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January 12, 2014

Roberta Brien, Chairwoman
Zoning Board of Appeals
Town of Paxton
697 Pleasant Street
Paxton, MA 01612

RE: Application of New Cingular Wireless PCS, LLC ("AT&T") to construct a new personal wireless facility ("PWS") at 196 West Street, Paxton, MA.

Dear Chairwoman Brien and members of the Zoning Board of Appeals:

Your Board has requested that the undersigned, a New York State Licensed Professional Engineer specializing in radio frequency engineering, review portions of the application of New Cingular Wireless PCS, LLC, ("AT&T") to construct a wireless telecommunications facility at 196 West Street in the Town. For this critical review, the undersigned has considered the following documents:

Application Package submitted by Elizabeth Mason, Esq., attorney with Anderson & Kreiger, LLP dated October 15, 2013

Exhibit 6 Table of Code Compliance Document

Exhibit 7: RF Report, Proposed Paxton PCS Facility Site MA4988, dated October 11, 2013 prepared by Ceferiano Bautista, RF Engineering, AT&T Mobility

Exhibit 8: Maximum Permissible Exposure Study, Theoretical Report, dated October 9, 2013, prepared by SAI Communications

Exhibit 9: FAA 1A certification prepared by Dewberry Engineers, Inc., dated October 8, 2013.

Exhibit 10: TOWAIR determination, dated October 17, 2013

In his RF Report, Mr. Bautista claims that: *AT&T has determined that significant coverage gaps exist in its network in western Paxton, including along substantial portions of West Street, and Pleasant Street. These gaps also include areas along side roads proximate to West Street and Pleasant Street and residential and business areas proximate to West Street and Pleasant Street*

He further goes on to say that: *computer modeling is used to define a search ring. The search ring is designed such that a site location within the ring would have a high probability of completing coverage in the Targeted Coverage Area (assuming that sufficient height is used)*

Finally he notes that the Bylaw 8.8.1.6 requires that an applicant submit: *predicted radio frequency coverage plots for the proposed facility and results of the pre-construction coverage drive test for comparison with the predicted plots* and goes on to note that: *a submission is required of a map of the geographic area in which the proposed facility will provide adequate coverage.*

An examination of Exhibit 1 "Current AT&T Coverage in Paxton, MA" depicts a computer generated simulation of the existing coverage purported to be in the area. Signal strengths of various intensities are displayed ranging from: (1) greater than or equal to -74 dBm in green (an extremely strong signal needed to penetrate significant concrete and steel buildings that are typically found in a built up down town area; (2) -82 dBm in blue (a strong signal needed to penetrate vehicles and residential type (homes) buildings; (3) -92 dBm in yellow (a somewhat weaker signal that is needed to provide "on street" coverage to personal wireless devices; and (4) -105 dBm in red (a very weak signal that while not actually a gap as there is a signal, albeit small, may or may not be useful for AT&T's system).¹

Unfortunately from this presentation, it is impossible to determine where the purported gaps are and how they agree with the gap claims made above (paragraph 2 of this report). The use of such a street map with such a large scale makes it quite difficult to examine roads with names, streets, local land use and other issues associated with coverage. It is best to present such propagation maps on a USGS 7.5 minute topographic map, which is of sufficient scale to actually see all the roads and streets as well as terrain, and other land use features. Such land use features may be important in evaluating the proposal.

Exhibit 2 "Proposed AT&T coverage in Paxton, MA" depicts the information on Exhibit with the propose coverage of the facility requested. All of the comments related to Exhibit 1 also are applicable for this Exhibit with the addition of the request that the new coverage be shown on a plot all by itself, over-layable on the base map, so one can accurately determine the new coverage depth as well as its breadth (that is overlap of existing coverage).

¹ Please note that the signal levels depicted are not necessarily consistent with other AT&T applications, where, for example the in vehicle/suburban house signal level is typically -85 dBm, which would be a signal one half as strong as depicted here, resulting an even greater amount of blue color and coverage.

Mr. Bautista's report is also missing significant information that may be required by the Code. Specifically there were no scan drive tests of the existing system than can be used to verify the accuracy of the predicted model presentation. These scan drive tests are routinely performed by the network performance group of carriers to determine actual real world coverage. Such results are nearly the "gold standard" with determining coverage needs. Mr. Bautista's report is also missing the "search ring" he speaks of. This ring as he correctly notes allows the site acquisition specialist to search in the correct area (as determined by engineering) that would meet the coverage needs. This search ring should be supplied so as other sites may be evaluated.

