

**MINUTES OF THE  
MENDHAM BOROUGH BOARD OF ADJUSTMENT  
June 3, 2009  
Garabrant Center, 4 Wilson Street, Mendham, NJ**

**CALL TO ORDER**

The regular meeting of the Board of Adjustment was called to order by Chair Santo at 7:40 p.m. at the Garabrant Center, 4 Wilson Street, Mendham, NJ.

**CHAIRMAN'S ADEQUATE NOTICE STATEMENT**

Notice of this meeting was published in the Observer Tribune on February 5, 2009 and the Daily Record on January 29, 2009 in accordance with the Open Public Meetings Act and was posted on the bulletin board of the Phoenix House.

**ATTENDANCE**

Mr. Palestina – Present  
Mr. Peck – Present (7:45 p.m.)  
Mr. Peralta – Present  
Mr. Schumacher – Absent

Mr. Seavey - Present  
Mr. Smith - Present  
Mr. Santo - Present

Also Present:

Mr. MacDonald, Attorney  
Mr. Humbert, Planner  
Mr. Hansen, Engineer  
Dr. Eisenstein, Telecommunications Consultant

**PUBLIC COMMENT**

Chair Santo opened the meeting to public comment or questions on items that were not on the agenda. There being none, the public comment session was closed.

**APPROVAL OF MINUTES**

On motion by Mr. Seavey, second by Mr. Smith and carried, the minutes of the special meeting of May 13, 2009 were approved as written.

**HEARINGS**

**Horne, Cecilia** – Hardship Variance

Block 406, Lot 20, 12 Birch Street

Mr. MacDonald, Esq. reviewed the public notices and advised that the utilities had not been notified. Applicant will notice the utilities for the July 7, 2009 regular meeting. Mr. MacDonald, Esq. announced that notice to all other property owners and the newspaper notification had been completed. He stated that any party present should return in July for the hearing. Ms. Horne will also send a regular mail notice to all other parties advising of the July 7, 2009 date. The application is carried to the July regular meeting.

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Mr. Peralta recused from the Board.

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**Omnipoint Communications, Inc. and New York SMSA Limited Partnership d/b/a Verizon Wireless** – Use and Other required variances: **Continuation**

Block 801, Lot 20, Kings Shopping Center

Present: Richard Schneider, Esq., Attorney for the Applicant

On Behalf of Mr. Isko:  
Robert Simon, Esq., Attorney  
Ronald Graiff, RF Engineer

The hearing continued with the cross examination of Mr. Graiff by Dr. Eisenstein.

Dr. Eisenstein addressed a series of questions to Mr. Graiff relating to the protocol of the “gold standard”. In terms of his testimony relating to driving at variable speeds, Mr. Graiff stated that he was addressing the need to measure two types of systems: T-Mobile and Verizon. He referenced the Lee criteria. He would drive the area not exceeding the speed limit once for each carrier. The roads he would request the applicant to drive would include Route 24 in the area of the gap and the feeder roads to Main Street in the gap area. He would also request the applicant to drive the non-gap areas to see if there were any anomalies. The number of streets to be driven would be a function of time and money. Route 24 and the feeder roads would be priority. Coverage would only be known in the areas measured on the street and not in between.

Moving to the next series of questions based on previous testimony, Dr. Eisenstein asked Mr. Graiff to explain fading to the Board. Mr. Graiff explained Rayleigh fading as a rapid fading of the signal at a point due to propagation anomalies between the transmit point and the receive point. He did not define deep fading. Dr. Eisenstein commented that understanding fading is important as one should know if the measurement is being taken at the high point in the fade or at a low point in the fade. Dr. Eisenstein and Mr. Graiff had a technical exchange on fading and power. Dr. Eisenstein also referred to the work done by Okumura and Hata who concluded that one could not test drive. They took median measurements and walked lawns. Mr. Graiff responded that it was state of the art at the time.

Dr. Eisenstein questioned Mr. Graiff on whether it was his expert opinion that a 10 ft. difference in the height of an antenna on a pole makes no difference in the actual power that is received at some distance from the pole. Mr. Graiff stated that in this area with its rolling hills, a model cannot resolve 10 ft. Dr. Eisenstein clarified that his question did not have anything to do with models, but was directed at the difference in power. Dr. Eisenstein continued questioning Mr. Graiff on various 10 ft. differentials. He and Mr. Graiff disagreed on the intent of Mr. Graiff's previous testimony related to the difference in 10 ft. and 20 ft. intervals.

Dr. Eisenstein continued questioning Mr. Graiff on whether it was his expert opinion that there is no way to determine actual coverage from the propagation plots and the “sea of green.” Mr. Graiff replied that the Board needed to know if there was coverage or not for a critical evaluation.

