

June 18, 2019

Mashpee Planning Board
16 Great Neck Road
Mashpee, MA 02649

**SUBJECT: 101 RED BROOK ROAD – SPECIAL PERMIT APPLICATION
FEASIBILITY OF ALTERNATIVE TECHNOLOGIES**

Members of the Planning Board:

Over the course of the various Cape Cod Commission public meetings and/or Mashpee Planning Board meetings, there have been brief discussions regarding technologies such as small cells as an alternative solution to the proposed facility. The intent of this letter is to provide additional information and further supplement the application as it relates specifically to Verizon Wireless' network needs and design strategy.

To provide ubiquitous and reliable network access to its customers, Verizon Wireless utilizes a variety of available technologies to deploy their wireless services. These technologies can generally be separated into macro-sites, small cells and CRAN nodes, and indoor and outdoor DAS (Distributed Antenna Systems). The deployment of a particular technology is largely dependent upon the specific network needs and type of environment it will be used in, such that each technology complements the others to establish a more robust overall network.

Macro-sites, such as the proposed facility at 101 Red Brook Road, are the more common type of solution applicable to most environments, whether it be a rural area, or busy urban center. These sites typically consist of an antenna support structure, such as a building or tower, with three sectors of antennas intended to serve a broad geographic area around the site. Macro-sites have long been deployed as part of the initial 1st generation analog networks in the 1980's. As wireless technologies have evolved to 2nd, 3rd, and now 4th generation networks, the macro-site infrastructure has continued to be a vital component of these networks because they provide the first critical layer of broad area coverage needed to support wireless network connectivity.

Small cells and CRAN nodes (Centralized Radio Access Network) are a fairly recent addition to the set of available solutions used to deploy modern wireless services. Verizon small cell and CRAN applications generally consist of a smaller antenna (in comparison to that used on a macro-site) deployed on utility poles, light poles, or short rooftops, and are typically used as a capacity solution intended to serve discrete, isolated areas of heavy network usage such as strip malls, schools, town commons, high traffic areas/intersections, etc. These solutions operate at the same frequencies as the macro-sites, and their coverage potential is subject to the same impacts of surrounding obstructions or "clutter," such as trees, buildings, and topographical variations. Because the smaller antennas are often mounted on shorter structures and below much of the surrounding "clutter," their coverage areas are essentially limited to open line-of-sight stretches up and down the adjacent roads, and across open areas often surrounding the examples listed above. A typical small cell installation is shown in the figure inset to the right. Each small cell or CRAN node is connected via fiber optic cable to a central hub, which can support multiple small cells or CRAN node locations. Because they are intended to serve isolated "hot spots" of heavy usage, application of this sort of technology is not typically effective at addressing broader coverage gaps, such as the intended objectives of the proposed site.

Similar to small cells and CRANs, indoor and outdoor DAS solutions are also intended for use as a solution in discrete areas; however, they are often operated as a lower powered, neutral host solution in which the DAS is owned and maintained by a



party. Multiple wireless carriers are able to "plug into" the DAS at a central head-end location. Indoor/outdoor DAS systems can be found in large sporting venues such as Fenway Park, TD Bank North Garden, Gillette Stadium, casinos, and parking lots around such complexes, as well as in major traffic corridors such as the Central Artery Tunnel.

As Verizon's network continues to grow, small cells and DAS may have their place in Mashpee to complement the service provided by the proposed and existing macro-sites to address capacity demand and improve weaker, fringe coverage areas. However, based on Verizon Wireless' present objectives in Mashpee and the surrounding area, we have concluded that the proposed macro-site solution is the most appropriate technology available to serve its network needs in this area at this time, and that alternative technologies discussed herein are not a feasible alternative.

To the extent there are any questions related to the use of alternate technologies, we welcome any inquiries and will attempt to address them during the next scheduled meeting on June 19, 2019.

Regards,



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