EMPIRE telecom

January 29, 2015

Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Street
New Britain, CT 06051

| | |
|---|---|
| Regarding: | Notice of Exempt Modification – Addition of 3 radio heads previously approved |
| Property Address: | 23 Wayne Road, Wallingford, CT (the "Property") |
| Applicant: | AT&T Mobility ("AT&T") |

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 80 foot lattice tower ("tower") location on the Property. AT&T's facility consists of nine (9) wireless telecommunications antenna at 78 feet. The tower is controlled by Stephen B. Tripp. The Council approved the previous application on May 7th 2012 reference number EM-AT&T-148-120418. This application (attached) granted AT&T the use of 6 radio heads at this location. The approval expired one year from the issue date. During that time AT&T made the changes to the site per the approval but only installed three (3) of the six (6) radio heads that they received approval. AT&T would now like to install the additional three (3) radio heads that were originally approved under EM-AT&T-148-120418.

Please accept this application as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72 (b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Mayor, and the Town Planner for the Town of Wallingford. A copy of this letter is also being sent to Stephen B. Tripp, the owner of the structure on which AT&T is located.

The planned modifications to AT&T's facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T's additional, previously approved 3 radio heads will be installed at 78 foot level of the 80 foot tower.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety

16 Esquire Road, Billerica, MA 01862 Mobile 617-639-4908 Email: Dcooper@empiretelecomm.com

EMPIRE telecom

standard. An RF emissions calculation (attached) for AT&T's modified facility was provided in the application which led to the May 7th 2012 Decision.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed Centek Engineering dated April 12, 2012).

For the foregoing reasons AT&T respectfully requests that the proposed addition of 3 radio heads previously approved be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

David P. Cooper
Director of Site Acquisition
Empire Telecom

CC: William W. Dickinson, Jr., the Mayor, Town of Wallingford
Kacie Costello, Town Planner, Town of Wallingford
Stephen B. Tripp, Property Owner

16 Esquire Road, Billerica, MA 01862 Mobile 617-639-4908 Email: Dcooper@empiretelecomm.com

STATE OF CONNECTICUT
*CONNECTICUT SITING COUNCIL*
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

CT2168

May 7, 2012

Eric Dahl, Consultant
AT&T Mobility
55 Lynn Road
Ivoryton, CT 06442

RE: **EM-AT&T-148-120418** – AT&T Mobility notice of intent to modify an existing telecommunications facility located at 23 Wayne Road, Wallingford, Connecticut.

Dear Mr. Dahl:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated April 16, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies

EM-AT&T-148-120418

April 16, 2012

VIA OVERNIGHT DELIVERY

Ms. Linda Roberts, Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051



RE: AT&T Mobility – Notice of Exempt Modification
23 Wayne Road, Wallingford, CT

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of AT&T Mobility ("AT&T"). AT&T is enhancing the capabilities of its wireless system in Connecticut by implementing LTE technology. In order to do so, AT&T will modify antenna and equipment configurations at a number of existing sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the Mayor of Wallingford.

AT&T plans to modify the existing facility at 23 Wayne Road, Wallingford owned by Stephen Tripp (coordinates 41°27'45"N, -72°50'33"W). Attached are drawings depicting the planned changes, and documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration. Also included are a power density calculation reflecting the modification to AT&T's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will be unaffected. Both AT&T's existing and proposed antennas will be located at an approximate center line of 78' AGL on the approximately 80' tower. The existing antennas and TMAs will remain and AT&T will add three (3) new antennas and six (6) new RRU's. The existing and proposed equipment will be mounted on three (3) proposed t-frames.

Additionally, AT&T will install one (1) surge arrestor to the tower leg at 76' AGL, and one (1) fiber cable and two (2) DC control cables.

2. The proposed changes will not extend the site boundaries. AT&T will install one additional cabinet in the existing equipment room. Thus, there will be no effect on the site compound.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated in the attached power density calculations, AT&T's operations at the site will result in a power density of 5.02%; the combined site operations will result in a total power density of 39.54%.

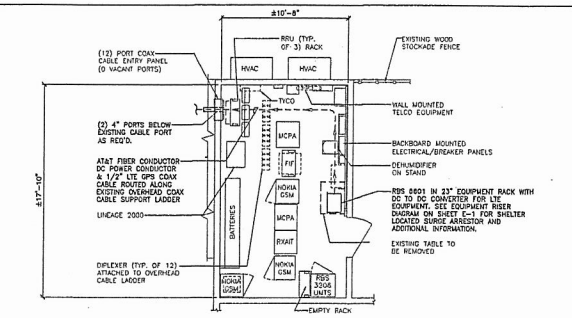
Please feel free to call me with any questions or concerns regarding this matter. Thank you for your consideration.

Respectfully submitted,
AT&T Mobility

By: _____
Eric Dahl, Consultant
edahl@comcast.net
860-227-1975

cc: Honorable William W. Dickinson, Jr., Mayor, Town of Wallingford
Mr. Stephen Tripp, Property Owner

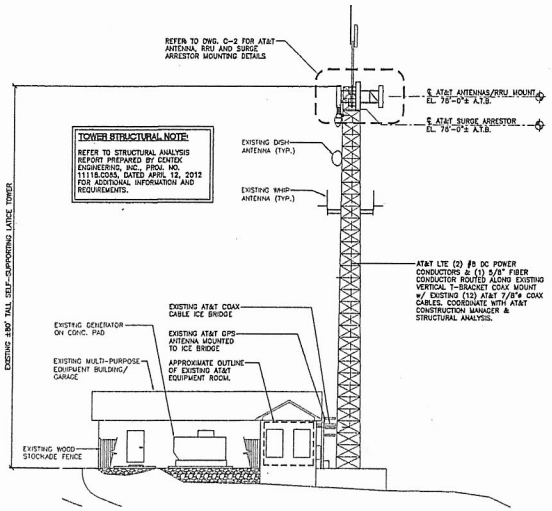
Attachments




3 C-1 EQUIPMENT ROOM FLOOR PLAN
SCALE: 1/4" = 1'-0"

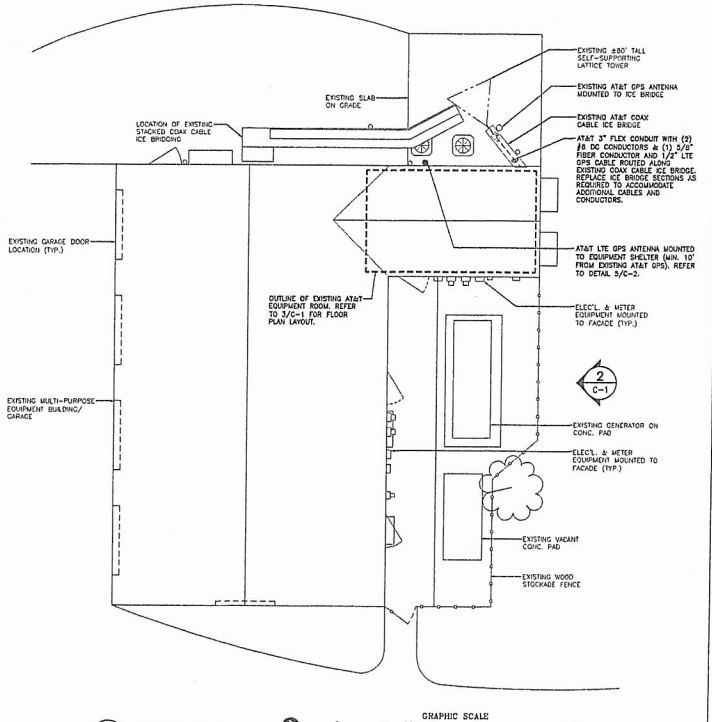
APPROX. NORTH

GRAPHIC SCALE
4 0 2 4 8 16
( IN FEET )
1 inch = 4 ft.




2 C-1 NORTH ELEVATION
SCALE: 1" = 10'-0"

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




1 C-1 COMPOUND PLAN
SCALE: 1" = 5'-0"

APPROX. NORTH

GRAPHIC SCALE
5 0 2.5 5 10 20
( IN FEET )
1 inch = 5 ft.

| | |
|---|---|
| DESIGNED BY: | DEB |
| DRAWN BY: | FLO |
| CHK'D BY: | CFC |

| NO. | DATE | BY | DESCRIPTION |
|---|---|---|---|
| 0 | 3/2/12 | DEB | CONSTRUCTION - CLIENT REVIEW |

PROFESSIONAL ENGINEER SEAL

REVIEW SET
NOT FOR CONSTRUCTION

at&t

NEXLINK

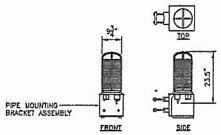
CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY EXPANSION
CT2168
MT. TOM WALLINGFORD
22 WATSON RD
WALLINGFORD, CT 06492

DATE: 03/02/12
SCALE: AS NOTED
JOB NO. 11118.C025

PLANS AND ELEVATIONS

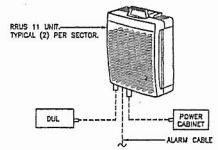
C-1
Sheet No. 2 of 6




| SURGE ARRESTOR | | | | |
|---|---|---|---|---|
| SITE TYPE | ARRESTOR MAKE/MODEL | QTY REQUIRED | ARRESTOR LOCATION | WEIGHT |
| TOWER | MAKE: RAYCAP (SQUID)<br>MODEL: DC6-48-60-18-8F | (1) PER SITE | TOWER, ADJACENT TO AT&T ANTENNAS AND RRUs. | 20 LBS. (WITHOUT MOUNT) |

NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

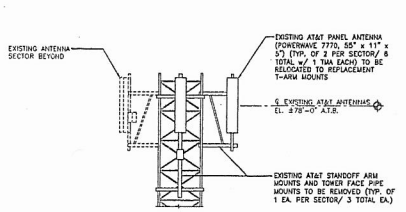
6 / C-2 SURGE ARRESTOR DETAIL
NOT TO SCALE