Dr. Eisenstein questioned Mr. Graiff's previous testimony that 39 dbu which was used in original applications did not have any relevance to this application. Mr. Graiff referred to the original FCC application for the five markets outlined in his resume. The FCC required 39 dbu coverage to the cellular geographic service area (CGSA) in the application. The weak standard of 39 dbu was for initial build out in five years to cover a percentage of the CGSA. That was what the commission required, as opposed to what the applicant wanted to do. Dr. Eisenstein disagreed with Mr. Graiff that 39dbu is weaker than -84 dbm.

Moving on to Mr. Graiff's testimony on the downtilt of the antenna, Dr. Eisenstein questioned whether Mr. Graiff had considered the beam width in his calculations. Mr. Graiff stated that it was taken into consideration as it is included in the formula. After a technical exchange about antenna downturn and tilt and a re-visitation of Mr. Graiff's calculations, Mr. Graiff explained that he would have questioned the downturn of the Conifer antennae as part of a critical evaluation. Responding to Dr. Eisenstein on whether he had reviewed the specifications of the antennae manufacturers, Mr. Graiff stated that he has never seen a manufacturer recommend downtilt to an applicant. The model number of the antenna usually provides enough information.

Questioning moved to I-9, the propagation plots from the hearing that was held in Mendham Township. Responding to Dr. Eisenstein, Mr. Graiff did not know the bin sizes for the plots and stated that the power would have been 25, 92 and 32 watts. The model used was Longley-Rice. He did not know the diffraction method or the clutter types used. He knew the antenna height, but not the gains. He did not know if the model was tuned with test drive data. Dr. Eisenstein questioned why Mr. Graiff would be so critical of the models used in this case, yet did not question those used in the Township case.

Mr. Smith questioned whether there were discrepancies between the computer models and the drive tests in other municipalities in which Mr. Graiff consulted. Mr. Graiff responded that in every case there is a difference. In one case it was so significant the Board chose to use the drive test as a way of judging the existing coverage and what the cell site could do. In terms of whether there was an impact from topography differences or the location of structures, Mr. Graiff explained that in central or northern New Jersey, the Hudson Valley and Connecticut the topography is not all the same, but it is relative. Most of the municipalities are semi-rural, rural or suburban. Most of the differences are seen on the inside perimeter of the “sea of green”.

Responding to Mr. Palestina on whether he was recommending a drive test, Mr. Graiff stated that he would require the applicant to do a drive test of the proposed and the existing facilities. Dr. Eisenstein advised that drive tests are a snapshot in time and best used to tune the model. The models are based on median coverage averaged and medianized over the seasons, over the time of day, over the fading, and over all the conditions. The question to be answered is how is the system to be designed. He did not see the need for a drive test in the case of this application.

Mr. Palestina responded that the Board is trying to determine whether there is a gap and questioned again whether Dr. Eisenstein would recommend a drive test to fine tune the model. He did not. He explained that the carrier is entitled to substantially better than mediocre service which is interpreted as a certain power level throughout the area. Responding to Mr. Palestina's concern about the perceived uncertainty of a gap given the ability to receive five bars in the area, Dr. Eisenstein advised that the Board needed to consider whether there was an acceptable design criterion, not just whether or not a call can be made. The propagation models have been tuned with a drive test.

Responding to Mr. Peck on whether the drive test took place in Mendham Borough, Dr. Eisenstein stated that the models are tuned by driving areas with similar homes as Mendham Borough and other places that are suburban-rural or rural. Since the data is overlaid on the US Geological Survey, which takes into account the hills, valleys and rivers, big differences will not occur.

Mr. Seavey agreed with Mr. Palestina that coverage has gotten better since the Mendham Township site has been on-air. Discussion ensued among the Board members about the various places they could receive calls. When Mr. Pierson returned to testify, they would address the question again. Dr. Eisenstein advised that the applicants should not position the gaps as areas of no coverage as some coverage may exist.

Responding to Mr. Peck on whether he puts more credibility behind the drive test or the model when he advises a client, Mr. Graiff stated that once the model has been verified with a good set of existing system drive tests at different heights, he advises that there is realistic representation of the design criteria. There is no statement or requirement from the FCC on what signal level a carrier must provide to a municipality. The requirement existed for the initial five-year system build-out.

Mr. MacDonald, Esq. clarified that Mr. Graiff and Dr. Eisenstein were referring to Dr. Y. C. Lee in testimony and that "the gold standard" is Mr. Graiff's term. Mr. Graiff stated that it is the standard that he sets for review of any application. He conducts a critical review thoroughly questioning all information submitted by the applicants.

