								
ELECTRICAL TILT (700/850/1900/AWS)								
MECHANICAL DOWNTILT								
FEEDER AMOUNT								
Antenna RET Motor (QTY/MODEL)								
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)								
TMA/LNA (TYPE/MODEL)								
CURRENT INJECTORS FOR TMA (QTY/MODEL)								
PDU FOR TMAS (QTY/MODEL) usually per site								
SURGE ARRESTOR (QTY/MODEL)								
DIPLEXER (QTY/MODEL)								
HYBRID COMBINER (QTY/MODEL)								
DUPLEXER (QTY/MODEL)								
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?								
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)								
SCPA/MCPA MODULE?								
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION								
HATCHPLATE POWER (Watts)								
ERP (Watts)								
Local Market Note1								
Local Market Note2								
Local Market Note3								

AM-X-CD-16-65-00T-RET(6' 65˚ Dual Broadband Antenna)

Dual Band Electrical DownTilt Antenna

698 ~ 894MHz, X-pol., H65˚ / V12˚

1710 ~ 2170MHz, X-pol., H65˚ / V6.0˚

Electrical Specification

Frequency Range		698~894MHz	1710~2170MHz
Impedance		50Ω	
Polarization		Dual, Slant ±45˚	
Gain		15.5dBi / 13.35dBd @ 698-806MHz 16.0dBi / 13.85dBd @ 824-894MHz	17.3dBi / 15.15dBd @ 1710-1755MHz 17.4dBi / 15.25dBd @ 1850-1900MHz 17.1dBi / 14.95dBd @ 2110-2155MHz
Beamwidth	Horizontal	65˚ @ 698-806MHz 63˚ @ 824-894MHz	65˚ @ 1710-1755MHz 67˚ @ 1850-1900MHz 69˚ @ 2110-2155MHz
	Vertical	12.3˚ @ 698-806MHz 11.5˚ @ 824-894MHz	6.5˚ @ 1710-1755MHz 6.0˚ @ 1850-1900MHz 5.7˚ @ 2110-2155MHz
VSWR		≤1.5:1	
Front-to-Back Ratio		≥27 dB	
Electrical Downtilt Range		2˚ ~ 16˚	0˚ ~ 10˚
Isolation Between Ports		≥30 dB	
Isolation Between Ports of Different Frequency Elements		≥35 dB	
Cross Pole Discrimination		10.0 dB @ ±60˚ 15.0 dBi @ 0˚	
First Upper Side Lobe Suppression		16dB	
Side Lobe Suppression		> 16 dB @ 0-6˚ Tilt > 18 dB @ 7-12˚ Tilt (Up to 10˚ from Boresight)	> 16 dB @ 0-6˚ Tilt > 18 dB @ 7-10˚ Tilt (Up to 10˚ from Boresight)
Passive Intermodulation		≤ -150 dBc @ 2x20w	
Input Maximum CW Power		500 W	300 W
Environmental Compliance		IP65 for Radome IP67 for Connectors	
RET Motor Configuration		Field Replaceable RET Electronic Control Module / RET Motor is internal to antenna & not field replaceable	
Compliant with AISG 1.1 and 2.0		AISG 1.1 and 2.0	

Mechanical Specification

Dimension (W×D×H)	11.8×5.9×72 inches (300×150×1829mm)
Weight (Without clamp)	48.5 lbs (22.0 kg)
Connector	4 x 7/16 DIN(F), Long Neck
Max Wind Speed	150 mph
Wind Load (@150 mph)	1891 N

300

Twin Triple Band "Active PCS with 700 and 850 Band Pass-thru" Dual Duplexed TMA

Tel: 201-342-3338 Fax: 201-342-3339 www.cciproducts.com

General Information

CCI's Twin Triple Band (700 Band, Cellular and PCS) TMA contains two triple band TMA's in a single housing. The PCS TMA is full band and fully duplexed, while the 700 Band and Cellular RF is bypassed and combined (Diplexed) with the PCS RF signal. High linearity improves the uplink sensitivity and the receive performance of base stations. The TMA is fully compliant with the latest AISG 2.0 specification. The TMA supports EDGE/GSM, UMTS and LTE BTS equipment. It provides a convenient package for sites upgraded to triple or quad antenna configurations. The twin TMA package reduces tower loading, leasing, and installation costs. Unit count on the tower is cut in half. An excellent match for two branch receive diversity applications using triple polarization antennas. The input and output connectors are located inline for ease of installation in space constrained areas such as uni-pole structures and stealth antennas.

Model
DTMABP7819VG12A

Contents:

Features:

- Small, lightweight, twin unit
- Triple Band Dual Duplexed (PCS with 700 Band & Cellular Bypass)
- Optional AISG 2.0 compatible unit
- AISG TMA detects BTS port that DC voltage and AISG sampling is applied to, and automatically switches to utilize that port
- AISG TMA operates at constant power
- AISG TMA may be powered by a standard PDU
- High linearity
- Lightning protected
- Fail-safe bypass mode
- High reliability

Technical Description

The TMA system consists of a twin outdoor triple band tower mount unit which combine separate PCS, 700 Band & Cellular antennas onto a single BTS port. The PCS path of the tower mount unit is dual duplexed to separate the low-power uplink signals from the high-power downlink signals at the antenna port, amplifies the low-level uplink signals using an ultra-low noise amplifier (LNA), and recombines the two paths at the BTS port. The 700 Band & Cellular path is ultra low loss and passive. Both paths are diplexed at the BTS port. The tower mount units consist of eight band-pass filters, two redundant low-noise amplifiers, bypass failure circuitry, and bias tee's which are all housed in an IP65 moisture proof enclosure, with IP68 Immersion proof connectors suited to long-life masthead mounting. The unit provides protection against lightning strikes via a multi-stage surge protection circuit. DC power and control is provided via the feeder cable from the BTS or a Power Distribution Unit (PDU). Optional AISG 2.0 DC power and control is provided via the feeder cable from the BTS using the AISG 2.0 and 3GPP standard. The optional AISG TMA detects which BTS port has DC Voltage/AISG Sampling applied and automatically switches to utilize that port. Additionally the AISG TMA operates at constant power when powered by an AISG 2.0 Compatible Site Control Unit, but may be powered by a "Standard Power distribution Unit. A separate AISG connector is also provided to allow direct AISG connection or "Daisy Chaining" to multiple AISG products at the top of the tower.

An optional indoor site control unit (SCU) is available to power up to up to 32 AISG modules per sector and to provide the all the monitoring and alarm functions for the system. The SCU is housed in a single (1U) 1.75" x 19" rack and contains triple redundant power supplies capable of being "hot swapped" that provide a regulated DC supply voltage on the RF coax for the tower mount amplifiers.

Twin Triple Band "Active AWS with 700 and 850 Band Pass-thru" TMA Typical Specifications

Description	Typical Specifications
Electrical Specifications	
700 Band & Cellular Frequency Range	698 to 894 MHz
PCS Receive Frequency Range	1850 – 1910 MHz
PCS Transmit Frequency Range	1930 - 1990 MHz
PCS Amplifier Gain	6 to 12 dB Adjustable in 0.25 dB steps via AISG
PCS Gain Variation	±1.0 dB
PCS System Noise Figure	1.4 dB (@ +25°C),1.6 dB (@ +65°C), At 1910 MHz: 1.7 dB (@ +25°C), 1.9 dB (@ +65°C)
PCS Input Third Order Intercept Point	+12 dBm Min @ Max. Gain
Input/Output Return Loss	18 dB Min. all ports, 15 dB Min. Bypass Mode
Insertion Loss	
700 Band & Cellular Passband	< 0.2 dB, 0.1 dB typical
PCS Transmit Passband	0.4 dB Typical
PCS Transmit Passband Ripple	±0.2 dB
PCS Bypass Mode, Rx Passband	1.6 dB (@ +25°C),1.8 dB (@ +65°C), At 1910 MHz: 2.3 dB (@ +25°C), 2.5 dB (@ +65°C)
PCS Bypass Mode, Rx Passband Ripple	±1 dB
Filter Characteristics	
700 Band & Cellular Path Rejection	70 dB @ 1850 - 1990 MHz
PCS Path Rejection	80 dB @ 698 - 894 MHz
Continuous Average Power	200 Watts max
Peak Envelope Power	2 kW max
Intermodulation Performance	
IMD at ANT port in Rx Band	-112 dBm Min. (2 x +43 dBm tones)
Operating Voltage	+10V to +30V DC provided via coax or AISG
Power Consumption	≤ 2.1 Watts
Mechanical Specifications	
Connectors	DIN 7-16 Female (Long Neck) x 6, AISG x 1
Dimensions (Body Only)	10.63" (H) x 11.02" (W) x 3.78" (D); (270 (H) x 280 (W) x 96 (D) mm)
Dimensions (with Bracket)	14.25" (H) x 11.46" (W) x 4.17" (D); (362 (H) x 291 (W) x 106 (D) mm)
Weight (w/o Bracket)	19.18 Lbs. (8.7 Kg)
Mounting	Pole/Wall Mounting Bracket
Environmental Specifications	
Operating Temperature	-40˚ C to +65˚C
Lightning Protection	8/20us, ±2KA max, 10 strikes each, IEC61000-4-5
Enclosure	IP65 (Unit Body), IP68 (Connector)
MTBF	>500,000 hours

All specifications are subject to change. The latest specifications are available at www.cciproducts.com

Network Modernization RFDS v3.0

T-Mobile

Site ID	**CTNL010A**	**Latitude**	41.36006
		Longitude	-72.22650
Site Name	Temp Site	**Site Type**	Structure (Non-Building)
Address	Ancient Hwy, East Lyme	**Site Class**	Monopole
Market	CONNECTICUT	**Landlord**	

Configuration
4B

Approvals	
Market RF	
Market Development	

RFDS Revision		**Date**	03/11/2015
RFDS Final			
Work Order #		**NOC#**	(888) 218-6664

Site Information

Existing Configuration					Proposed Configuration			
1	2	3	4	Cabinet #	1	2	3	4
				Technology	GSM/UMTS/LTE			
				Cabinet type	3106			
				CBU				
				DUW30	2			
				DUL20	1			
				DUG20	1			
				DUS41				
				RBS6601				
				dTRU/TRX				
				RU22 B4				
				RUS01 B2	6			
				RUS01 B4	6			

	Relocate cabinet
x	Add cabinet
	Swap cabinet
	Remove cabinet
	Make cabinet dark

Scope of Work

Add 3106 cabinet. Add 2 DUW30, DUL20, DUG20, 6 RUS01 B2 and 6 RUS01 B4 radios to 3106 cabinet.