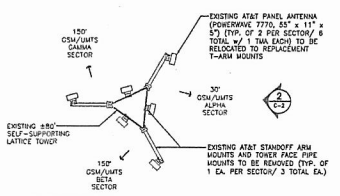

| RRU (REMOTE RADIO UNIT) | | | |
|---|---|---|---|
| EQUIPMENT | DIMENSIONS | WEIGHT | CLEARANCES |
| MAKE: ERICSSON<br>MODEL: RRUS 11 | 17.8"L x 17.3"W x 7.3"D | BAND 4: 44 LBS.<br>BAND 12: 50 LBS. | ABOVE: 18" MIN.<br>BELOW: 12" MIN.<br>SIDE: 0" MIN. |

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

7 / C-2 RRU DETAIL
NOT TO SCALE

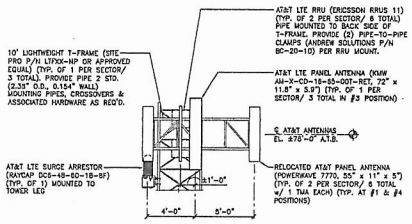



2 / C-2 EXISTING ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"

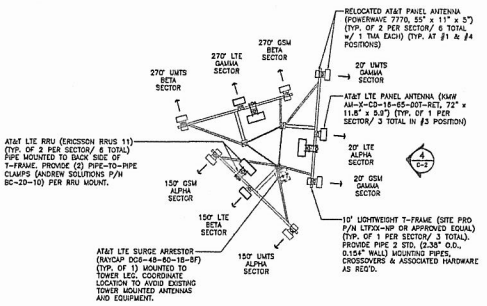



NOTE:
RELOCATE EXISTING MISCELLANEOUS ANTENNAS MOUNTED TO AT&T'S EXISTING ANTENNA MOUNTS AS REQUIRED TO INSTALL REPLACEMENT T-ARMS. COORDINATE RELOCATION WITH OWNER.

1 / C-2 EXISTING ANTENNA PLAN
SCALE: 1/4" = 1'-0"
APPROX. NORTH

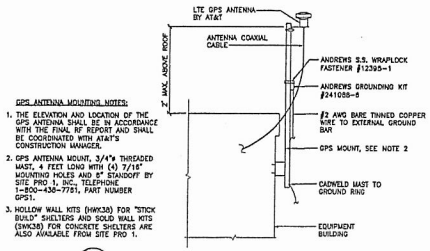



4 / C-2 PROPOSED ANTENNA SECTOR ELEVATION
SCALE: 1/4" = 1'-0"




3 / C-2 PROPOSED ANTENNA PLAN
SCALE: 1/4" = 1'-0"
APPROX. NORTH

REFER TO FINAL AT&T RF ENGINEER'S RF RADIO PLAN PRIOR TO INSTALLATION OF ANTENNAS AND COAX




GPS ANTENNA MOUNTING NOTES:
1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT AND SHALL BE COORDINATED WITH AT&T'S CONSTRUCTION MANAGER.
2. GPS ANTENNA MOUNT, 3/4"ø THREADED MAST, 4 FEET LONG WITH (4) 7/16" MOUNTING HOLES AND 6" STANDOFF BY SITE PRO 1, INC., TELEPHONE 1-800-438-7781, PART NUMBER GPS1.
3. HOLLOW WALL KITS (HWK38) FOR "STICK BUILT" SHELTERS AND SOLID WALL KITS (SWK38) FOR CONCRETE SHELTERS ARE ALSO AVAILABLE FROM SITE PRO 1.

5 / C-2 GPS ANTENNA MOUNTING DETAIL
NOT TO SCALE

| | |
|---|---|
| DESIGNED BY: | CTC |
| DRAWN BY: | FLO |
| CHK'D BY: | CTC |

| REV. | DATE | ISSUED FOR |
|---|---|---|
| 6 | 4/17/12 | CONSTRUCTION - CLIENT REVIEW |

PROFESSIONAL ENGINEER SEAL

REVIEW SET
NOT FOR CONSTRUCTION

at&t

NEXLINK

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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY TO BE UPGRADED
CT2168
MT. TOM WALLINGFORD
21 WAYNE RD
WALLINGFORD, CT 06492

| | |
|---|---|
| DATE: | 03/02/12 |
| SCALE: | AS NOTED |
| JOB NO. | 11118.C025 |

LTE EQUIPMENT DETAILS

C-2

Sheet No. 4 of 4

STATE OF CONNECTICUT
*CONNECTICUT SITING COUNCIL*
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

April 19, 2012

The Honorable William W. Dickinson, Jr.
Mayor
Town of Wallingford
Municipal Building
45 South Main Street
Wallingford, CT 06492

RE: **EM-AT&T-148-120418** – AT&T Mobility notice of intent to modify an existing telecommunications facility located at 23 Wayne Road, Wallingford, Connecticut.

Dear Mayor Dickinson:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by May 3, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts

Linda Roberts
Executive Director

LR/cm

Enclosure: Notice of Intent

c: Kacie Costello, Assistant Town Planner, Town of Wallingford

CENTEK engineering

Centered on Solutions℠

# Structural Analysis Report

80' Existing Lattice Tower

Proposed AT&T Mobility
Antenna Upgrade

AT&T Mobility Site Ref: CT2168

23 Wayne Road
Wallingford, CT

Centek Project No. 11118.CO25

Date: April 12, 2012


**Prepared for:**

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

# Table of Contents

## Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna installation/modification proposed by AT&T Mobility on the existing lattice tower located in Wallingford Connecticut.

The host tower is a 80-ft, three legged, lattice tower originally designed and manufactured by PiROD Inc,. ENG. File No. A-111743 dated September 18, 1995. The tower geometry, structure member sizes and foundation information were obtained/ derived from a previous structural report prepared by URS Corp. project no. 36924399 dated May 24, 2010. Antenna and appurtenance inventory were taken from the aforementioned structural report prepared by URS, visual verification from grade by Centek personnel on April 4, 2012 and a RF data sheet.

The tower consists of four (4) vertical sections consisting of solid round pipe legs conforming to ASTM A572 Gr. 50 and solid round lateral and horizontal bracing conforming to ASTM A572 Gr. 50. The vertical tower sections are connected by bolted sleeve connections with the diagonal and horizontal bracing to pipe legs consisting of welded connections. The width of the tower face is 3-ft 6-in at the top and 5-ft 0-in at the bottom.

AT&T proposes the installation of three (3) panel antennas and six (6) RRU's mounted to three (3) proposed T-Frames and one (1) leg mounted Surge Arrestor. 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 tower supports several communication antennas and appurtenances. The existing and proposed loads considered in the analysis consist of the following:

- Unknown (Existing):
  Antenna: One (1) 7-ft Omni-directional whip antenna mounted on a 4"x10-ft pipe to the top of the tower.
  Coax Cable: See note 1.
- UNKNOWN (Existing):
  Antenna: Four (4) flash beacon lights pole mounted to the top of the tower.
- **Unknown (Existing to Relocate):**
  **Antenna: One (1) 3-ft x 6" panel antenna mounted on a 3-ft standoff to the top of the tower to be relocated to the proposed AT&T T-Frame.**
  **Coax Cable: See note 1.**
- **Unknown (Existing to Relocate):**
  **Antenna: One (1) 2-ft canister mounted on a 3-ft standoff to the top of the tower to be relocated to the proposed AT&T T-Frame.**
  **Coax Cable: See note 1.**
- Unknown (Existing):
  Antenna: One (1) 2-ft ∅ Microwave dish antenna with radome leg mounted with a RAD center elevation of ±73-ft above grade level.
  Coax Cable: See note 1.

- Unknown (Existing):
  Antenna: One (1) 4-ft ∅ Microwave dish antenna with radome mounted on a 5" ∅ pipe with a RAD center elevation of ±73-ft above grade level.
  Coax Cable: See note 1.
- Unknown (Existing):
  Antenna: One (1) 8-ft dipole antenna leg mounted with an elevation of ±68-ft above grade level.
  Coax Cable: See note 1.
- Unknown (Existing):
  Antenna: One (1) 7-ft Omni-directional whip, one (1) 8-ft Omni-directional whip, and one (1) 4-ft Omni-directional whip mounted on two (2) 6-ft bogner mounts with an elevation of ±65-ft above grade level.
  Coax Cable: See note 1.
- Unknown (Existing):
  Antenna: One (1) 2-ft ∅ Microwave dish antenna with radome leg mounted with a RAD center elevation of ±65-ft above grade level.
  Coax Cable: See note 1.
- Unknown (Existing):
  Antenna: One (1) 4-ft ∅ Microwave dish antenna with radome mounted on a 5" ∅ pipe with a RAD center elevation of ±65-ft above grade level.
  Coax Cable: See note 1.
- Unknown (Existing):
  Antenna: One (1) 10-ft yagi and one (1) 10-ft Omni-directional whip mounted on three (3) 3-ft side arms with an elevation of ±55-ft above grade level.
  Coax Cable: See note 1.
- AT&T (Existing to Remain):
  Coax Cable: Twelve (12) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report. See note 1
- **AT&T (Existing to Remove):**
  **Antenna: Three (3) 3-ft standoffs mounted to the top of the tower.**
- **AT&T (Existing to Relocate):**
  **Antenna: Three (3) Powerwave 7770 panel antennas and three (3) Powerwave TT19-08BP111 TMA's mounted on three (3) standoffs and three (3) Powerwave 7770 panel antennas and three (3) Powerwave TT19-08BP111 TMA's face mounted with a RAD center elevation of ±78-ft above grade level to be relocated to three (3) proposed 10-ft T-Frames.**

- **AT&T (PROPOSED):**
  **Antennas: One (1) Raycap DC6-48-60-18-8F surge arrestor leg mounted with an elevation of 76-ft above grade level.**
  **Coax Cables: One (1) fiber cable and two (2) dc control cables routed on a leg/face of the existing tower as specified in Section 3 of this report.**
- **AT&T (PROPOSED):**
  **Antennas: Three (3) KMW AM-X-CD-16-65-00T panel antennas and six (6) Ericsson RRUS-11 mounted on three (3) proposed Site Pro 10-ft T-Frames P/N LTF10-NP with a RAD center elevation of ±78-ft above grade level.**

  Note 1: All coax cables assumed to run to the top of the tower. Total coax cable inventory consists of thirty-one (31) 7/8" ∅ cables, and eight (8) 1-1/4" ∅ cables.