Chair questioned whether it would be worthwhile having an up-to-date propagation analysis now that Conifer Drive is live. Mr. Schneider, Esq. advised that in June 2008, Mr. Pierson introduced his exhibit and presented information. He read from that transcript that indicated that at the time the exhibit was prepared, the analysis was not solely based on computer propagation models, but was based on an existing signal strength from the bell tower and Verizon Wireless being live at Conifer Drive. Conifer was accounted for relative to Verizon. Mr. Pierson confirmed that in 2008 he sent a PierCon representative with drive test equipment to Mendham Borough to scan Verizon and Omnipoint. Verizon was on the air at Conifer Drive. The information was then used to create the plots presented.

Addressing the Chair on the fact that Omnipoint was not yet on air, Mr. Pierson stated that Verizon and Omnipoint operate at 1900 megahertz. He knows the power outputs of both and the parameters, and they result in extremely similar propagation analysis. The Verizon information was utilized to verify Omnipoint for Conifer Drive. One would be cutting hairs to find the differences.

Responding to Mr. Palestina, Mr. Pierson stated that the drive test was conducted on May 20, 2008 on the existing network. The Board has not seen the results of the drive test; they have seen the results of the propagation. The results of the drive test were not materially different than the results of the propagation from the propagation model. He defined "materially" as about 200 ft.

Mr. Palestina summarized that based on the discussion, there is drive test data with Conifer Drive -Verizon live. There is a propagation model and the drive-test data has been used to fine tune it. Mr. Pierson agreed. Chair noted the significance of the new testimony indicating that it was the first time that the Board heard it. Dr. Eisenstein advised that he had previously seen the notation on Exhibit A-2.

Mr. Seavey stated that he would like to have a better understanding of why, as an extra cell tower has not been added in the area, the local residents seem to have better coverage now than before. He questioned whether the drive test had covered the change in power levels as well. Mr. Pierson stated he would cover it in a review.

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Board took a 10 minute break

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As the original cell phones were considered car phones, Mr. MacDonald, Esq. questioned whether there is any difference in the gap testing for vehicle use versus on the street. He questioned use of the phone while driving by versus standing in a gap and making a call. He wanted to assure that the witnesses and the Board were analyzing the gap in the same way.

Dr. Eisenstein advised that it was a multipart question. He explained that if a meter registered -85 dbm on the street, that same power level would be diminished in a car as it absorbs some of the power. The -85 on the street might be -90 in the car. It could also be diminished by holding the cell phone on the opposite side of a head from the antenna. Going into a home causes another diminishment in power, and it could be substantial in a basement as opposed to a second floor. Different construction materials in the homes would also make a difference. People today may be in different locations making a call. Decided court cases in New Jersey have said that -85 dbm power level on the street is a reasonable design criteria to use.

Addressing the differences in the old and new phones, Dr. Eisenstein explained that the early car cell phones were fairly high-powered devices. They were also very bad analogue devices communicating in a two-way system. They needed a lot more power to transmit back to the antenna site and from the antenna site to the phone. Negative 85 worked at that time as well as a design criteria. Over time, the phones have gotten smaller, but the batteries in the phone have gotten even smaller coupled with people wanting to have eight days of stand-by power. As a result, the power that the phones transmit now has gone way down. As the power does not change coming out of the tower or the cell phone, in some cases carriers are asking for -74 dbm, more power, and the site is installed closer to where the people are using the phones to achieve it.

Discussing signal strength, Dr. Eisenstein continued that - 85 dbm is the signal from the tower that is received on the street some distance from the tower, but the signal must also get from the cell phone to the tower. The phones put out one tenth of a watt to six tenths of a watt which is exceeding small amounts. While there are more sensitive antennas and receiving equipment at the receiving end of the tower, the criteria for whether or not the phone will be able to communicate with the tower is -85 dbm at the location of the phone. It might be -125 at the phone, but the tower can receive given the sensitive equipment. It is not particularly relevant whether one is distinguishing between a citizen standing in place versus someone driving in a vehicle. If there is an adequate power level, then from the viewpoint of coverage there is adequate coverage. There could be -85 dbm, but if the phone is in a briefcase one might not be able to call out.

Drawing on Mr. Graiff's experience with other municipalities, Mr. MacDonald, Esq. asked Graiff if he came across any business advantage or economic motivation for a carrier to claim that they had a gap and needed a complete new installation. Time and expense are involved. Mr. Graiff offered his opinion that many times the carrier's engineering department would put together the need for a tower, and they would develop the height and power required. At times when he was asked to testify to the need, he did not as his opinion was that the tower was too tall. It is a corporate mind set. For example, one carrier uses 60,000 watt diesel generators for each of its sites. This is a carryover from a blackout in which many cell sites died. It should be a balance between what the carrier insists that it must have and what it really needs to make the system work to provide the service that will serve the community.

Chair opened the meeting to questions by the public.