ALPHA - Scope of Work

X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna	X	Add coax cables
X	Add TMA	X	Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Add 1 Quad Pole Antenna . Add PCS dd B2 TMA at position 1/left. Add AWS dd B4 TMA at position 2/right. Add 2 Coax lines at postion 1/ left for PCS GSM/UMTS. Add 2 coax lines at position 2/right for AWS UMTS/LTE. Connect PCS GSM/UMTS and AWS UMTS/LTE in cabinet radio units to passive antenna at position 2/left and /right respectively via coax lines.

BETA - Scope of Work

X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna	X	Add coax cables
X	Add TMA	X	Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Add 1 Quad Pole Antenna . Add PCS dd B2 TMA at position 1/left. Add AWS dd B4 TMA at position 2/right. Add 2 Coax lines at postion 1/ left for PCS GSM/UMTS. Add 2 coax lines at position 2/right for AWS UMTS/LTE. Connect PCS GSM/UMTS and AWS UMTS/LTE in cabinet radio units to passive antenna at position 2/left and /right respectively via coax lines.

GAMMA - Scope of Work

X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna	X	Add coax cables
X	Add TMA	X	Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Add 1 Quad Pole Antenna . Add PCS dd B2 TMA at position 1/left. Add AWS dd B4 TMA at position 2/right. Add 2 Coax lines at postion 1/ left for PCS GSM/UMTS. Add 2 coax lines at position 2/right for AWS UMTS/LTE. Connect PCS GSM/UMTS and AWS UMTS/LTE in cabinet radio units to passive antenna at position 2/left and /right respectively via coax lines.

DELTA - Scope of Work

	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Network Modernization RFDS v3.0

T-Mobile

Site ID	**CTNL010A**	**Latitude**	41.36006
		Longitude	-72.22650
Site Name	Temp Site	**Site Type**	Structure (Non-Building)
Address	Ancient Hwy, East Lyme	**Site Class**	Monopole
Market	CONNECTICUT	**Landlord**	

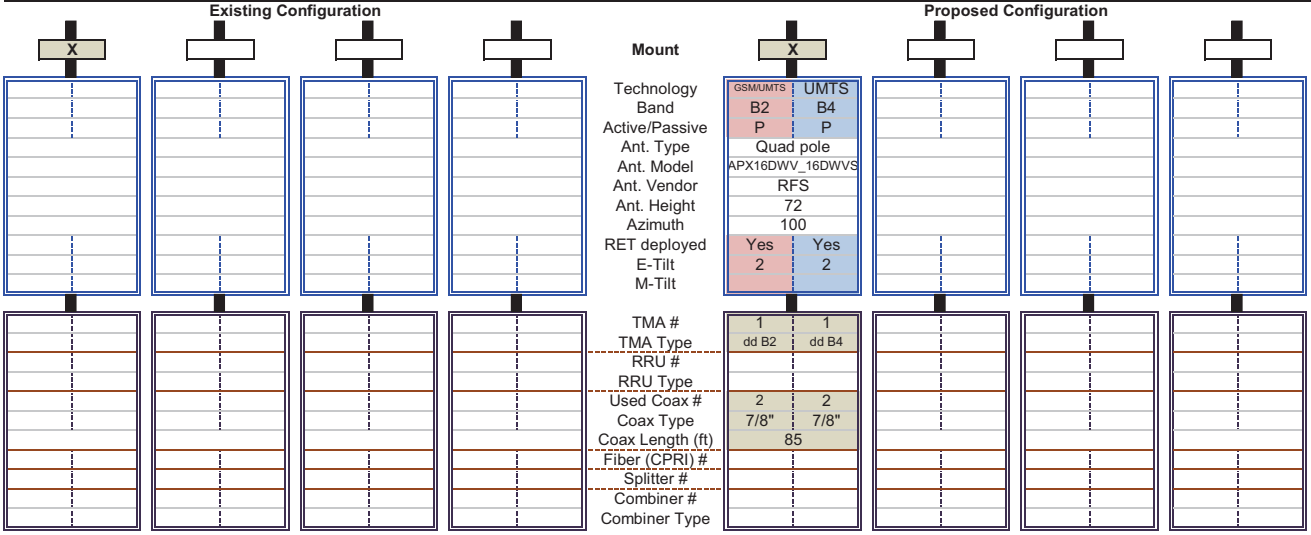
Configuration
4B

Approvals	
Market RF	
Market Development	

RFDS Revision	
RFDS Final	

Date 03/11/2015

ALPHA (view from behind)

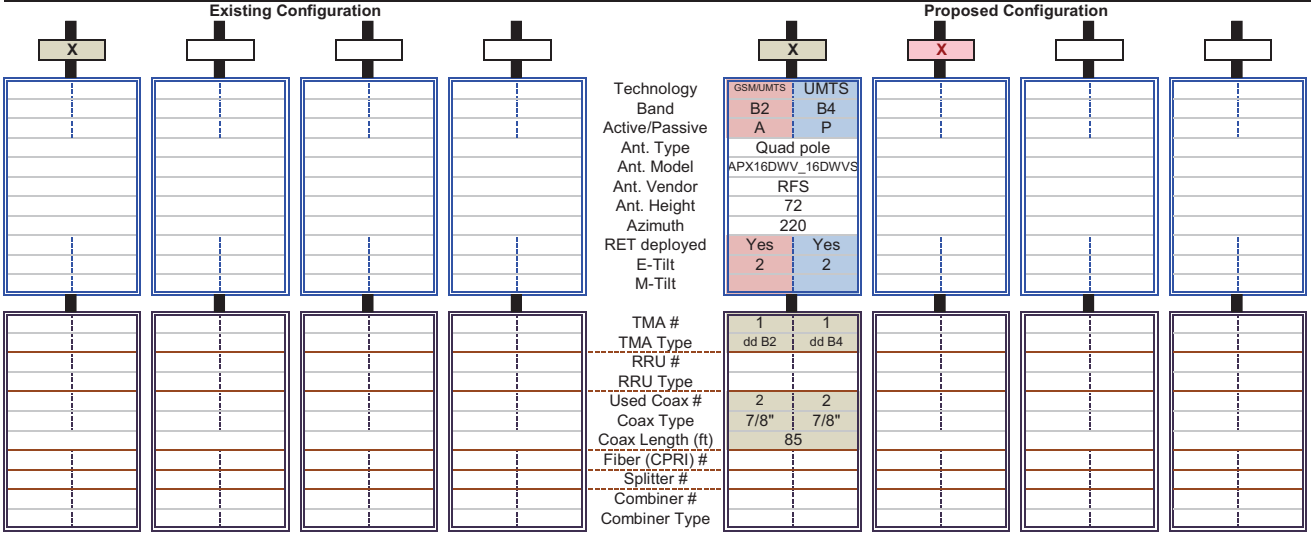


X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna	X	Add coax cables
X	Add TMA	X	Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Add 1 Quad Pole Antenna . Add PCS dd B2 TMA at position 1/left. Add AWS dd B4 TMA at position 2/right. Add 2 Coax lines at postion 1/ left for PCS GSM/UMTS. Add 2 coax lines at position 2/right for AWS UMTS/LTE. Connect PCS GSM/UMTS and AWS UMTS/LTE in cabinet radio units to passive antenna at position 2/left and /right respectively via coax lines.

BETA (view from behind)



X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
X	Swap antenna		Consolidate coax cables
	Remove antenna	X	Add coax cables
	Add TMA	X	Add fiber cables
X	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Add 1 Quad Pole Antenna . Add PCS dd B2 TMA at position 1/left. Add AWS dd B4 TMA at position 2/right. Add 2 Coax lines at postion 1/ left for PCS GSM/UMTS. Add 2 coax lines at position 2/right for AWS UMTS/LTE. Connect PCS GSM/UMTS and AWS UMTS/LTE in cabinet radio units to passive antenna at position 2/left and /right respectively via coax lines.