## 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 should be routed as specified in section 3 of this report.

## Analysis

The existing tower was analyzed using a comprehensive computer program entitled RISATower. 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 Haven; v = 85 mph (fastest mile) | *[Section 16 of TIA/EIA-222-F-96]* |
| | Wallingford; v = 105 mph (3 second gust) equivalent to v = 85 mph (fastest mile) | *[Appendix K of the 2005 CT Building Code Supplement]* |
| | *TIA/EIA and Appendix K wind speeds are equal.* | |
| Load Cases: | Load Case 1; 85 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; 74 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 74 mph wind speed velocity represents 75% of the wind pressure generated by the 85 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 RISATower. 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 2, per RISATower "Section Capacity Table", this tower was found to be at **97.2%** of its total capacity.

| Tower Section | Elevation | Stress Ratio (percentage of capacity) | Result |
|---|---|---|---|
| Leg (T3) | 20'-0"-40'-0" | 97.2% | **PASS** |

## Foundation and Anchors

The existing foundation consists of a 14-ft square x 8-ft 3-in thick reinforced concrete mat. The sub grade conditions used in the foundation analysis were derived from the aforementioned structural report prepared by URS Corp. project no. 36924399 dated May 24, 2010. The base of the tower is connected to the foundation by means of (2) 1.75"∅, ASTM A687 anchor bolts per leg embedded into the concrete foundation structure.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower reactions developed from the governing Load Case 2 were used in the verification of the foundation:

| Location | Vector | Proposed Base Reactions |
|---|---|---|
| Base | Shear | **10 kips** |
| | Compression | **17 kips** |
| | Moment | **567 kip-ft** |
| Leg | Shear | **22 kips** |
| | Uplift | **125 kips** |
| | Compression | **136 kips** |

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

| Tower Component | Design Limit | Stress Ratio (percentage of capacity) | Result |
|---|---|---|---|
| Anchor Bolts | Tension | 38.3% | PASS |

- The foundation 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 |
|---|---|---|---|---|
| Reinforced concrete mat | OM | 2.0 | 2.75 | PASS |

*Note 1: FS denotes Factor of Safety*

## Conclusion

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

The analysis is based, in part, on the information provided to this office by AT&T Mobility. 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:

Carlo F. Centore, PE
Principal ~ Structural Engineer

Prepared by:

Timothy J. Lynn, EIT
Structural Engineer

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# Calculated Radio Frequency Emissions

CT2168

23 Wayne Road, Wallingford, CT

April 13, 2012

# Table of Contents



# List of Tables



# List of Figures

## 1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the lattice tower located off 23 Wayne Road in Wallingford, CT. The coordinates of the tower are 41-27-45.87 N, 72-50-30.8 W

AT&T is proposing the following modifications:

1) Install three 700 MHz LTE antennas (one per sector) with two at 80' AGL and one at 97' AGL due to microwave dish on tower.
2) Relocate one sector of existing antennas to 97' AGL due to microwave dish on tower

## 2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter ($mW/cm^2$). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

## 3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left( \frac{1.6^2 \times EIRP}{4\pi \times R^2} \right) \text{x Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

## 4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, 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 Attachment C for the vertical pattern of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

| Carrier | Antenna Height (Feet) | Operating Frequency (MHz) | Number of Trans. | ERP Per Transmitter (Watts) | Power Density ($mw/cm^2$) | Limit | %MPE |
|---|---|---|---|---|---|---|---|
| *AT&T GSM* | *80* | *880* | *4* | *296* | *0.0665* | *0.5867* | *11.34%* |
| *AT&T GSM* | *80* | *1900* | *2* | *427* | *0.0480* | *1.0000* | *4.80%* |
| *AT&T UMTS* | *80* | *1900* | *2* | *500* | *0.0562* | *1.0000* | *5.62%* |
| *AT&T UMTS* | 80 | 880 | 1 | 500 | 0.0281 | 0.5867 | 4.79% |
| PageNet | 55 | 940.0625 | 1 | 1200 | 0.1426 | 0.6267 | 22.76% |
| BAM/Verizon | 73 | N/A | N/A | N/A | N/A | N/A | 0.00% |
| Land Mobile Radio | 35 | 42 | 1 | 50 | 0.0147 | 0.2000 | 7.34% |
| Amateur Radio | 55 | 144 | 1 | 50 | 0.0059 | 0.2000 | 2.97% |
| Amateur Radio | 65 | 440 | 1 | 50 | 0.0043 | 0.2933 | 1.45% |
| AT&T UMTS | 80 | 880 | 2 | 565 | 0.0063 | 0.5867 | 1.08% |
| AT&T UMTS | 80 | 1900 | 2 | 875 | 0.0098 | 1.0000 | 0.98% |
| AT&T LTE | 80 | 734 | 1 | 1313 | 0.0074 | 0.4893 | 1.51% |
| AT&T GSM | 80 | 880 | 1 | 283 | 0.0016 | 0.5867 | 0.27% |
| AT&T GSM | 80 | 1900 | 4 | 525 | 0.0118 | 1.0000 | 1.18% |
| | | | | | | **Total** | **39.54%** |

**Table 1: Carrier Information[1,2]**

[1] The existing CSC filing for Cingular should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 3/29/2012.

[2] In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario.

## 5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels, as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **39.54% of the FCC limit**.

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

## 6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

Daniel L. Goulet
C Squared Systems, LLC

April 13, 2012
Date

## Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

## Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

**(A) Limits for Occupational/Controlled Exposure**[3]

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (E) (A/m) | Power Density (S) ($mW/cm^2$) | Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes) |
|---|---|---|---|---|
| 0.3-3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0-30 | 1842/f | 4.89/f | ($900/f^2$)* | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | - | - | f/300 | 6 |
| 1500-100,000 | - | - | 5 | 6 |

**(B) Limits for General Population/Uncontrolled Exposure**[4]

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (E) (A/m) | Power Density (S) ($mW/cm^2$) | Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes) |
|---|---|---|---|---|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | ($180/f^2$)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | - | - | f/1500 | 30 |
| 1500-100,000 | - | - | 1.0 | 30 |

f = frequency in MHz * Plane-wave equivalent power density

**Table 2: FCC Limits for Maximum Permissible Exposure (MPE)**

[3] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

[4] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

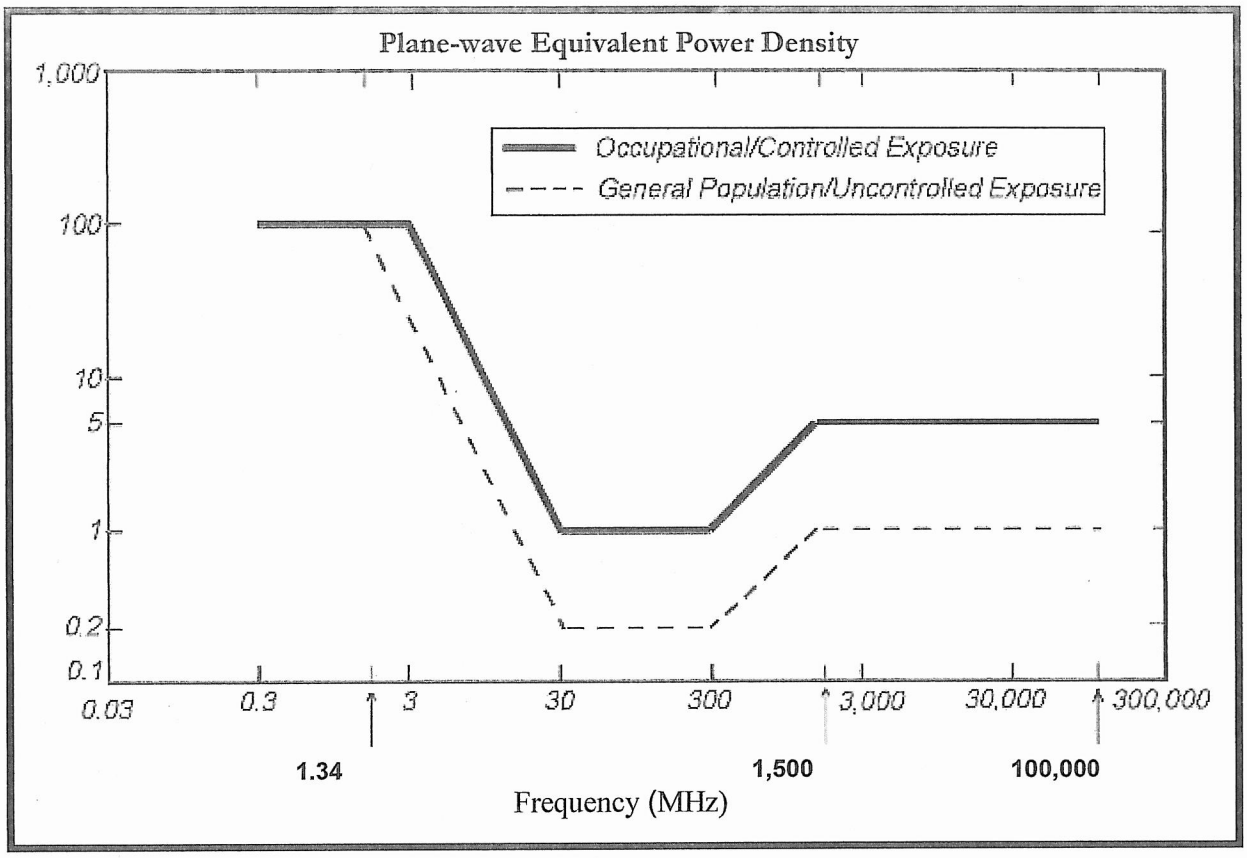
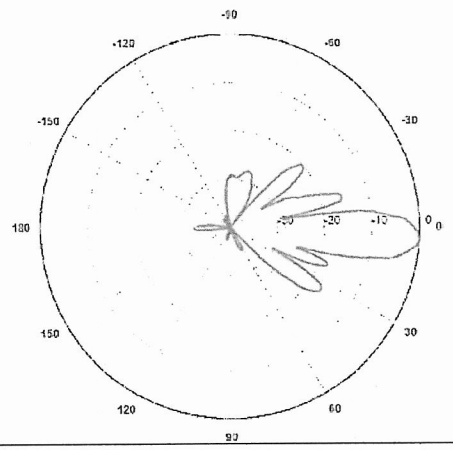



**Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)**

## Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

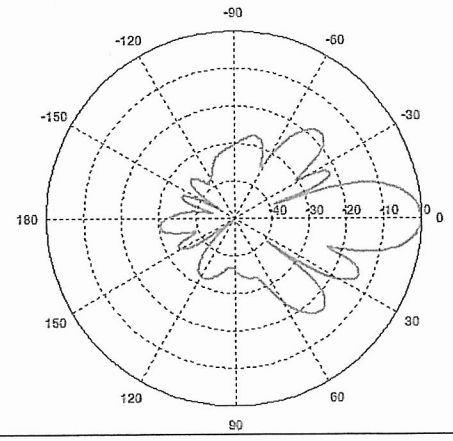
### 700 MHz

| | |
|---|---|
| Manufacturer: | KMW |
| Model #: | AM-X-CD-16-65-00T |
| Frequency Band: | 698-806 MHz |
| Gain: | 13.4 dBd |
| Vertical Beamwidth: | 12.3° |
| Horizontal Beamwidth: | 65° |
| Polarization: | Dual Linear ±45° |
| Size L x W x D: | 72" x 11.8" x 5.9" |



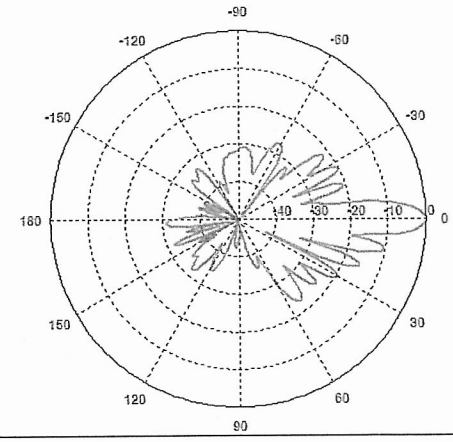

### 850 MHz

| | |
|---|---|
| Manufacturer: | Powerwave |
| Model #: | 7770.00 |
| Frequency Band: | 824-896 MHz |
| Gain: | 11.4 dBd |
| Vertical Beamwidth: | 15° |
| Horizontal Beamwidth: | 85° |
| Polarization: | Dual Linear ±45° |
| Size L x W x D: | 55.4" x 11.0" x 5.0" |




### 1900 MHz

| | |
|---|---|
| Manufacturer: | Powerwave |
| Model #: | 7770.00 |
| Frequency Band: | 1850-1990 MHz |
| Gain: | 13.4 dBd |
| Vertical Beamwidth: | 7° |
| Horizontal Beamwidth: | 90° |
| Polarization: | Dual Linear ±45° |
| Size L x W x D: | 55.4" x 11.0" x 5.0" |



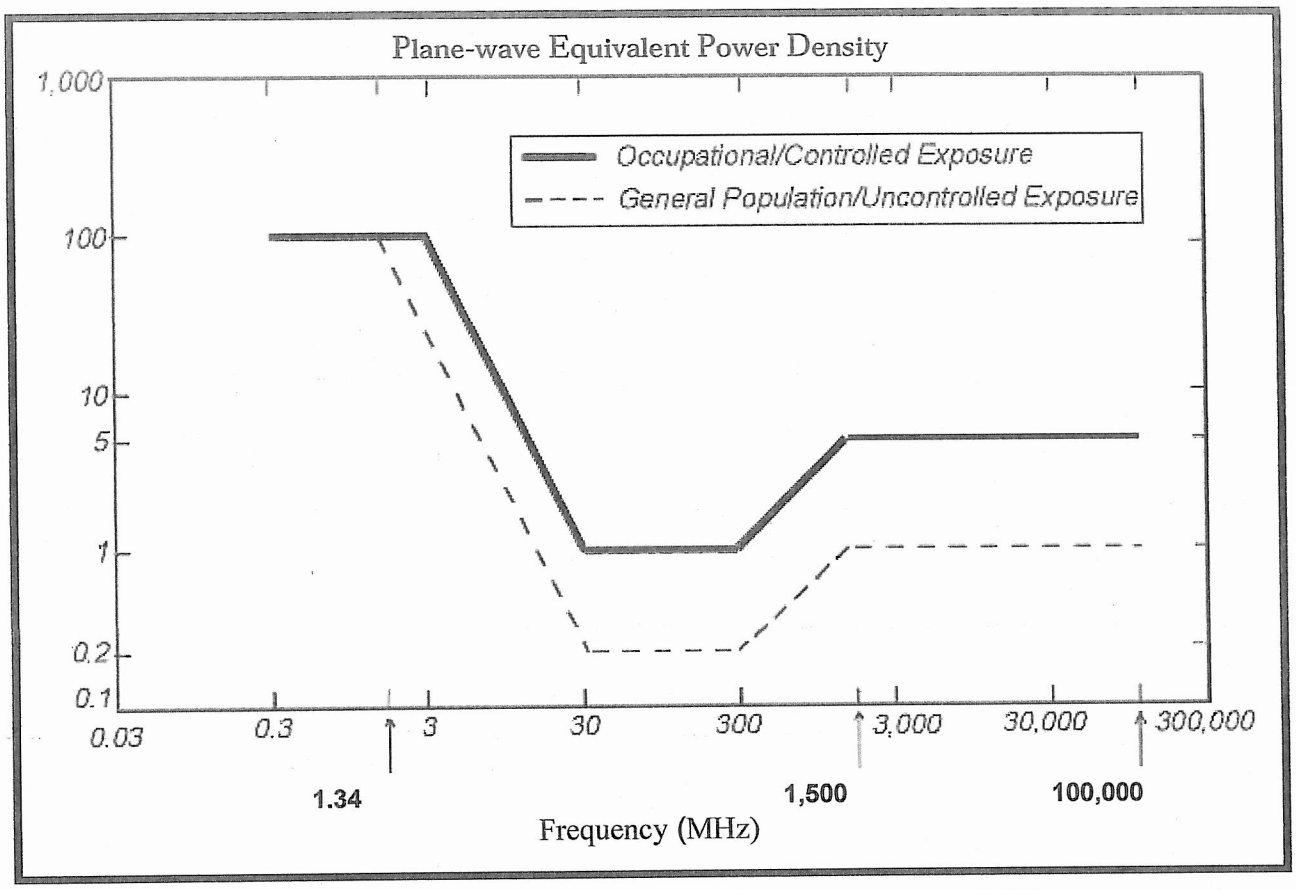
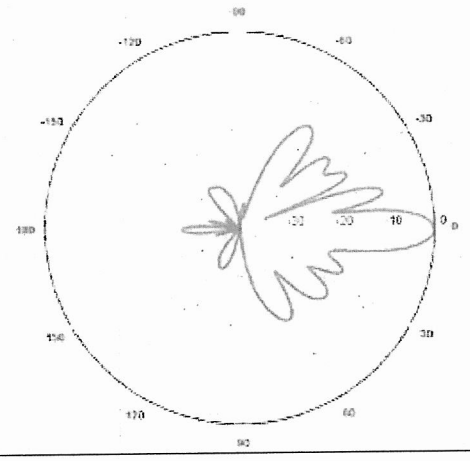



**Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)**

## Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

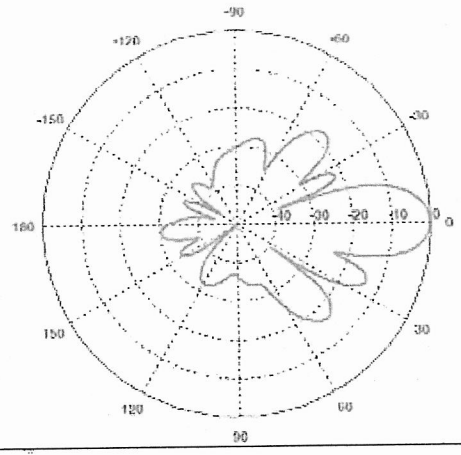
### 700 MHz

| | |
|---|---|
| Manufacturer: | Powerwave |
| Model #: | P65-17-XLH-RR |
| Frequency Band: | 698-806 MHz |
| Gain: | 14.3 dBd |
| Vertical Beamwidth: | 8.4° |
| Horizontal Beamwidth: | 70° |
| Polarization: | Dual Linear ± 45° |
| Size L x W x D: | 96.0" x 12.0" x 6.0" |



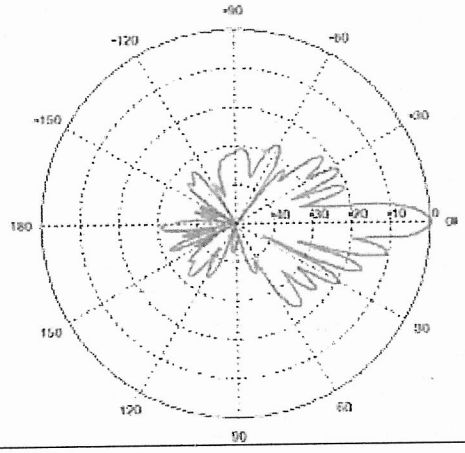
### 850 MHz

| | |
|---|---|
| Manufacturer: | Powerwave |
| Model #: | 7770 |
| Frequency Band: | 824-896 MHz |
| Gain: | 11.5 dBd |
| Vertical Beamwidth: | 15° |
| Horizontal Beamwidth: | 82° |
| Polarization: | Dual Linear ± 45° |
| Size L x W x D: | 55.0" x 11.0" x 5.0" |



### 1900 MHz

| | |
|---|---|
| Manufacturer: | Powerwave |
| Model #: | 7770 |
| Frequency Band: | 1850-1990 MHz |
| Gain: | 13.4 dBd |
| Vertical Beamwidth: | 7° |
| Horizontal Beamwidth: | 86° |
| Polarization: | Dual Linear ± 45° |
| Size L x W x D: | 55.0" x 11.0" x 5.0" |



