SMART COMMUNITIES PLAN FOR MOBILE

Addressing Coverage & Capacity

Meeting Wireless Demands Requires Infrastructure

Americans' demands for mobile services show no sign of slowing. In fact, a recent CTIA annual survey found that 2016 mobile data use was 35 times 2010's traffic volume. Mobile networks have shifted from being predominantly voice networks to transporting data. According to CTIA, video is 61% of mobile traffic today and that's expected to climb to 77% by 2020.

The Federal Communications Commission recently recognized that the "explosion in wireless connectivity is driving an urgent and growing need for additional infrastructure technologies."

To meet unrelenting demand, T-Mobile must address the challenges of coverage and capacity with denser networks, and infrastructure that incorporates different technologies to solve the complex challenges of transporting vast amounts of data. Traditional macro cell sites, small cells, and distributed antenna systems are a few examples.

Wireless Networks Need Capacity

Ever had what looks like five bars of coverage on your mobile phone yet can't send a text message or get an email? Just like roads, which carry physical traffic, wireless infrastructure carries digital traffic. As with traffic congestion, when too much information is jammed into the network tunnel, the speed of the network slows, just like rush hour on the local Interstate. This is due to a finite amount of spectrum carrying digital traffic.

Networks Rely on Radio Waves and Antennas

Macro sites and small cells play vital roles in delivering wireless services, and the right solution depends on the unique needs and circumstances of the network. Macro sites and small cells must work together to support optimal coverage and capacity.

Traditional macro sites include antennas that are usually oriented in three directions and can be installed on rooftops, building facades, monopoles and other structures that provide the correct height and location to accommodate network needs. These traditional antenna support structures handle many users across a broad geographic area. They can provide solutions to both coverage and capacity issues and provide the backbone for small cells.

Only 3-5% of network traffic on T-Mobile's network comes from voice services. The rest is data: texts, photos, videos, and live streaming events.

High-performance networks are every bit as important to the future strength of cities and counties as other infrastructure systems, including transportation, water and waste management. ***(Center for Digital Government)***

Small Cells in Public Right-of-Way Pave the Way to 5G

To meet the challenges of increased digital consumption, a denser network is essential. Small cells located along transportation corridors, streets, and places where people gather are key. Small cells are built to handle the newest 4G technologies – and soon-to-be-deployed next generation 5G technologies. They cover a small geographic footprint, have a smaller form factor than traditional equipment, and precisely expand network coverage while adding capacity.

Spectrum is the Lifeblood of Mobile Broadband

Reliable broadband coverage is a top priority for T-Mobile. In early 2017, T-Mobile acquired 600 MHz low-band spectrum that will stretch across the entire continental United States. This low-band spectrum – which travels farther and provides better connectivity inside homes, offices, schools and buildings – will result in higher quality services in rural areas.

Building the Infrastructure Together

Local policies can accelerate or delay the successful build-out of wireless networks. Keeping up with ever-growing consumer demand by expanding wireless networks and building the next generation of wireless technologies will require clear policies and regulations from local governments.

To meet the demand for mobile broadband services, address coverage and capacity issues, and take advantage of emerging 5G/IoT technologies, optimizing the network with existing and new macro sites as well as dense smaller cell antennas, often using rights of way and public corridors, is essential.

Achieving this connectivity will require a cooperative effort. Careful consideration must be given to our collective challenges:

- **Streamlined permitting and processes –** Building a network that will depend in part on hundreds of small sites will require updated permitting policies and processes to avoid permitting bottlenecks.
- **Right-of-way applications –** Access to sites such as government-owned utility poles, streetlights and other street fixtures will greatly facilitate 5G network deployment.
- **Fee structures –** A reasonable fee structure scalable for 5G network deployment will take into consideration the need for a large number of small sites, and the significant community benefits of building the infrastructure needed for smart communities to flourish.

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For more information, check out HowMobileWorks.com, or contact us at: SitingRelations@T-Mobile.com