Network Modernization RFDS v3.0

Site ID	**CTNL010A**	**Latitude**	41.36006
		Longitude	-72.22650
Site Name	Temp Site	**Site Type**	Structure (Non-Building)
Address	Ancient Hwy, East Lyme	**Site Class**	Monopole
Market	CONNECTICUT	**Landlord**	

Configuration

4B

Approvals	
Market RF	
Market Development	

RFDS Revision	
RFDS Final	

Date 03/11/2015

GAMMA (view from behind)

Existing Configuration

Proposed Configuration

	Existing Configuration					Proposed Configuration				
						X	X			
Technology						GSM/UMTS	UMTS			
Band						B2	B4			
Active/Passive						A	P			
Ant. Type						Quad pole				
Ant. Model						APX16DWV_16DWVS				
Ant. Vendor						RFS				
Ant. Height						72				
Azimuth						340				
RET deployed						Yes	Yes			
E-Tilt						2	2			
M-Tilt										
TMA #	1					1	1			
TMA Type						dd B2	dd B4			
RRU #										
RRU Type										
Used Coax #						2	2			
Coax Type						7/8"	7/8"			
Coax Length (ft)						85				
Fiber (CPRI) #										
Splitter #										
Combiner #										
Combiner Type										

X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
X	Swap antenna		Consolidate coax cables
	Remove antenna	X	Add coax cables
	Add TMA	X	Add fiber cables
X	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Add 1 Quad Pole Antenna . Add PCS dd B2 TMA at position 1/left. Add AWS dd B4 TMA at position 2/right. Add 2 Coax lines at postion 1/ left for PCS GSM/UMTS. Add 2 coax lines at position 2/right for AWS UMTS/LTE. Connect PCS GSM/UMTS and AWS UMTS/LTE in cabinet radio units to passive antenna at position 2/left and /right respectively via coax lines.

DELTA (view from behind)

Existing Configuration

Proposed Configuration

	Existing Configuration				Proposed Configuration			
Technology								
Band								
Active/Passive								
Ant. Type								
Ant. Model								
Ant. Vendor								
Ant. Height								
Azimuth								
RET deployed								
E-Tilt								
M-Tilt								
TMA #								
TMA Type								
RRU #								
RRU Type								
Used Coax #								
Coax Type								
Coax Length (ft)								
Fiber (CPRI) #								
Splitter #								
Combiner #								
Combiner Type								

	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Product Data Sheet **APX16DWV-16DWVS-E-A20**

Optimizer® Side-by-Side Dual Polarized Antenna, 1710-2200, 65deg, 18.4dBi, 1.4m, VET, 0-10deg RET

Product Description

A combination of two X-Polarized antennas in a single radome, this pair of variable tilt antennas 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). The antenna comes pre-connected with two antenna control units (ACU).

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 <-20dB).**
- **Gain tracking – difference between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz) <1dB.**
- **Two X-Polarised panels in a single radome.**
- **Azimuth horizontal beamwidth difference <4deg between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz).**
- **Low profile for low visual impact.**
- **Dual polarization; Broadband design.**
- **Includes (2) AISG 2.0 Compatible ACU-A20-N antenna control units.**

Technical Specifications

Electrical Specifications

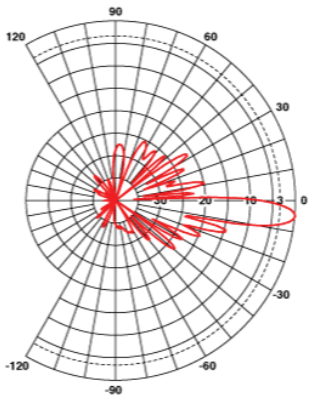
Frequency Range, MHz	1710-2200
Horizontal Beamwidth, deg	65
Vertical Beamwidth, deg	5.9 to 7.7
Electrical Downtilt, deg	0-10
Gain, dBi (dBd)	18.4 (16.3)
1st Upper Sidelobe Suppression, dB	> 18 (typically > 20)
Upper Sidelobe Suppression, dB	> 18 all (typically > 20)
Front-To-Back Ratio, dB	>26 (typically 28)
Polarization	Dual pol +/-45°
VSWR	< 1.5:1
Isolation between Ports, dB	> 30
3rd Order IMP @ 2 x 43 dBm, dBc	> 150 (155 Typical)
Impedance, Ohms	50
Maximum Power Input, W	300
Lightning Protection	Direct Ground
Connector Type	(4) 7-16 Long Neck Female

Mechanical Specifications

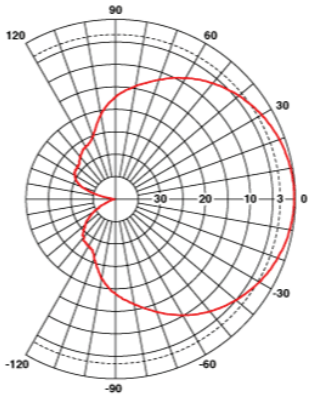
Dimensions - HxWxD, mm (in)	1420 x 331 x 80 (55.9 x 13 x 3.15)
Weight w/o Mtg Hardware, kg (lb)	18.5 (40.7)
Survival Wind Speed, km/h (mph)	200 (125)
Rated Wind Speed, km/h (mph)	160 (100)
Max Wind Loading Area, m² (ft²)	0.47 (5.03)
Front Thrust @ Rated Wind, N (lbf)	756 (170)
Maximum Thrust @ Rated Wind, N (lbf)	756 (170)
Wind Load - Side @ Rated Wind, N (lbf)	231 (52)
Wind Load - Rear @ Rated Wind, N (lbf)	408 (92)
Radome Material	Fiberglass
Radome Color	Light Grey RAL7035
Mounting Hardware Material	Diecasted Aluminum
Shipping Weight, kg (lb)	24.5 (53.9)
Packing Dimensions, HxWxD, mm (in)	1520 x 408 x 198 (59.8 x 16 x 7.8)

Ordering Information

Mounting Hardware	APM40-2 + APM40-E2



Vertical Pattern



Horizontal Pattern

Product Data Sheet **ATMAA1412D-1A20**

AWS Twin Wideband Dual Duplex TMA

Product Description

Designed for use in AWS projects, these units improve base station receiver sensitivity and enhance coverage. Use of these TMAs can increase data rates without a reduction in capacity. These TMAs are wideband and cover the entire 45 MHz in the AWS frequency band. The unit is extremely lightweight, weighing just 13 lbs (5.9 kg) for a twin unit. It is easy to install and meets IP66 requirements for ingress protection. The TMA has a metallic base and the radome cap is light grey allowing them to blend with antenna radomes. Its dual-duplex configuration enables the use of a single feeder for both Downlink and Uplink.

Features/Benefits

- **AISG 2.0 compliant**
- **Two TMAs in a single enclosure – Reduces tower load and installation time.**
- **Low noise figure overcomes feeder losses and enhances site coverage**
- **Filtering improves Tx-Rx isolation by reducing noise and interference**
- **Dual-duplex configuration enables use of a single feeder for both Downlink and Uplink**
- **Low insertion loss of Tx filter provides increased downlink coverage**
- **Extremely light weight – Reduces tower loading and facilitates installation.**
- **Equipped with breather valve – Guards against internal condensation.**
- **Option: AISG connector location at bottom or top**

Technical Specifications

Product Type	Tower Mount Amplifier
Frequency Band, MHz	1710-1755, 2110-2155
Noise Figure, Typical, dB	1.3 @ midband, 1.5 @ band edge
Gain, dB	12 ± 1
Configuration	AWS double dual-duplex TMA
Mounting	Wall, pole
Uplink Frequency, MHz	1710-1755
Downlink Frequency, MHz	2110-2155
Bandwidth Tx & Rx, MHz	45
Input IP3, Min, dBm	+13
Tx Loss, Max, dB	0.4
Return Loss All Ports, Min, dB	18
Tx Rejection in Rx Branch, Min, dB	80
Rx Rejection in Tx Branch, Min, dB	60
Tx Power Handling, Max, W	250 cw, 5000 peak
IMP Level at the ANT Port, Min, dBm	-117 @ 2 * 43
Nominal Current (ATMAA1412D-1A20), mA	AISG Mode: AWS 1 Port = 120-200 (AISG RS485 port), AWS 2 Port = 100 ± 20 ; Non-AISG Mode: Each port = 100 ± 20
Alarm Current (ATMAA1412D-1A20), mA	AISG Mode: AWS 1 port = AISG alarm, AWS 2 port = 190 ± 10 ; Non-AISG Mode: Each port = 190 ± 10
Impedance, Ohms	50
Temperature Range, °C (°F)	-40 to +65 (-40 to +149)
Ingress Protection	IP66
Connectors	7/16-Female Long-neck
Weight, kg (lb)	5.9 (13)
Application	AWS
Dimensions, H x W x D, mm (in)	305 x 254 x 101 (12 x 10 x 4), includes connector length
Supporting Power Distribution Unit	CNI-P1A20 and CNI-P2A20 with bias-T BITA2S-AL20

Notes

EXHIBIT D

VISIBILITY ASSESSMENT

To: David Vivian
SAI Communications, Inc.
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

Date: March 28, 2015

Re: CT1345T - East Lyme Relo
Temporary Ballast Tower
Ancient Highway
East Lyme, Connecticut

From: Michael Libertine

New Cingular Wireless PCS, LLC (d/b/a "AT&T") has identified a potential site candidate location for development of a new, temporary wireless telecommunications facility ("Facility") on property off Ancient Highway in East Lyme, Connecticut (Map 30, Lot 1; the "host Property"). The proposed Facility would consist of an 85-foot tall, temporary ballast monopole within a 30-foot by 51-foot gravel based, fence-enclosed equipment compound. AT&T would install an approximately 11-foot tall, 12-foot by 20-foot equipment shelter within the compound. Additional space is also being made available for temporary relocation of T-Mobile antennas and equipment. The temporary Facility is required while AT&T secures a new permanent location in this area.

At the request of SAI Communications, Inc. and on behalf of AT&T, All-Points Technology Corporation, P.C. ("APT") prepared viewshed mapping to evaluate the potential visibility associated with the proposed temporary Facility. To conduct this assessment, a predictive computer model was developed specifically for this project. The predictive model provides an initial estimate of potential visibility throughout a pre-defined Study Area, in this case a two-mile radius surrounding the proposed Facility location.