Date: **August 15, 2012**

James Williams
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2509

**Subject:** **Structural Analysis Report**

| | | |
|---|---|---|
| ***Carrier Designation:*** | ***AT&T Mobility* Co-Locate** | |
| | **Carrier Site Number:** | CT2182 |
| | **Carrier Site Name:** | GROTON-CANDID TOWER |
| ***Crown Castle Designation:*** | **Crown Castle BU Number:** | 881533 |
| | **Crown Castle Site Name:** | GROTON TOWER |
| | **Crown Castle JDE Job Number:** | 199139 |
| | **Crown Castle Work Order Number:** | 519500 |
| | **Crown Castle Application Number:** | 157886 Rev. 1 |
| ***Engineering Firm Designation:*** | **Crown Castle Project Number:** | 519500 |
| ***Site Data:*** | **75 Roberts Road, Groton, New London County, CT**<br>**Latitude *41° 21' 36.8"*, Longitude *-72° 2' 55.1"***<br>**144.5 Foot - Monopole Tower** | |

Dear James Williams,

*Crown Castle* is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 519500, in accordance with application 157886, revision 1.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment ***Sufficient Capacity**

Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

***The structure has sufficient capacity once the loading changes described in the Recommendations section of this report are completed.**

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 Connecticut State Building Code based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Crown Castle* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Alex Mrkajic, EI / SLS

Respectfully submitted by:

Jamal A. Huwel, P.E.
Manager Engineering

STATE OF CONNECTICUT
JAMAL A HUWEL
26893
LICENSED
PROFESSIONAL ENGINEER

Date Signed:
AUG 15 2012

## TABLE OF CONTENTS

## 1) INTRODUCTION

This tower is a 144.5 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in January of 2001. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The tower has been modified per reinforcement drawings prepared by Walker Engineering, in August of 2007. Reinforcement consists of addition of base plate stiffeners. The tower was later reinforced per reinforcement drawings prepared by Vertical Structures, in November of 2008. Reinforcement consists of weld size increase to the previous base plate stiffener modification.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 38 mph with 0.75 inch ice thickness and 50 mph under service loads.

**Table 1 - Proposed Antenna and Cable Information**

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) | Note |
|---|---|---|---|---|---|---|---|
| 145.0 | 147.0 | 1 | andrew | SBNH-1D6565C w/ Mount Pipe | 3 | 3/8 | - |
| | | 2 | powerwave technologies | P65-17-XLH-RR w/ Mount Pipe | | | |
| | | 1 | raycap | DC6-48-60-18-8F | | | |
| 143.0 | 143.0 | 6 | ericsson | TME-RRUS-11 | - | - | - |
| | | 1 | tower mounts | Side Arm Mount [SO 102-3] | | | |

**Table 2 - Existing and Reserved Antenna and Cable Information**

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) | Note |
|---|---|---|---|---|---|---|---|
| 145.0 | 147.0 | 6 | powerwave technologies | 7770.00 w/ Mount Pipe | 12 | 1-5/8 | 1 |
| | 145.0 | 6 | kathrein | 782-10250 | | | |
| | | 6 | powerwave technologies | LGP13519 | | | |
| | | 1 | tower mounts | Platform Mount [LP 601-1] | 1 | 1-5/8 | 1,3 |
| 135.0 | 137.0 | 3 | antel | BXA-171063/8CF w/ Mount Pipe | 6 | 1-5/8 | 2 |
| | | 3 | antel | BXA-70063-6CF-EDIN-0 w/ Mount Pipe | | | |
| | | 6 | antel | LPA-80063/4CF w/ Mount Pipe | 12 | 1-5/8 | 1 |
| | 135.0 | 1 | tower mounts | Platform Mount [LP 601-1] | | | |
| 125.0 | 126.0 | 3 | ems wireless | RR90-17-02DPL2 w/ Mount Pipe | 12 | 1-5/8 | 1 |
| | | 3 | rfs celwave | APX16DWV-16DWV-S-E-A20 w/Mount Pipe | | | |
| | | 3 | rfs celwave | ATMAA1412D-1A20 | | | |
| | | 3 | rfs celwave | ATMPP1412D-1CWA | | | |

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) | Note |
|---|---|---|---|---|---|---|---|
| | 125.0 | 1 | tower mounts | Platform Mount [LP 601-1] | | | |
| 113.0 | 113.0 | 6 | decibel | DB980H65T2E-M w/ Mount Pipe | 6 | 1-5/8 | 1 |
| | | 1 | tower mounts | Platform Mount [LP 601-1] | | | |
| 100.0 | 102.0 | 3 | kathrein | 800 10504 w/ Mount Pipe | 6 | 7/8 | 1 |
| | 100.0 | 1 | tower mounts | Platform Mount [LP 601-1] | | | |
| 51.0 | 52.0 | 1 | lucent | KS24019-L112A | 1 | 1/2 | 1 |
| | 51.0 | 1 | tower mounts | Side Arm Mount [SO 701-1] | | | |

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Abandoned Feedline, To Be Removed

**Table 3 - Design Antenna and Cable Information**

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) |
|---|---|---|---|---|---|---|
| 145 | 145 | 12 | Allgon | 7120.16 | - | - |
| 135 | 135 | 12 | Allgon | 7120.16 | - | - |
| 125 | 125 | 9 | Allgon | 7120.16 | - | - |
| 115 | 115 | 12 | Allgon | 7120.16 | - | - |
| 105 | 105 | 12 | Allgon | 7120.16 | - | - |
| 95 | 95 | 12 | Allgon | 7120.16 | - | - |

## 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

| Document | Remarks | Reference | Source |
|---|---|---|---|
| 4-GEOTECHNICAL REPORTS | Clarence Welti Associates, Inc. | 1406209 | CCISITES |
| 4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS | URS | 1405796 | CCISITES |
| 4-TOWER MANUFACTURER DRAWINGS | Engineering Endeavors, Inc. | 1405782 | CCISITES |
| 4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA | Vertical Structures, Inc. | 2353860 | CCISITES |

### 3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

### 3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

## 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary)**

| Section No. | Elevation (ft) | Component Type | Size | Critical Element | P (K) | SF*P_allow (K) | % Capacity | Pass / Fail |
|---|---|---|---|---|---|---|---|---|
| L1 | 144.5 - 117.568 | Pole | TP26.875x21x0.1875 | 1 | -5.41 | 799.65 | 60.1 | Pass |
| L2 | 117.568 - 87.1823 | Pole | TP33x25.6587x0.25 | 2 | -11.67 | 1310.09 | 99.0 | Pass |
| L3 | 87.1823 - 42.1068 | Pole | TP42.2188x31.5084x0.375 | 3 | -21.09 | 2512.17 | 94.5 | Pass |
| L4 | 42.1068 - 0 | Pole | TP50.5x40.224x0.4375 | 4 | -35.21 | 3614.03 | 92.1 | Pass |
| | | | | | | | Summary | |
| | | | | | | Pole (L2) | 99.0 | Pass |
| | | | | | | RATING = | 99.0 | Pass |

**Table 6 - Tower Component Stresses vs. Capacity – LC7**

| Notes | Component | Elevation (ft) | % Capacity | Pass / Fail |
|---|---|---|---|---|
| 1 | Anchor Rods | 0 | 87.2 | Pass |
| 1 | Base Plate | 0 | 73.9 | Pass |
| 1 | Base Foundation | 0 | 46.0 | Pass |

| Structure Rating (max from all components) = | 99.0% |
|---|---|

Notes:
1.) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

### 4.1) Recommendations

The tower and foundation have sufficient capacity to carry the existing, reserved, and proposed loading. In order for the results of this analysis to be considered valid the loading modification listed below must be completed.

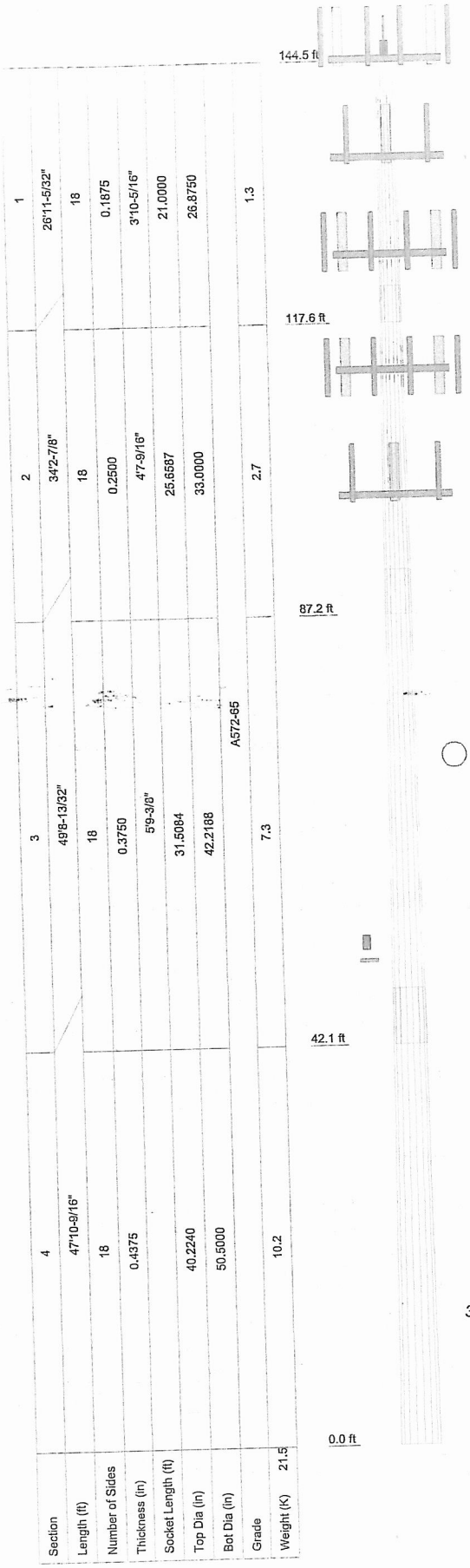
Loading Changes:

1.) All unused mounting pipes should be removed from the 145' MCL

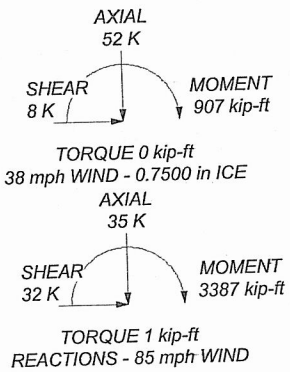
No structural modifications are required at this time, provided that the above listed changes are implemented.