Ms. Susan Kaplan, 19 Aberdeen Drive, asked Mr. Graiff if the FCC, not the TCA define what they mean by reliable service. He replied that he has reviewed Part 22 and 24 of the rules many times, but has not found an instance where the term or service is defined as a specific number. They also do not define what they mean by adequate service. Differentiating between coverage and capacity for Ms. Kaplan, Mr. Graiff explained with examples that capacity is the ability of a cellular system or a PCS system to handle the traffic. Having to add channels or do something else to improve the number of calls is a capacity issue. There needs to be capacity to have a coverage issue. Coverage deals with not having a signal in the area.

Explaining the difference between a dropped call, a missed call and a blocked call, Mr. Graiff stated that a blocked call does not go through as a function of capacity. A dropped call is a call that is on the system, but due to a lack of coverage on an existing a cell site or the inability of an adjacent cell site to handle additional traffic, it is dropped. He did not define a missed call.

In response to Ms. Kaplan's request to distinguish between a cellular communications tower versus a monopole, Mr. Graiff stated that a monopole would be a steel tubular structure that is slightly tapered. It is relatively slender, 6 ft at the base and 2 feet at the top. A tower can take two forms, a lattice tower and a guyed tower. A lattice tower is a self-supporting structure with up to four legs tied together with cross-members and braces. It begins at 20 ft. at the bottom and tapers to 2 to 3 feet at the top. A guyed tower is a uniform cross-section structure also, but it is not tapered and has the same width at the bottom as it does at the top. It is held up by the guy wires that attach at points along the tower to anchors at the base.

Addressing a crane test, Mr. Graiff advised that it is usually done in the case of a new site. A test antenna is elevated to various heights that have been determined by the carrier or determined by the ordinance. The crane supports the antenna while the CW drive tests are done to determine what the coverage from the site would be. A test in November would be less credible than in August due to attenuation. Following with a reply on ordinance development, Mr. Graiff stated that there is usually a separate checklist for completeness as part of the municipal ordinance.

Mr. Lupo, 17 Dean Road, questioned whether there are any differences to the user in 1900 megahertz and 850 megahertz frequencies. Mr. Graiff stated that it is totally transparent. Most phones sold today are quad band phones. In terms of a 911 call, Mr. Graiff responded that if there were a cellular system capable of being accessed and there were two carriers in town, and they both used the same access method, it would be transparent. Mr. Lupo's question on whether law enforcement tickets could be issued if there was no coverage in the area was objected to by Mr. Schneider, Esq. who advised that it was not in the area of Mr. Graiff's expertise.

Responding to Mr. Lupo on reliability, Mr. Graiff explained that T-Mobile designs their system to receive a signal strength that will give them 95 percent reliability. Mr. Schneider, Esq. objected stating there is nothing in the record substantiating it.

Addressing Mr. Lupo's question on whether a CW drive test is the only type, Mr. Graiff referenced Verizon who has a valuation department with the job of constantly monitoring the RF performance of the system. It is done by drive testing. They measure such things as signal strengths, clutter rates, and blockage. That data could be used to verify the model.

Mr. Lupo questioned whether there were minimum heights associated with the models. He commented on the 97 foot monopole discussion at the Fire Department. Mr. Graiff answered that the Hata model is good from 30 meters, about 98 feet, to 200 meters. As that requires the tower to be taller than the one measured for the Fire Department, he questioned the test at less than 30 meters. If one violates the standards of the model then it is intuitive that the results would be violated.

Responding to Mr. Lupo on whether the Borough was limiting itself by only discussing a tower to accommodate four carriers when others were entering the market, Mr. Graiff stated that carriers today are combining different systems into one antenna array. He cited Verizon with 850 and 1900 megahertz using one layer of antennae as both systems are inside the same antenna. Since their merger, Sprint and Nextel are also combining the arrays to cut down on rent. T-Mobile is introducing a new technology that operates with dual and tri-band antennae. If antennae can be combined into one layer they can be spaced closer than 10 ft. If another carrier comes along, the proposed tower may or may not be the place for them.

There being no additional questions from the public, Chair closed the public session.

Discussion took place on the plan for the continuation of the hearing at the July 7 regular meeting and availability of witnesses. In the course of discussion Messrs. Simon and Schneider, Esq. exchanged comments on whether the drive test data should be made available before the next meeting. It was finally determined that any test drive data would be made to Dr. Eisenstein who would pass it on to the Board.

Mr. Schneider, Esq. announced that the applicant grants an extension of time and no further notice will be made. At the July 7 meeting, he will cross-examine Mr. Graiff and Mr. Pierson will be recalled if necessary.

**ADJOURNMENT**

There being no additional business to come before the Board, on motion duly made, seconded and carried, Chair Santo adjourned the meeting at 10:50 p.m. The next regular meeting of the Board of Adjustment is Tuesday, July 7, 2009 at 7:30 p.m. at the Garabrant Center, 4 Wilson Street, Mendham, NJ.

Respectfully submitted,

Diana Callahan  
Recording Secretary