Computer modeling tools were used to predict those areas where at least a portion of the Facility is estimated to be visible including TerrSet, an image analysis program developed by Clark Labs at Clark University. Project- and Study Area-specific data were incorporated into the computer model, including the site location, its ground elevation and the proposed Facility height, as well as the surrounding topography and existing vegetation, which are the primary features that can block direct lines of sight.

Information used in the model included lidar[1] based digital elevation data and customized land use data layers developed specifically for this analysis. Lidar is a remote-sensing technology that develops

[1] Lidar (a word invented to mean "light radar") may also be referred to as LiDAR, an acronym for Light Detection and Ranging. It is a technology that utilized lasers to determine the distance to an object or surface. LiDAR is similar to radar, but incorporates laser pulses rather than sound waves. It measures the time delay between transmission and reflection of the laser pulse.

elevation data in meters by measuring the time it takes for laser light to return from the surface to the instrument's sensors. The varying reflectivity of objects also means that the returns can be classified based on the characteristics of the reflected light, normally into categories such as "bare earth," "vegetation," "road," or "building." The system is also designed to capture many more data points than older radar-based systems. Thus, lidar-based digital elevation models ("DEM"s) have a much finer resolution and can also identify the different features of the landscape at the time that it was captured.

Viewshed analysis using lidar data provide a much more detailed view of the potential obstacles (especially trees and buildings), and therefore the viewshed modeling produces results with many smaller areas of visibility than those produced by using radar-based DEMs. Its precision makes lidar a superior source of data, but at present it is only available for limited areas of the state. The viewshed results are also checked against the most current aerial photographs in case significant changes (a new housing development, for example) have occurred since the time the lidar data was captured.

The lidar-based DEM created for this analysis represents topographic information for the state of Connecticut that was derived through the spatial interpolation of airborne LiDAR-based data collected in the years 2007 through 2012 and has a horizontal resolution of approximately two (2) feet. In addition, multiple land use data layers were created from the Natural Resources Conservation Service (through the USDA) aerial photography (1-meter resolution, flown in 2012) using IDRISI image processing tools. The IDRISI tools develops light reflective classes defined by statistical analysis of individual pixels, which are then grouped based on common reflective values such that distinctions can be made automatically between deciduous and coniferous tree species, as well as grassland, impervious surface areas, surface water and other distinct land use features.

With these data inputs, the model is then queried to determine where the top of the Facility can be seen from any point(s) within the Study Area, given the intervening existing topography and vegetation. The results of the preliminary analysis are depicted on the attached maps and are intended to provide a representation of those areas where portions of the Facility may potentially be visible to the human eye without the aid of magnification, based on a viewer eye-height of 5 feet above the ground and the combination of intervening topography and tree canopy (year-round) and tree trunks (seasonally, when the leaves are off the deciduous trees). The shaded areas of predicted visibility shown on the map denote locations from within the Study Area which the proposed Facility may potentially be visible year-round (in yellow) above the tree canopy and/or seasonally, through the trees (during "leaf-off" conditions; depicted in orange). The Facility however may not necessarily be visible from all locations within those shaded areas. It is important to note that the computer model cannot account for mass density, the height, diameter and branching variability of the trees, or the degradation of views that occur with distance. In addition, each point – or pixel - represents about one square meter in area, and thus is not predicting visibility from all viewpoints through all possible obstacles. Although large portions of the predicted viewshed may theoretically offer visibility of the Facility, because of these unavoidable limitations the quality of those views may not be sufficient for the human eye to recognize the tower or discriminate it from other surrounding objects. Visibility also varies seasonally with

increased, albeit obstructed, views occurring during "leaf-off" conditions. Beyond the density of woodlands found within the given Study Area, each individual tree has its own unique trunk, pole timber and branching pattern characteristics that provide varying degrees of screening in leafless conditions which cannot be precisely modeled.

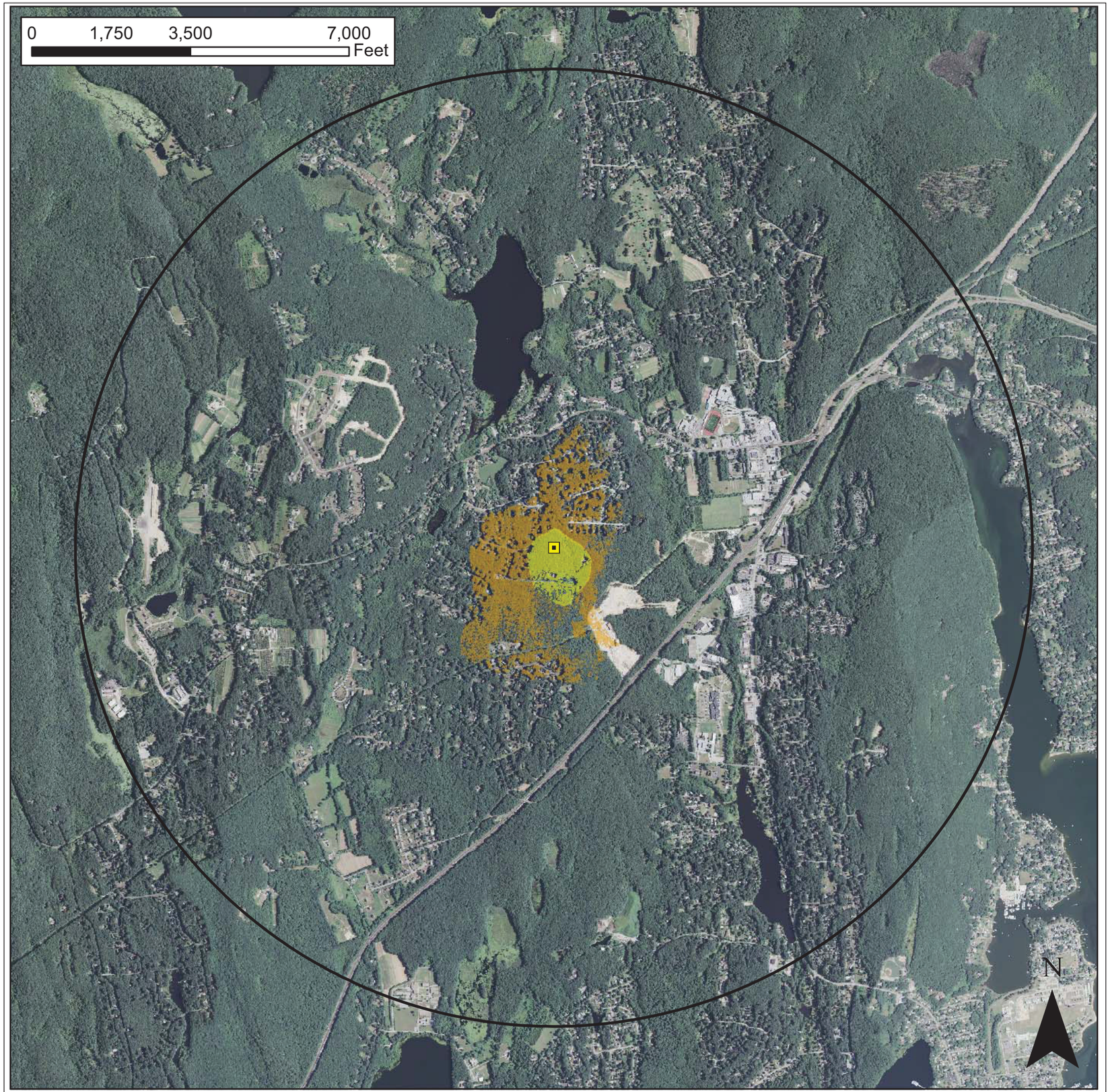
The preliminary viewshed mapping results indicate that year-round visibility associated with the proposed Facility could extend out distances of approximately 0.25 mile primarily to the south of the host Property. Seasonal visibility (when the leaves are off the deciduous trees) may allow views of at least a portion of the Facility at distances of approximately 0.5 mile. On a purely quantitative basis, areas from where the proposed Facility is predicted to be visible above the tree canopy year-round constitute approximately 37 acres. Seasonal views through the intervening pole timber and branches are anticipated to occur over an additional 178± acres of land.

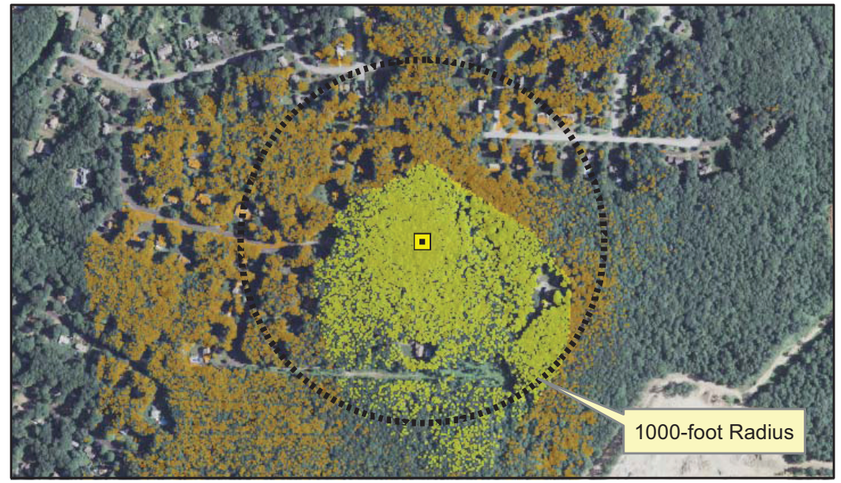
APT visited the site on March 27, 2015 to photo-document existing conditions. The attached photo-log map and accompanying photographs depict views from the site and nearby locations. As demonstrated in the photographs, the thick understory and tree cover will prohibit direct views of the compound and lower portions of the temporary tower from surrounding locations, including the nearest homes. Seasonal views, at this time of year when the leaves are off the deciduous trees, may be attained of upper portions of the tower from some nearby locations; however, these potential views would be heavily obscured by intervening trees. Once the leaves are on the trees, no substantial views of the temporary tower are anticipated.