# APPENDIX A

# TNXTOWER OUTPUT




| Section | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Length (ft) | 26'11-5/32" | 34'2-7/8" | 49'8-13/32" | 47'10-9/16" |
| Number of Sides | 18 | 18 | 18 | 18 |
| Thickness (in) | 0.1875 | 0.2500 | 0.3750 | 0.4375 |
| Socket Length (ft) | 3'10-5/16" | 4'7-9/16" | 5'9-3/0" | |
| Top Dia (in) | 21.0000 | 25.6587 | 31.5084 | 40.2240 |
| Bot Dia (in) | 26.8750 | 33.0000 | 42.2188 | 50.5000 |
| Grade | 1.3 | 2.7 | 7.3 | 10.2 |
| Weight (K) | | | | 21.5 |




## DESIGNED APPURTENANCE LOADING

| TYPE | ELEVATION | TYPE | ELEVATION |
|---|---|---|---|
| Lightning Rod 5/8x4' | 147 | RR90-17-02DPL2 w/ Mount Pipe | 125 |
| Flash Beacon Lighting | 145 | APX16DWV-16DWV-S-E-A20 w/Mount Pipe | 125 |
| (2) 782-10250 | 145 | ATMAA1412D-1A20 | 125 |
| (2) 7770.00 w/ Mount Pipe | 145 | ATMPP1412D-1CWA | 125 |
| (2) LGP13519 | 145 | Platform Mount [LP 601-1] | 125 |
| (2) 782-10250 | 145 | RR90-17-02DPL2 w/ Mount Pipe | 125 |
| (2) 7770.00 w/ Mount Pipe | 145 | APX16DWV-16DWV-S-E-A20 w/Mount Pipe | 125 |
| (2) LGP13519 | 145 | ATMAA1412D-1A20 | 125 |
| (2) 782-10250 | 145 | ATMPP1412D-1CWA | 125 |
| (2) 7770.00 w/ Mount Pipe | 145 | RR90-17-02DPL2 w/ Mount Pipe | 125 |
| (2) LGP13519 | 145 | APX16DWV-16DWV-S-E-A20 w/Mount Pipe | 125 |
| Platform Mount [LP 601-1] | 145 | ATMAA1412D-1A20 | 125 |
| P65-17-XLH-RR w/ Mount Pipe | 145 | ATMPP1412D-1CWA | 125 |
| P65-17-XLH-RR w/ Mount Pipe | 145 | (2) DB980H65T2E-M w/ Mount Pipe | 113 |
| DC6-48-60-18-8F | 145 | (2) DB980H65T2E-M w/ Mount Pipe | 113 |
| SBNH-1D6565C w/ Mount Pipe | 145 | (2) DB980H65T2E-M w/ Mount Pipe | 113 |
| (2) TME-RRUS-11 | 143 | Platform Mount [LP 601-1] | 113 |
| (2) TME-RRUS-11 | 143 | (2) 6' x 2" Mount Pipe | 113 |
| (2) TME-RRUS-11 | 143 | (2) 6' x 2" Mount Pipe | 113 |
| Side Arm Mount [SO 102-3] | 143 | (2) 6' x 2" Mount Pipe | 113 |
| BXA-70063-6CF-EDIN-0 w/ Mount Pipe | 135 | 800 10504 w/ Mount Pipe | 100 |
| Platform Mount [LP 601-1] | 135 | 800 10504 w/ Mount Pipe | 100 |
| (2) LPA-80063/4CF w/ Mount Pipe | 135 | Platform Mount [LP 601-1] | 100 |
| BXA-171063/8CF w/ Mount Pipe | 135 | 8'x2 1/2" Pipe Mount | 100 |
| BXA-70063-6CF-EDIN-0 w/ Mount Pipe | 135 | 8'x2 1/2" Pipe Mount | 100 |
| (2) LPA-80063/4CF w/ Mount Pipe | 135 | 8'x2 1/2" Pipe Mount | 100 |
| BXA-171063/8CF w/ Mount Pipe | 135 | 800 10504 w/ Mount Pipe | 100 |
| BXA-70063-6CF-EDIN-0 w/ Mount Pipe | 135 | KS24019-L112A | 51 |
| (2) LPA-80063/4CF w/ Mount Pipe | 135 | Side Arm Mount [SO 701-1] | 51 |
| BXA-171063/8CF w/ Mount Pipe | 135 | | |

## MATERIAL STRENGTH

| GRADE | Fy | Fu | GRADE | Fy | Fu |
|---|---|---|---|---|---|
| A572-65 | 65 ksi | 80 ksi | | | |

## TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99%


CROWN CASTLE
We Are Solutions
Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2509
FAX: -


| | | | |
|---|---|---|---|
| Job: BU 881533 | | | |
| Project: | | | |
| Client: Crown Castle | Drawn by: AMrkajic | App'd: | |
| Code: TIA/EIA-222-F | Date: 08/14/12 | Scale: NT | |
| Path: R:\SA Models - Letters\Work Area\AMrkajic\881533_51500\881533.eri | | Dwg No. E | |

## Tower Input Data

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

1) Tower is located in New London County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.00 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) 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 | | |

## Tapered Pole Section Geometry

| Section | Elevation ft | Section Length ft | Splice Length ft | Number of Sides | Top Diameter in | Bottom Diameter in | Wall Thickness in | Bend Radius in | Pole Grade |
|---|---|---|---|---|---|---|---|---|---|
| L1 | 144'6"-117'6-27/32" | 26'11-5/32" | 3'10-5/16" | 18 | 21.0000 | 26.8750 | 0.1875 | 0.7500 | A572-65 (65 ksi) |
| L2 | 117'6-27/32"-87'2-5/32" | 34'2-7/8" | 4'7-9/16" | 18 | 25.6587 | 33.0000 | 0.2500 | 1.0000 | A572-65 (65 ksi) |
| L3 | 87'2-5/32"-42'1-5/16" | 49'8-13/32" | 5'9-3/8" | 18 | 31.5084 | 42.2188 | 0.3750 | 1.5000 | A572-65 (65 ksi) |
| L4 | 42'1-5/16"-0' | 47'10-9/16" | | 18 | 40.2240 | 50.5000 | 0.4375 | 1.7500 | A572-65 (65 ksi) |

## Tapered Pole Properties

| Section | Tip Dia. in | Area $in^2$ | I $in^4$ | r in | C in | I/C $in^3$ | J $in^4$ | It/Q $in^2$ | w in | w/t |
|---|---|---|---|---|---|---|---|---|---|---|
| L1 | 21.3240 | 12.3860 | 677.8263 | 7.3884 | 10.6680 | 63.5383 | 1356.5444 | 6.1942 | 3.3660 | 17.952 |

| Section | Tip Dia. in | Area $in^2$ | I $in^4$ | r in | C in | I/C $in^3$ | J $in^4$ | It/Q $in^2$ | w in | w/t |
|---|---|---|---|---|---|---|---|---|---|---|
| | 27.2896 | 15.8824 | 1429.1221 | 9.4741 | 13.6525 | 104.6784 | 2860.1246 | 7.9427 | 4.4000 | 23.467 |
| L2 | 26.8941 | 20.1618 | 1644.4889 | 9.0201 | 13.0346 | 126.1632 | 3291.1417 | 10.0828 | 4.0759 | 16.304 |
| | 33.5091 | 25.9871 | 3521.4238 | 11.6262 | 16.7640 | 210.0587 | 7047.4812 | 12.9960 | 5.3680 | 21.472 |
| L3 | 33.0065 | 37.0566 | 4537.9161 | 11.0524 | 16.0063 | 283.5085 | 9081.8034 | 18.5318 | 4.8855 | 13.028 |
| | 42.8700 | 49.8045 | 11017.1037 | 14.8545 | 21.4471 | 513.6867 | 22048.7039 | 24.9070 | 6.7705 | 18.055 |
| L4 | 42.1032 | 55.2486 | 11049.1937 | 14.1242 | 20.4338 | 540.7310 | 22112.9263 | 27.6295 | 6.3094 | 14.422 |
| | 51.2790 | 69.5180 | 22012.0267 | 17.7722 | 25.6540 | 858.0349 | 44053.0173 | 34.7656 | 8.1180 | 18.555 |

| Tower Elevation ft | Gusset Area (per face) $ft^2$ | Gusset Thickness in | Gusset Grade | Adjust. Factor $A_f$ | Adjust. Factor $A_r$ | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals in | Double Angle Stitch Bolt Spacing Horizontals in |
|---|---|---|---|---|---|---|---|---|
| L1 144'6"-117'6-27/32" | | | | 1 | 1 | 1 | | |
| L2 117'6-27/32"-87'2-5/32" | | | | 1 | 1 | 1 | | |
| L3 87'2-5/32"-42'1-5/16" | | | | 1 | 1 | 1 | | |
| L4 42'1-5/16"-0' | | | | 1 | 1 | 1 | | |