Mr. Bautista in his report also notes that in his alternate sites analysis that *there are no suitable pre-existing structures, buildings or towers to which AT&T could attach its wireless antennas and equipment...* Such a statement does require more explanation. An examination by the undersigned of the 7.5 minute topographic map noted above as well as an internet aerial map web site, shows that there are what appear to be **significant** steel high voltage transmission towers running west to east that cross over Marshal and South Streets less than 1 mile from the proposed location. These towers (one which is just off and to the east of South Street with easy access) could very well be capable of supporting the proposed antennas. Many utilities do permit such co-locations, and AT&T in other municipalities has utilized such transmission towers.² AT&T should be required to investigate the transmission towers, and provide propagation maps.

Finally, Mr. Bautista claims that the facility has been designed to be constructed: *at the minimum height necessary to accommodate the anticipated user (AT&T) and future users.* While such a statement is admirable, there is no evidence in the record indicating that the height requested is the minimum required to fill the purported gaps in coverage claimed by AT&T. Such alternate height analyses (done at 20 foot intervals with the propagation program [once it has been verified by scan drive tests]) should be presented on stand along over-layable formats so they can be compared.

FINDING: The evidence presented in the RF Report falls somewhat short of providing sufficient information for a critical review. Specifically: (1) the use of maps of sufficient detail and scale as noted above should be utilized for all propagation plots; (2) Coverage plots should be presented on over-layable formats so that alternatives can be compared; (3) a search ring should be provided; (4) all possible co-location sites should be evaluated, i.e. High Voltage transmission towers; (5) alternate height analyses should be prepared to determine if, indeed, the proposed facility is at the minimum height necessary.

Exhibit 8: The radio frequency exposure study has been performed with reasonable compliance to FCC Bulletin OET-65 and demonstrates compliance with emission standards. Notwithstanding that note, emissions cannot be used by your Board in determining whether the application can be approved or not.

FINDING: No further action required.

² The undersigned has reviewed AT&T applications in New York, New Jersey and Connecticut where such transmission line towers were utilized.

Exhibit 9: FAA-1A Certification This document is unsigned and un-sealed by a licensed Professional Land Surveyor.

FINDING: The document should be signed and sealed.

Exhibit 10: TOWAIR determination This document's purpose is to alert an applicant that the proposed structure need not be registered with the FCC in compliance of section 77.13 of the rules and regulations. This document is not a "determination of no hazard." Such a determination by the FAA can only be obtained by filing FAA form 7460-1. While a structure of this height usually does not require lighting or painting, please note that it is proposed to be located approximately 1 mile from the end of runway 01 (19) of the Spencer Airport (FAA designation 60M) a public use airport. Filing of such a document allows the FAA as well as airport management to evaluate the proposal.

FINDING: FAA form 7460-1 should be prepared and filed.

Zoning and Construction Drawings, C-5 and C-10 Depict details associated with the proposed monopole and the antenna mounts. Note that there are twelve antennas proposed, 4 per sector, mounted on a 12 foot platform. There are also noted additional apertures for future carriers.

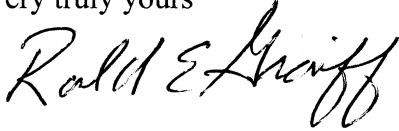
The use of such an antenna configuration is a standard design for AT&T. There are possible alternative mounting and antenna configurations that may be utilized in the event this application is approved and your Board wishes to attempt to minimize the visual impact. Such alternate configurations consist of close mounted antennas, multiband antennas and possible the use of a stealth structure such as a monopine or silo. These are alternates that can only be evaluated by a planner that may be retained by your Board. It is mentioned here as there are very few, if any, radio frequency issues associated with minimizing the visual impact of the structure.

FINDING: The Board may wish to evaluate alternate antenna mounting configurations or stealth facilities.

There is one additional issue that may be helpful to mention. It was noted on page 14 of Exhibit 6, "Table of compliance with Paxton Zoning Bylaw 6.2.5(Special Permits) and 8 (Personal Wireless Services)" - By Law Provisions (6) requires *that within 30 days of filing an application, the applicant shall arrange for a crane test for a period of at least seven days at the proposed site*. Should your Board require such a crane test, it is strongly recommended that at the time of the crane test, a Continuous Wave test ("CW Test") as well as scan drive tests be performed by the applicant to actually measure the levels of signal strength received in areas surrounding the site. In such a CW Test, an antenna is suspended from the crane at various heights and transmits a special signal. Test vehicles then drive the area and measure and record the results of the tests for presentation on coverage maps. Such a test is nearly the "gold standard" for determining the expected coverage from a proposed site. This test should be performed at the height requested and in 10 foot increments lower to a level just above the tree canopy. Should your Board decide to request such tests, the undersigned could provide, if your Board wishes, information regarding the protocol for such a test.

This review and report is based on the information presented and to the best of the undersigned's knowledge and belief that the information contained therein is true, accurate and complete. Should your Board have any additional questions, please feel free to contact the undersigned.

Very truly yours

A handwritten signature in black ink, reading "Ronald E. Graiff". The signature is written in a cursive style with a large, stylized 'R' and 'G'.

Ronald E. Graiff