The minimal visibility associated with the proposed temporary Facility is the result of the tower's relatively low height of 85 feet and the dense tree cover in the area, with several trees reaching heights of 60 to 70 feet.

Attachments

ATTACHMENTS





Viewshed Map – Topo Base

Proposed Temporary Ballast Tower
Ancient Highway, East Lyme, CT

This Visibility Analysis map relies solely on computer modeling and interpretation of aerial photographs and topographic maps. The information presented herein has not been field verified.

NOTES

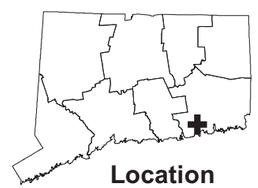
- Viewshed analysis conducted using Clark University's TerrSet.
- Areas of potential visibility are calculated based on facility location and height, Study Area topography, and Study Area vegetation.
- Proposed facility height is 85 feet AGL.
- Forest canopy height is variable, based on the lidar DEM.
- Study area encompasses a two-mile radius and includes 8,042 acres of land.

DATA SOURCES

- Digital elevation model (DEM) derived from 0.64-meter USGS lidar data obtained from NOAA.
- Forest areas are generated with TerrSet (Clark University) image processing from the lidar data and 2012 NRCS/NAIP digital orthophotos with 1-meter pixel resolution.
- Municipal Open Space, State Recreation Areas, Trails, County Recreation Areas, and Town Boundary data obtained from CT DEEP and the towns.

Legend

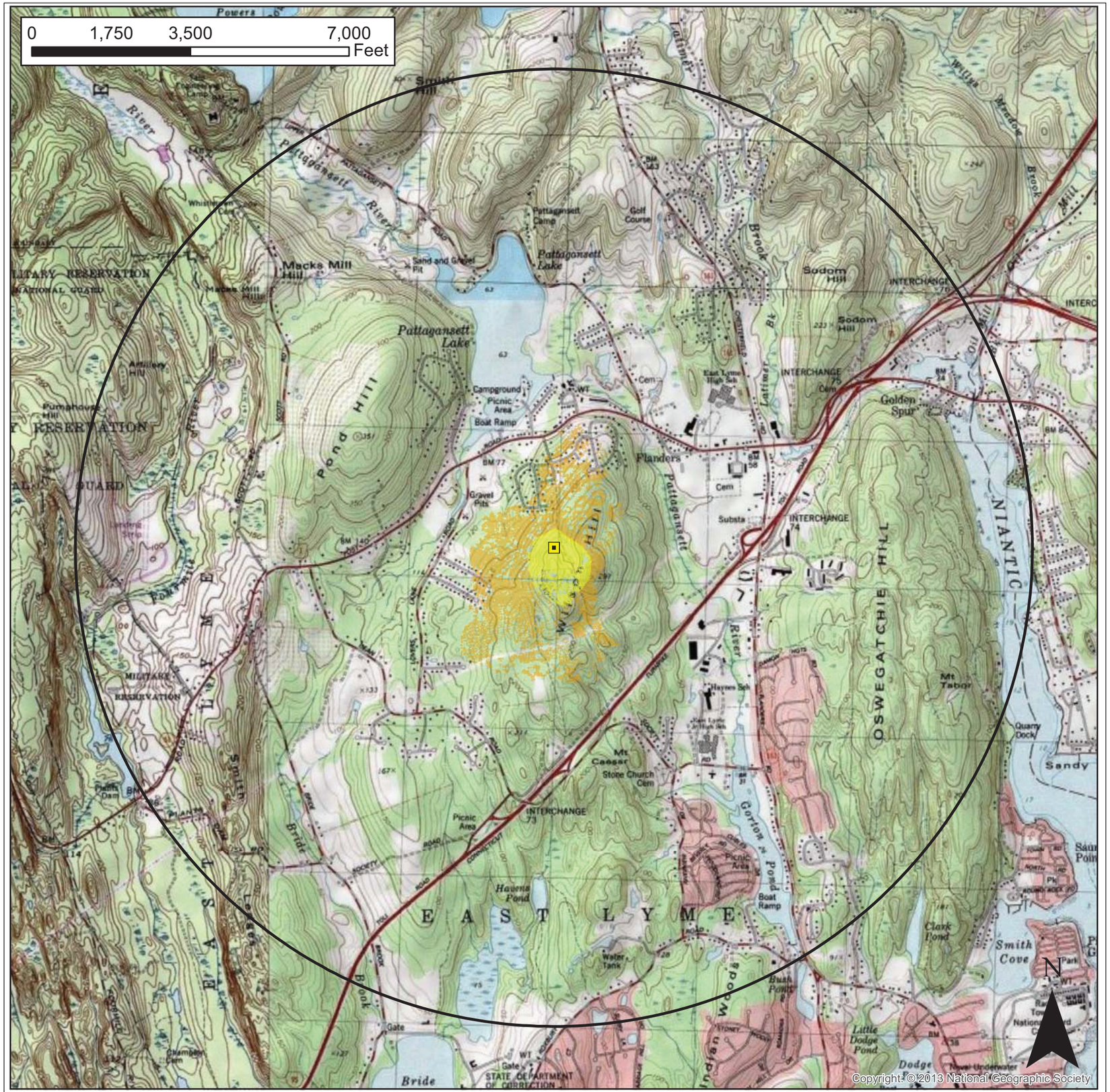
- Proposed Tower
- Predicted Seasonal Visibility (37 Acres)
- Predicted Year-Round Visibility (178 Acres)
- Towns
- 2-Mile Study Area

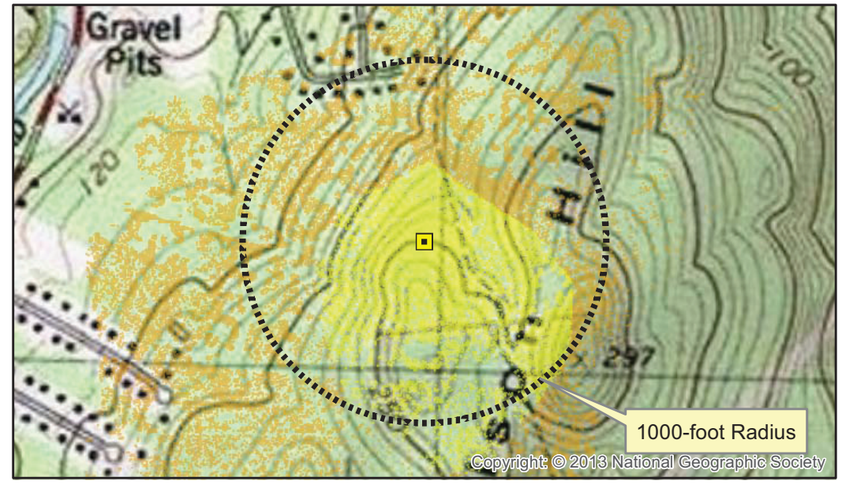


Location

at&t

ALL-POINTS TECHNOLOGY CORPORATION





Viewshed Map – Topo Base

Proposed Temporary Ballast Tower
Ancient Highway, East Lyme, CT

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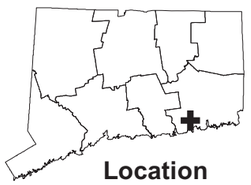
Legend

- Proposed Tower
- Predicted Seasonal Visibility (37 Acres)
- Predicted Year-Round Visibility (178 Acres)
- Towns
- 2-Mile Study Area



Location

at&t

ALL-POINTS TECHNOLOGY CORPORATION

PHOTO LOG

Legend

Site Photo Location Approximate Parcel Boundary (CTDEEP)

N W E S

400 200 0 400 Feet

1 inch = 400 feet

ALL-POINTS TECHNOLOGY CORPORATION

at&t

Photo 1: View from Site, looking south.

Photo 2: View from Site, looking north.

Photo 3: View from Site, looking west.

Photo 4: View from Site, looking east.

Photo Location 1: Looking north.

Photo Location 1: Looking southeast.

Photo Location 1: Looking west.

Photo Location 1: Looking east.

Photo Location 2: Looking north.

Photo Location 2: Looking northwest.

Photo Location 3: Looking northwest.

Photo Location 4: Looking east.

EXHIBIT E

Daniel L. Goulet
C Squared Systems, LLC
65 Dartmouth Drive
Auburn, NH 03032
603-644-2800
Dan.Goulet@csquaredsystems.com

C Squared Systems, LLC

April 09, 2015

Connecticut Siting Council

Subject: New Cingular Wireless PCS, LLC ("AT&T") – (CT1345T) – Ancient Highway, East Lyme, CT

Dear Connecticut Siting Council:

C Squared Systems has been retained by New Cingular Wireless PCS, LLC ("AT&T") to investigate RF Power Density levels for the AT&T and T-Mobile antenna arrays, to be installed on a portable temporary tower, to be located off of Ancient Highway, East Lyme, CT.

Calculations were done in accordance with FCC OET Bulletin 65. These worst-case calculations assume that all transmitters are simultaneously operating at full power and that there is 0 dB of cable loss. The calculation point is 6 feet above ground level to model the RF power density at the head of a person standing at the base of the tower.