## Feed Line/Linear Appurtenances - Entered As Area

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Face Offset in | Lateral Offset (Frac FW) | # | | $C_AA_A$ $ft^2/ft$ | Weight plf |
|---|---|---|---|---|---|---|---|---|---|---|
| CR 50 1873(1-5/8") | C | No | Inside Pole | 144'6" - 0' | 0.0000 | 0 | 12 | No Ice | 0.00 | 0.83 |
| | | | | | | | | 1/2" Ice | 0.00 | 0.83 |
| | | | | | | | | 1" Ice | 0.00 | 0.83 |
| | | | | | | | | 2" Ice | 0.00 | 0.83 |
| | | | | | | | | 4" Ice | 0.00 | 0.83 |
| CR 50 1873(1-5/8") | C | No | Inside Pole | 144'6" - 0' | 0.0000 | 0 | 1 | No Ice | 0.00 | 0.83 |
| | | | | | | | | 1/2" Ice | 0.00 | 0.83 |
| | | | | | | | | 1" Ice | 0.00 | 0.83 |
| | | | | | | | | 2" Ice | 0.00 | 0.83 |
| | | | | | | | | 4" Ice | 0.00 | 0.83 |
| *** | | | | | | | | | | |
| AVA7-50(1-5/8") | A | No | Inside Pole | 135' - 0' | 0.0000 | 0 | 12 | No Ice | 0.00 | 0.70 |
| | | | | | | | | 1/2" Ice | 0.00 | 0.70 |
| | | | | | | | | 1" Ice | 0.00 | 0.70 |
| | | | | | | | | 2" Ice | 0.00 | 0.70 |
| | | | | | | | | 4" Ice | 0.00 | 0.70 |
| LDF7-50A(1-5/8") | A | No | Inside Pole | 135' - 0' | 0.0000 | 0 | 6 | No Ice | 0.00 | 0.82 |
| | | | | | | | | 1/2" Ice | 0.00 | 0.82 |
| | | | | | | | | 1" Ice | 0.00 | 0.82 |
| | | | | | | | | 2" Ice | 0.00 | 0.82 |
| | | | | | | | | 4" Ice | 0.00 | 0.82 |
| *** | | | | | | | | | | |
| LDF7-50A(1-5/8") | B | No | Inside Pole | 125' - 0' | 0.0000 | 0 | 10 | No Ice | 0.00 | 0.82 |
| | | | | | | | | 1/2" Ice | 0.00 | 0.82 |
| | | | | | | | | 1" Ice | 0.00 | 0.82 |
| | | | | | | | | 2" Ice | 0.00 | 0.82 |
| | | | | | | | | 4" Ice | 0.00 | 0.82 |
| LDF7-50A(1-5/8") | B | No | CaAa (Out Of Face) | 125' - 0' | 0.0000 | 0 | 2 | No Ice | 0.20 | 0.82 |
| | | | | | | | | 1/2" Ice | 0.30 | 2.33 |
| | | | | | | | | 1" Ice | 0.40 | 4.46 |
| | | | | | | | | 2" Ice | 0.60 | 10.54 |
| | | | | | | | | 4" Ice | 1.00 | 30.04 |
| *** | | | | | | | | | | |
| LDF7-50A(1-5/8") | C | No | Inside Pole | 113' - 0' | 0.0000 | 0 | 6 | No Ice | 0.00 | 0.82 |
| | | | | | | | | 1/2" Ice | 0.00 | 0.82 |

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Face Offset in | Lateral Offset (Frac FW) | # | | $C_AA_A$ $ft^2/ft$ | Weight plf |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 1" Ice | 0.00 | 0.82 |
| | | | | | | | | 2" Ice | 0.00 | 0.82 |
| | | | | | | | | 4" Ice | 0.00 | 0.82 |
| *** | | | | | | | | | | |
| FSJ2-50(3/8") | B | No | CaAa (Out Of Face) | 100' - 0' | 0.0000 | 0 | 1 | No Ice | 0.00 | 0.08 |
| | | | | | | | | 1/2" Ice | 0.00 | 0.64 |
| | | | | | | | | 1" Ice | 0.00 | 1.82 |
| | | | | | | | | 2" Ice | 0.00 | 6.00 |
| | | | | | | | | 4" Ice | 0.00 | 21.70 |
| FXL 780 PE(7/8) | B | No | CaAa (Out Of Face) | 100' - 0' | 1.0000 | 0 | 2 | No Ice | 0.11 | 0.25 |
| | | | | | | | | 1/2" Ice | 0.21 | 1.22 |
| | | | | | | | | 1" Ice | 0.31 | 2.80 |
| | | | | | | | | 2" Ice | 0.51 | 7.80 |
| | | | | | | | | 4" Ice | 0.91 | 25.12 |
| FXL 780 PE(7/8) | B | No | CaAa (Out Of Face) | 100' - 0' | 1.0000 | 0 | 4 | No Ice | 0.00 | 0.25 |
| | | | | | | | | 1/2" Ice | 0.00 | 1.22 |
| | | | | | | | | 1" Ice | 0.00 | 2.80 |
| | | | | | | | | 2" Ice | 0.00 | 7.80 |
| | | | | | | | | 4" Ice | 0.00 | 25.12 |
| *** | | | | | | | | | | |
| LDF4-50A(1/2") | C | No | CaAa (Out Of Face) | 51' - 0' | 0.0000 | 0 | 1 | No Ice | 0.06 | 0.15 |
| | | | | | | | | 1/2" Ice | 0.16 | 0.84 |
| | | | | | | | | 1" Ice | 0.26 | 2.14 |
| | | | | | | | | 2" Ice | 0.46 | 6.58 |
| | | | | | | | | 4" Ice | 0.86 | 22.78 |
| *** | | | | | | | | | | |
| Safety Line 3/8 | A | No | CaAa (Out Of Face) | 144'6" - 0' | 0.0000 | 0 | 1 | No Ice | 0.04 | 0.22 |
| | | | | | | | | 1/2" Ice | 0.14 | 0.75 |
| | | | | | | | | 1" Ice | 0.24 | 1.28 |
| | | | | | | | | 2" Ice | 0.44 | 2.34 |
| | | | | | | | | 4" Ice | 0.84 | 4.46 |
| *** | | | | | | | | | | |
| Climbing Ladder ( Flat) | B | No | CaAa (Out Of Face) | 144'6" - 140' | 0.0000 | 0 | 1 | No Ice | 0.58 | 4.81 |
| | | | | | | | | 1/2" Ice | 1.03 | 7.12 |
| | | | | | | | | 1" Ice | 1.48 | 10.35 |
| | | | | | | | | 2" Ice | 2.37 | 19.55 |
| | | | | | | | | 4" Ice | 4.15 | 48.96 |
| Climbing Ladder ( Flat) | B | No | CaAa (Out Of Face) | 135' - 130' | 0.0000 | 0 | 1 | No Ice | 0.58 | 4.81 |
| | | | | | | | | 1/2" Ice | 1.03 | 7.12 |
| | | | | | | | | 1" Ice | 1.48 | 10.35 |
| | | | | | | | | 2" Ice | 2.37 | 19.55 |
| | | | | | | | | 4" Ice | 4.15 | 48.96 |
| Climbing Ladder ( Flat) | B | No | CaAa (Out Of Face) | 125' - 120' | 0.0000 | 0 | 1 | No Ice | 0.58 | 4.81 |
| | | | | | | | | 1/2" Ice | 1.03 | 7.12 |
| | | | | | | | | 1" Ice | 1.48 | 10.35 |
| | | | | | | | | 2" Ice | 2.37 | 19.55 |
| | | | | | | | | 4" Ice | 4.15 | 48.96 |
| *** | | | | | | | | | | |
| FB-L98B-002-75000( 3/8") | B | No | CaAa (Out Of Face) | 144'6" - 0' | 0.0000 | 0 | 1 | No Ice | 0.00 | 0.06 |
| | | | | | | | | 1/2" Ice | 0.00 | 0.60 |
| | | | | | | | | 1" Ice | 0.00 | 1.76 |
| | | | | | | | | 2" Ice | 0.00 | 5.91 |
| | | | | | | | | 4" Ice | 0.00 | 21.53 |
| WR-VG122ST-BRDA( 3/8) | B | No | CaAa (Out Of Face) | 144'6" - 0' | 0.0000 | 0 | 2 | No Ice | 0.00 | 0.20 |
| | | | | | | | | 1/2" Ice | 0.00 | 0.74 |
| | | | | | | | | 1" Ice | 0.00 | 1.89 |
| | | | | | | | | 2" Ice | 0.00 | 6.03 |
| | | | | | | | | 4" Ice | 0.00 | 21.63 |

## Feed Line/Linear Appurtenances Section Areas

| Tower Section | Tower Elevation ft | Face | $A_R$ $ft^2$ | $A_F$ $ft^2$ | $C_AA_A$ In Face $ft^2$ | $C_AA_A$ Out Face $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|
| L1 | 144'6"-117'6-27/32" | A | 0.000 | 0.000 | 0.000 | 1.010 | 0.24 |
| | | B | 0.000 | 0.000 | 0.000 | 11.417 | 0.16 |

| Tower Section | Tower Elevation ft | Face | $A_R$ $ft^2$ | $A_F$ $ft^2$ | $C_AA_A$ In Face $ft^2$ | $C_AA_A$ Out Face $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.29 |
| L2 | 117'6-27/32"-87'2-5/32" | A | 0.000 | 0.000 | 0.000 | 1.139 | 0.41 |
| | | B | 0.000 | 0.000 | 0.000 | 14.827 | 0.33 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.45 |
| L3 | 87'2-5/32"-42'1-5/16" | A | 0.000 | 0.000 | 0.000 | 1.690 | 0.61 |
| | | B | 0.000 | 0.000 | 0.000 | 27.676 | 0.54 |
| | | C | 0.000 | 0.000 | 0.000 | 0.560 | 0.71 |
| L4 | 42'1-5/16"-0' | A | 0.000 | 0.000 | 0.000 | 1.579 | 0.57 |
| | | B | 0.000 | 0.000 | 0.000 | 25.854 | 0.50 |
| | | C | 0.000 | 0.000 | 0.000 | 2.653 | 0.67 |

## Feed Line/Linear Appurtenances Section Areas - With Ice

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | $A_R$ $ft^2$ | $A_F$ $ft^2$ | $C_AA_A$ In Face $ft^2$ | $C_AA_A$ Out Face $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|
| L1 | 144'6"-117'6-27/32" | A | 0.885 | 0.000 | 0.000 | 0.000 | 5.774 | 0.26 |
| | | B | | 0.000 | 0.000 | 0.000 | 25.481 | 0.39 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.29 |
| L2 | 117'6-27/32"-87'2-5/32" | A | 0.859 | 0.000 | 0.000 | 0.000 | 6.515 | 0.44 |
| | | B | | 0.000 | 0.000 | 0.000 | 30.113 | 0.84 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.45 |
| L3 | 87'2-5/32"-42'1-5/16" | A | 0.812 | 0.000 | 0.000 | 0.000 | 9.432 | 0.65 |
| | | B | | 0.000 | 0.000 | 0.000 | 58.643 | 1.63 |
| | | C | | 0.000 | 0.000 | 0.000 | 2.088 | 0.72 |
| L4 | 42'1-5/16"-0' | A | 0.750 | 0.000 | 0.000 | 0.000 | 8.421 | 0.61 |
| | | B | | 0.000 | 0.000 | 0.000 | 53.220 | 1.45 |
| | | C | | 0.000 | 0.000 | 0.000 | 9.494 | 0.73 |