Due to the directional nature of the proposed AT&T and T-Mobile antennas, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to the Attachment for the vertical patterns of the proposed AT&T and T-Mobile antennas. The calculated results below include a nominal 10 dB off-beam pattern loss to account for the lower relative gain directly below the antennas.

Location	Carrier	Vertical Distance to Antenna (Ft.)	Operating Frequency (MHz)	Number of Trans.	Effective Radiated Power (ERP) Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
Ground Level	AT&T LTE	82	710	2	1313	0.0164	0.4733	3.46%
	AT&T GSM	82	880	1	491	0.0031	0.5867	0.52%
	AT&T UMTS	82	880	2	1964	0.0245	0.5867	4.17%
	AT&T UMTS	82	1900	2	2711	0.0338	1.0000	3.38%
	T-Mobile UMTS	72	1900	2	2355	0.0389	1.0000	3.89%
	T-Mobile GSM	72	1900	4	1178	0.0389	1.0000	3.89%
	T-Mobile UMTS	72	2100	2	2524	0.0417	1.0000	4.17%
	T-Mobile LTE	72	2100	2	3786	0.0625	1.0000	6.25%
							Total	**29.73%**

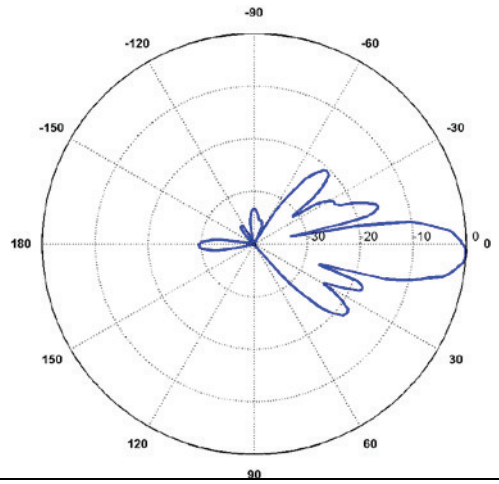
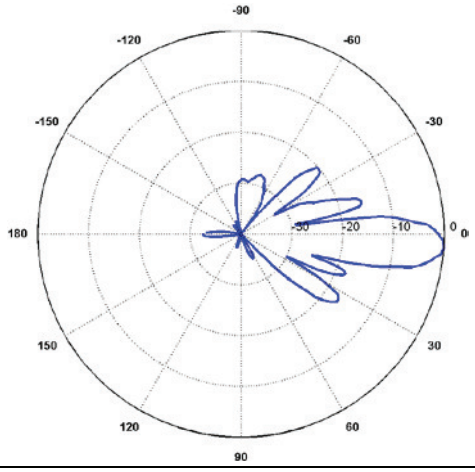
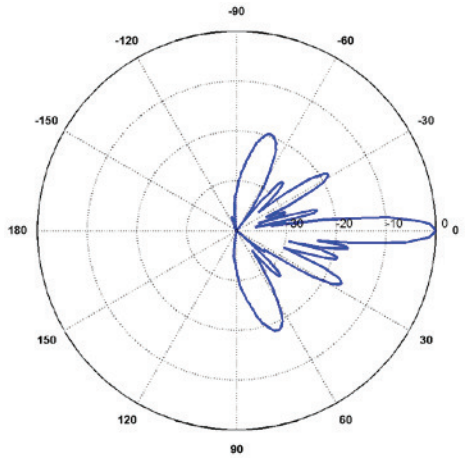
Summary: Under worst-case assumptions, RF Power Density levels for the proposed AT&T antenna arrays will not exceed **29.73%**[1] of the FCC MPE limit for General Public/Uncontrolled Environments.

Sincerely,

Daniel L. Goulet
C Squared Systems, LLC

[1] The total %MPE is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

Attachment: AT&T's Antenna Data Sheets and Electrical Patterns

750 MHz Manufacturer: KMW Products Model #: AM-X-CD-16-65-RET Frequency Band: 698-806 MHz Gain: 13.4 dBd Vertical Beamwidth: 12.3° Horizontal Beamwidth: 65° Polarization: Dual Pol ± 45° Size L x W x D: 72" x 11.8" x 5.9"	
850 MHz Manufacturer: KMW Products Model #: AM-X-CD-16-65-RET Frequency Band: 824-894 MHz Gain: 13.9 dBd Vertical Beamwidth: 11.5° Horizontal Beamwidth: 63° Polarization: Dual Pol ± 45° Size L x W x D: 72" x 11.8" x 5.9"	
1900 MHz Manufacturer: KMW Products Model #: AM-X-CD-16-65-RET Frequency Band: 824-894 MHz Gain: 15.3 dBd Vertical Beamwidth: 6.0° Horizontal Beamwidth: 67° Polarization: Dual Pol ± 45° Size L x W x D: 72" x 11.8" x 5.9"	

Attachment: T-Mobile's Antenna Data Sheets and Electrical Patterns

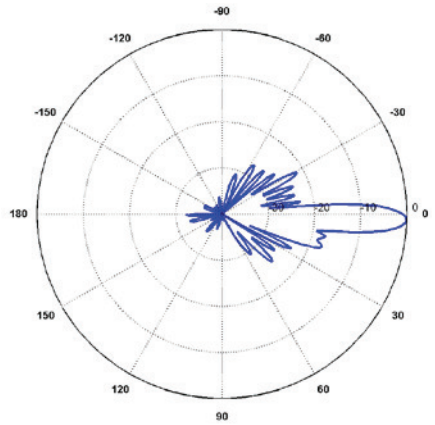
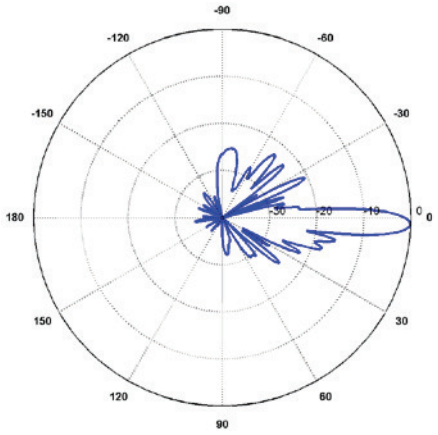
1900 MHz Manufacturer: RFS Products Model #: APX16DWV-16DWVS Frequency Band: 1850-1990 MHz Gain: 15.6 dBd Vertical Beamwidth: 7.7° Horizontal Beamwidth: 64° Polarization: Dual Pol ± 45° Size L x W x D: 55.9" x 13" x 3.15"	
2100 MHz Manufacturer: RFS Products Model #: APX16DWV-16DWVS Frequency Band: 1900-2200 MHz Gain: 15.9 dBd Vertical Beamwidth: 6.6° Horizontal Beamwidth: 65° Polarization: Dual Pol ± 45° Size L x W x D: 55.9" x 13" x 3.15"	

EXHIBIT F

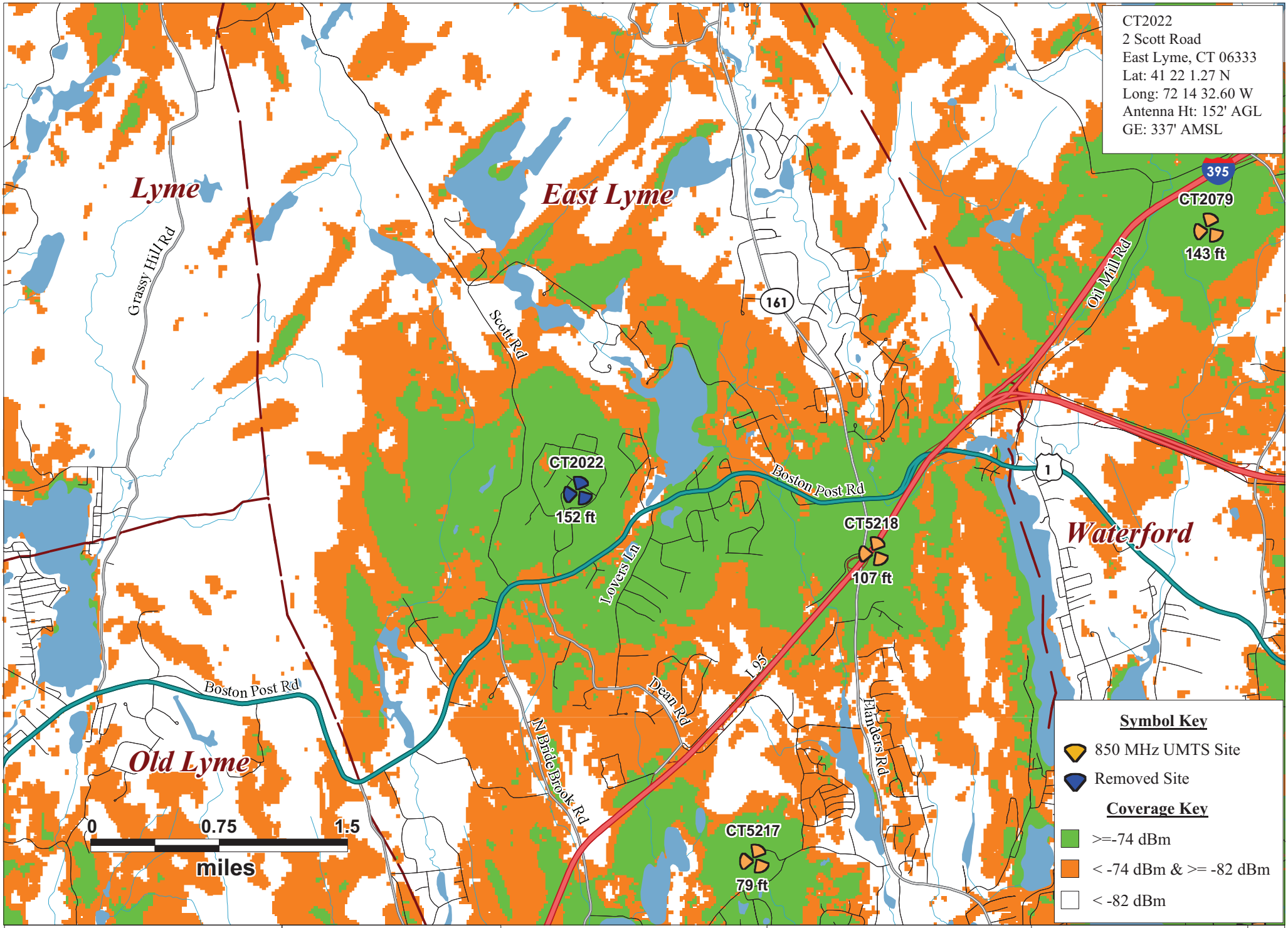
CT2022 Incremental

Incremental Coverage from CT2022 Site (850 MHz UMTS)		
Population Coverage:[1]	(≥ -74 dBm)	1,370
	(≥ -82 dBm)	2,389
Area Covered (mi²):	(≥ -74 dBm)	3.06
	(≥ -82 dBm)	6.25
Roadway Coverage (mi):	Main:	4.18
	Secondary:	16.10
	Total:	**20.28**

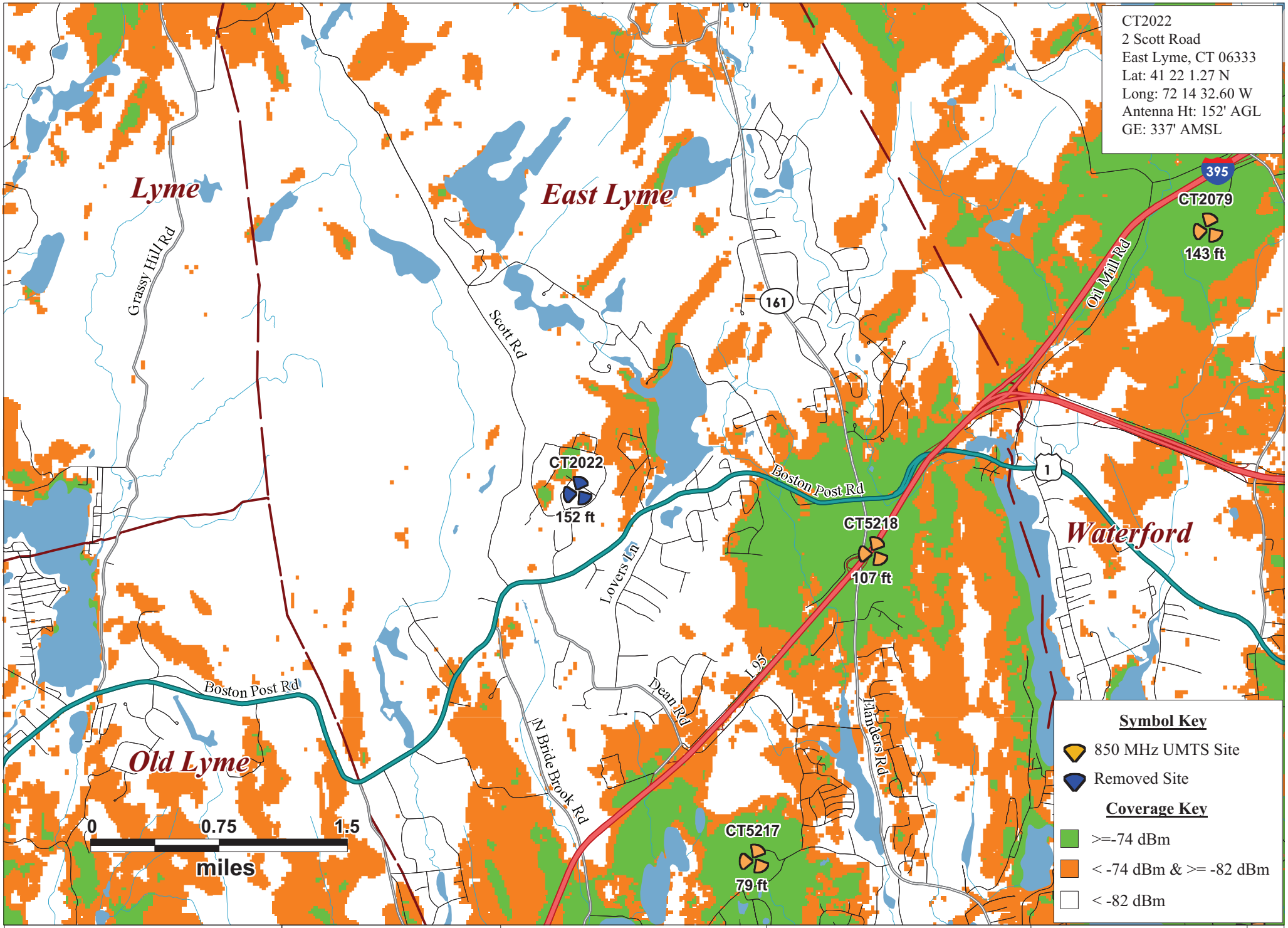
Temporary Tower Incremental

Incremental Coverage from CT1345T (Temporary) Site (850 MHz UMTS)		
Population Coverage:[2]	(≥ -74 dBm)	907
	(≥ -82 dBm)	1,660
Area Covered (mi²):	(≥ -74 dBm)	1.71
	(≥ -82 dBm)	3.54
Roadway Coverage (mi):	Main:	3.54
	Secondary:	10.05
	Total:	**13.59**

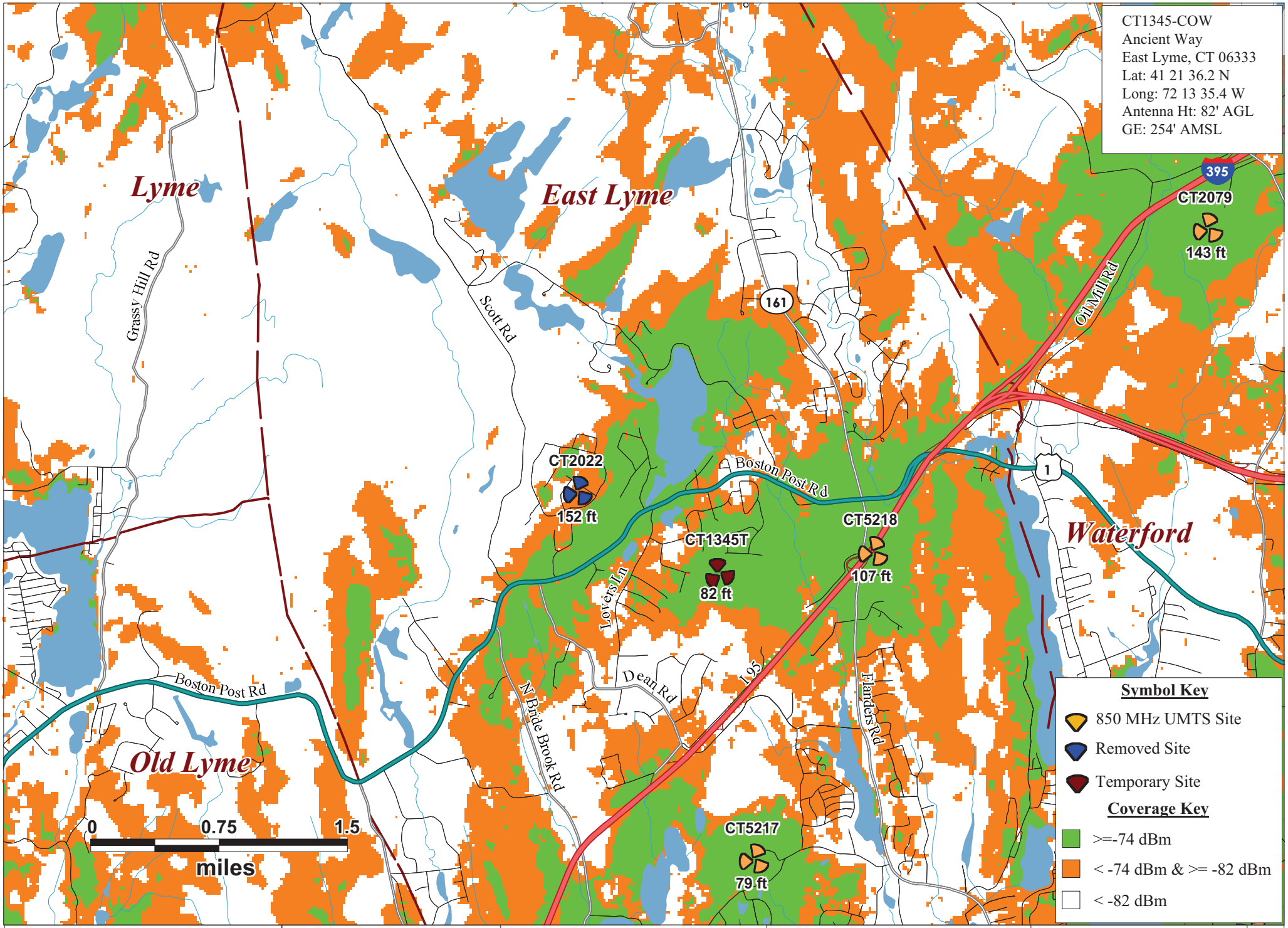
[1] Population figures are based upon 2010 US Census Block Data
[2] Population figures are based upon 2010 US Census Block Data



Existing 850 MHz UMTS Coverage	East Lyme, CT	2 Scott Road East Lyme, CT 06333	at&t	PREPARED ON DATE: 03/25/2015 REV 0



Existing without CT2022 Site 850 MHz UMTS Coverage	**East Lyme, CT**	**2 Scott Road East Lyme, CT 06333**	at&t	PREPARED ON DATE: 03/25/2015 REV 0



Existing with CT1345 - COW 850 MHz UMTS Coverage	**East Lyme, CT**	**Ancient Way East Lyme, CT 06333**	at&t	PREPARED ON DATE: 03/25/2015 REV 0

EXHIBIT G

April 2, 2015

VIA CERTIFIED MAIL

Re: New Cingular Wireless PCS, LLC ("AT&T")
Proposed Temporary Tower Facility
Ancient Highway, East Lyme Conneticut

Dear Sir or Madam:

We are writing to you on behalf of our client New Cingular Wireless PCS, LLC ("AT&T") with respect to the above referenced matter and our client's intent to file a petition with the State of Connecticut Siting Council for approval of a proposed temporary wireless communications tower facility (the "Facility") within the Town of East Lyme.