## Feed Line Center of Pressure

| Section | Elevation ft | $CP_X$ in | $CP_Z$ in | $CP_X$ Ice in | $CP_Z$ Ice in |
|---|---|---|---|---|---|
| L1 | 144'6"-117'6-27/32" | 0.4543 | 0.2166 | 0.7512 | 0.2395 |
| L2 | 117'6-27/32"-87'2-5/32" | 0.5292 | 0.2591 | 0.8456 | 0.2802 |
| L3 | 87'2-5/32"-42'1-5/16" | 0.6427 | 0.3417 | 1.0503 | 0.4530 |
| L4 | 42'1-5/16"-0' | 0.6033 | 0.3805 | 0.9138 | 0.5535 |

## Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral ft | Vert ft | Azimuth Adjustment ° | Placement ft | | $C_AA_A$ Front $ft^2$ | $C_AA_A$ Side $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|---|---|
| Lightning Rod 5/8x4' | C | None | | | 0.00 | 147' | No Ice | 0.25 | 0.25 | 0.03 |
| | | | | | | | 1/2" Ice | 0.66 | 0.66 | 0.03 |
| | | | | | | | 1" Ice | 0.97 | 0.97 | 0.04 |
| | | | | | | | 2" Ice | 1.49 | 1.49 | 0.06 |
| | | | | | | | 4" Ice | 2.68 | 2.68 | 0.14 |
| Flash Beacon Lighting | C | None | | | 0.00 | 145' | No Ice | 2.70 | 2.70 | 0.05 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | | $C_AA_A$ Front $ft^2$ | $C_AA_A$ Side $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1/2" Ice | 3.10 | 3.10 | 0.07 |
| | | | | | | 1" Ice | 3.50 | 3.50 | 0.09 |
| | | | | | | 2" Ice | 4.30 | 4.30 | 0.13 |
| | | | | | | 4" Ice | 5.90 | 5.90 | 0.21 |
| ** (2) 782-10250 | A | From Leg | 4.00 0' 0' | 0.00 | 145' | No Ice | 0.52 | 0.27 | 0.01 |
| | | | | | | 1/2" Ice | 0.63 | 0.36 | 0.01 |
| | | | | | | 1" Ice | 0.75 | 0.46 | 0.02 |
| | | | | | | 2" Ice | 1.01 | 0.69 | 0.03 |
| | | | | | | 4" Ice | 1.63 | 1.24 | 0.09 |
| (2) 7770.00 w/ Mount Pipe | A | From Leg | 4.00 0' 2' | 0.00 | 145' | No Ice | 6.12 | 4.25 | 0.06 |
| | | | | | | 1/2" Ice | 6.63 | 5.01 | 0.10 |
| | | | | | | 1" Ice | 7.13 | 5.71 | 0.16 |
| | | | | | | 2" Ice | 8.16 | 7.16 | 0.29 |
| | | | | | | 4" Ice | 10.36 | 10.41 | 0.66 |
| (2) LGP13519 | A | From Leg | 4.00 0' 0' | 0.00 | 145' | No Ice | 0.34 | 0.21 | 0.01 |
| | | | | | | 1/2" Ice | 0.42 | 0.28 | 0.01 |
| | | | | | | 1" Ice | 0.51 | 0.36 | 0.01 |
| | | | | | | 2" Ice | 0.73 | 0.55 | 0.02 |
| | | | | | | 4" Ice | 1.25 | 1.03 | 0.07 |
| (2) 782-10250 | B | From Leg | 4.00 0' 0' | 0.00 | 145' | No Ice | 0.52 | 0.27 | 0.01 |
| | | | | | | 1/2" Ice | 0.63 | 0.36 | 0.01 |
| | | | | | | 1" Ice | 0.75 | 0.46 | 0.02 |
| | | | | | | 2" Ice | 1.01 | 0.69 | 0.03 |
| | | | | | | 4" Ice | 1.63 | 1.24 | 0.09 |
| (2) 7770.00 w/ Mount Pipe | B | From Leg | 4.00 0' 2' | 0.00 | 145' | No Ice | 6.12 | 4.25 | 0.06 |
| | | | | | | 1/2" Ice | 6.63 | 5.01 | 0.10 |
| | | | | | | 1" Ice | 7.13 | 5.71 | 0.16 |
| | | | | | | 2" Ice | 8.16 | 7.16 | 0.29 |
| | | | | | | 4" Ice | 10.36 | 10.41 | 0.66 |
| (2) LGP13519 | B | From Leg | 4.00 0' 0' | 0.00 | 145' | No Ice | 0.34 | 0.21 | 0.01 |
| | | | | | | 1/2" Ice | 0.42 | 0.28 | 0.01 |
| | | | | | | 1" Ice | 0.51 | 0.36 | 0.01 |
| | | | | | | 2" Ice | 0.73 | 0.55 | 0.02 |
| | | | | | | 4" Ice | 1.25 | 1.03 | 0.07 |
| (2) 782-10250 | C | From Leg | 4.00 0' 0' | 0.00 | 145' | No Ice | 0.52 | 0.27 | 0.01 |
| | | | | | | 1/2" Ice | 0.63 | 0.36 | 0.01 |
| | | | | | | 1" Ice | 0.75 | 0.46 | 0.02 |
| | | | | | | 2" Ice | 1.01 | 0.69 | 0.03 |
| | | | | | | 4" Ice | 1.63 | 1.24 | 0.09 |
| (2) 7770.00 w/ Mount Pipe | C | From Leg | 4.00 0' 2' | 0.00 | 145' | No Ice | 6.12 | 4.25 | 0.06 |
| | | | | | | 1/2" Ice | 6.63 | 5.01 | 0.10 |
| | | | | | | 1" Ice | 7.13 | 5.71 | 0.16 |
| | | | | | | 2" Ice | 8.16 | 7.16 | 0.29 |
| | | | | | | 4" Ice | 10.36 | 10.41 | 0.66 |
| (2) LGP13519 | C | From Leg | 4.00 0' 0' | 0.00 | 145' | No Ice | 0.34 | 0.21 | 0.01 |
| | | | | | | 1/2" Ice | 0.42 | 0.28 | 0.01 |
| | | | | | | 1" Ice | 0.51 | 0.36 | 0.01 |
| | | | | | | 2" Ice | 0.73 | 0.55 | 0.02 |
| | | | | | | 4" Ice | 1.25 | 1.03 | 0.07 |
| Platform Mount [LP 601-1] | C | None | | 0.00 | 145' | No Ice | 28.47 | 28.47 | 1.12 |
| | | | | | | 1/2" Ice | 33.59 | 33.59 | 1.51 |
| | | | | | | 1" Ice | 38.71 | 38.71 | 1.91 |
| | | | | | | 2" Ice | 48.95 | 48.95 | 2.69 |
| | | | | | | 4" Ice | 69.43 | 69.43 | 4.26 |

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February 27, 2015

Mr. John Igoe
American Tower
10 Presidential Way
Woburn, MA 01801

Dear Mr. Igoe:

This letter is to inform you that an application for modification to the cell tower located at 159 Weingart Road, Harwinton CT has been sent to the Connecticut Siting Council for review and also to AT&T Mobility, the owner of the structure.

Thank you,

Kerry Sethares

Kerry Sethares
Site Acquisition Coordinator
Empire Telecom

cc: Mr. Michael Criss
First Selectman, Town of Harwinton

EMPIRE
telecom

March 3, 2015

Mr. Edward F. Jaconette, Jr.
Ms. Kristen L. Jaconette
405 Brushy Plain Road
Branford, CT 06405

Dear Mr. and Ms. Jaconette:

This letter is to inform you that an application for modification to the cell tower located at 405 Brushy Plain Road, Branford CT has been sent to the Connecticut Siting Council for review and also to AT&T Mobility, the owner of the structure.

Thank you,

Kerry Sethares

Kerry Sethares
Site Acquisition Coordinator
Empire Telecom

cc: Mayor, James B. Cosgrove, Town of Branford
Mr. Jose Giner, Director, Planning and Zoning Town of Branford
Mr. John Igoe, American Tower

EMPIRE telecom

February 27, 2015

Candid Associates, LLC
110 Washington Avenue
North Haven, CT 06473

To Whom It May Concern:

This letter is to inform you that an application for modification to the cell site located at 125 Washington Avenue, North Haven, CT has been sent to the Connecticut Siting Council for review and also to AT&T Mobility, the owner of the structure.

Thank you,

Kerry Sethares

Kerry Sethares
Site Acquisition Coordinator
Empire Telecom

cc: Michael Freda
First Selectman, Town of North Haven

EMPIRE telecom

February 27, 2015

Mr. Stephen B. Tripp
23 Wayne Road
Wallingford, CT 06492

Dear Mr. Tripp:

This letter is to inform you that an application for modification to the cell site located at 23 Wayne Road, Wallingford CT has been sent to the Connecticut Siting Council for review and also to AT&T Mobility, the owner of the structure.

Thank you,

Kerry Sethares

Kerry Sethares
Site Acquisition Coordinator
Empire Telecom

cc: William W. Dickinson, Mayor, Town of Walllingford
Kacie Costello, Town Planner

EMPIRE telecom

March 3, 2015

Mr. Charles Dunn
69 Wheeler Street
New Haven, CT 06512

Dear Mr Dunn:

This letter is to inform you that an application for modification to the cell tower located at 69 Wheeler Street, New Haven, CT has been sent to the Connecticut Siting Council for review and also to AT&T Mobility, the owner of the structure.

Thank you,

Kerry Sethares

Kerry Sethares
Site Acquisition Coordinator
Empire Telecom

cc: Toni Harp, Mayor, City of New Haven
Ms. Karyn Gilvarg, A.I.A. Executive Director, City of New Haven