State law requires that record owners of property abutting a parcel on which a facility is proposed be sent notice of an applicant's intent to file a petition with the Siting Council. Because the property has no assigned postal address, we have enclosed a copy of the site plan for your assistance in identifying the location of the proposed temporary tower site location

Included with this letter please find a Notice of this petition with details of the proposed temporary tower Facility. Of note, the location, height and other features of the Facility are subject to review and potential change by the Connecticut Siting Council under the provisions of Connecticut General Statutes §16-50g et seq.

If you have any questions concerning this petition, please contact the Connecticut Siting Council or the undersigned after April 9, 2015, the date which the petition is expected to be on file.

Very truly yours,

Christopher B. Fisher
Enclosure

NOTICE

Notice is hereby given, pursuant to Section 16-50j-40(a) of the Regulations of Connecticut State Agencies of a Petition to be filed with the Connecticut Siting Council ("Siting Council") on or after April 9, 2015 by New Cingular Wireless PCS, LLC ("AT&T" or the "Petitioner"). AT&T will seek a declaratory ruling that a temporary tower proposed on property located off of Ancient Highway in the Town of East Lyme, Connecticut (the "Site") is either an exempt modification pursuant to Siting Council regulations and/or a tower that does not have significant adverse environmental effects which might otherwise require a certificate of environmental compatibility and public need ("Certificate").

A temporary tower is being proposed by AT&T to partially replace service that will be disrupted when an existing 150' tall tower located on Scott Road is decommissioned at the requirement of the underlying property owner. The proposed temporary tower will provide limited service for AT&T and T-Mobile until a permanent and relocated tower site can be approved, constructed and made operational. AT&T anticipates filing a technical report for a permanent site and application for a Certificate from the Siting Council in 2015.

AT&T's proposed temporary tower facility consists of an approximately 85' tall ballast tower, with three (3) AT&T antennas located at a centerline height of 82' AGL. Additionally, T-Mobile would locate three (3) antennas on the temporary tower at a centerline height of approximately 72' AGL. A 30' x 51' gravel equipment compound would be located at the base of the temporary tower, enclosed by a temporary 6' high chain link fence, and include an AT&T unmanned 12' by 20' equipment shelter and T-Mobile equipment cabinets. Access to the facility would be over a proposed gravel driveway from Ancient Highway. Utility connections would be run underground from CL&P utility pole #7479 at Ancient Highway. The temporary tower would be removed upon approval, construction and operation of a permanent tower site location and the site reseeded.

Because the property has no assigned postal address, we have enclosed a copy of the site plan for your assistance in identifying the location of the temporary tower site location. The Petition will provide details of the facility and explain why the Petitioner submits that the proposed temporary tower presents no significant adverse environmental effects. The location, height and other features of the facility are subject to review and potential change under provisions of the Connecticut General Statutes Sections 16-50g et. seq.

Copies of the Petition will be available for review during normal business hours on or after April 9, 2015 at the Connecticut Siting Council:

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Town of East Lyme
Town Clerk
PO Box 519
Niantic, CT 06357

or the offices of the undersigned. All inquiries should be addressed to the Connecticut Siting Council or to the undersigned.

Christopher B. Fisher, Esq.
Cuddy & Feder LLP
445 Hamilton Ave, 14th Floor
White Plains, New York 10601
(914) 761-1300
Attorneys for the Petitioner

CERTIFICATION OF SERVICE

I hereby certify that on the 2d of April 2015, a copy of the foregoing letter and notice were mailed by certified mail, return receipt requested to each of the abutting properties owners on the accompanying list.

4/7/15
Date

Christopher B. Fisher
Cuddy & Feder LLP
445 Hamilton Avenue, 14th Floor
White Plains, New York 10601

Attorneys for:
New Cingular Wireless PCS, LLC ("AT&T")

ADJACENT PROPERTY OWNERS
Ancient Highway

Christopher J. & Christine M. Charland 8 Seedbeck Rd East Lyme, CT 06333	John A. & Linda T. Rhodes 6 Seebeck Rd East Lyme, CT 06333`
Vivian L. Weinberger 25 Mackinnon Pl East Lyme, CT 06333	Dane & Colleen Proctor 4 Seebeck Rd East Lyme, CT 06333
James W. Patria M. Fleming 10 Seebeck Rd East Lyme, CT 06333	Weng Mei Hui Li Yan 27 Mackinnon Pl East Lyme, CT 06333
Gateway Development East Lyme LLC 342 North Main St. Ste 200 West Hartford, CT 06117	Helen M. Drabik 18 Drabik Rd East Lyme, CT 06333
Carol A. Marelli 74 Ancient Highway East Lyme, CT 06333	

CERTIFICATION OF SERVICE

I hereby certify that on the 2d day of April 2015, copies of the attached notice of filing of a Petition with the Connecticut Siting Council for a declaratory ruling were sent by certified mail, return receipt requested, to the following:

Dated 4/7/15

Cuddy & Feder LLP
445 Hamilton Avenue, 14th Floor
White Plains, New York 10601
Attorneys for:
New Cingular Wireless PCS LLC ("AT&T")

State and Regional

The Honorable George Jepsen
Attorney General
Office of the Attorney General
55 Elm Street
Hartford, CT 06106

Connecticut Department of Emergency Services & Public Protection
Division of Emergency Management and Homeland Security
Dora B. Schiro, Commissioner
25 Sigourney Street, 6th Floor
Hartford, CT 06106-5042

Department of Energy & Environmental Protection
Rob Klee, Commissioner
79 Elm Street
Hartford, CT 06106

Department of Economic & Community Development
Catherine Smith, Commissioner
505 Hudson Street
Hartford, CT 06106

Department of Public Health
Dr. Jewel Mullen, Commissioner
410 Capitol Avenue
P.O. Box 340308
Hartford, CT 06134

Department of Transportation
James P. Redeker, Commissioner
2800 Berlin Turnpike
Newington, CT 06111

Council on Environmental Quality
Susan D. Merrow, Chair
79 Elm Street
Hartford, CT 06106

Department of Agriculture
Steven Reviczky, Commissioner
165 Capitol Avenue
Hartford, CT 06106

Department of Energy & Environmental Protection
Public Utilities Regulatory Authority
Chairman Arthur House
Ten Franklin Square
New Britain, CT 06051

State House Representative 37th District
Ed Jutila
Connecticut House Democrats
L.O.B. Room 4046
Hartford, CT 06106

Office of Policy and Management
Benjamin Barnes, Secretary
450 Capitol Avenue
Hartford, CT 06106-1379

State Senator District S20
Paul M. Formica
Legislative Office Building
Room 3400
Hartford, CT 06106

Department of Economic and Community Development-Offices of Culture and Tourism
Daniel Forrest, State Historic Preservation Officer
One Constitution Plaza, 2nd Floor
Hartford, CT 06103

James S. Butler, Executive Director
Southeastern Connecticut Council of Governments
5 Connecticut Avenue
Norwich, CT 06360

Federal

Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591

Federal Communications Commission
445 12th Street SW
Washington, D.C. 20554

Congressman Joe Courtney
2nd Congressional District
55 Main Street, Suite 250
Norwich, CT 06360

United States Senator Richard Blumenthal
90 State House Square, 10th Floor
Hartford, CT 06103

United States Senator Christopher S. Murphy
One Constitution Plaza, 7th Fl.
Hartford, Connecticut 06103

Town of East Lyme

First Selectman Mark C. Nickerson
Town of East Lyme
P.O. Box 519
108 Pennsylvania Avenue
Niantic, CT 06357

Lesley Blais, Town Clerk
Town of East Lyme
P.O. Box 519
108 Pennsylvania Avenue
Niantic, CT 06357

Inland Wetlands Commission
Cheryl Lozanov, Chairwoman
Town of East Lyme
P.O. Box 519
108 Pennsylvania Avenue
Niantic, CT 06357

Planning Commission
Brian Schuch, Chairman
Town of East Lyme
P.O. Box 519
108 Pennsylvania Avenue
Niantic, CT 06357

Conservation of Natural Resources Commission
Arthur Carlson, Chairman
Town of East Lyme
P.O. Box 519
108 Pennsylvania Avenue
Niantic, CT 06357

Zoning Commission
Mathew Walker, Chairman
Town of East Lyme
P.O. Box 519
108 Pennsylvania Avenue
Niantic, CT 06357