# 5G Technology: Smart Decisions for Smart Cities

5G wireless technology promises many benefits for cities and their residents, but cities need clear, well-thought-out policies for deploying the new infrastructure.

By Larry Thompson / *Vantage Point Solutions*

Personal wireless service (PWS) providers are beginning to call for 5G technology deployments in U.S. communities. Behind the scenes, city leaders must clear significant legal, technical, regulatory and engineering hurdles to allow 5G to be developed cohesively and in a manner that does not steamroller the city's values and those of its citizens. Here are some questions and considerations cities should work through as they determine their approaches to 5G and other new smart-city technologies.

Broadband availability is increasingly important to economic vitality and quality of life. As new generations of wireless and wireline broadband technologies develop, city officials must balance many competing priorities: serving the best interests of their citizens, promoting digital inclusion, appropriately pricing fees for rights-of-way access, protecting existing infrastructure, upholding community values, making appropriate investments for their economic environments, and adopting adequate technology standards that balance future-proofing against the risk of leaving current business and community needs behind. All the while, vendors and researchers press the latest, greatest services, complete with network and infrastructure wish lists, which may or may not be in a city's best interests.

In short, meeting the needs of cities, their residents and service providers can be difficult. Well-defined policies and procedures work in all parties' best interests and are critical to the balance. With thoughtful planning, cities can minimize the impacts to their staffs and resources while allowing faster deployment of advanced technologies to their citizens.

However, even the most forward-thinking communities are likely to be challenged in their ability to navigate legal, technical and financial questions, such as the following: What state and federal laws are in play? What are the legal ramifications of the contemplated courses of action? What negative impacts will there be on the city's infrastructure and citizens? To what liability will the city be exposed, and how can that liability be minimized? How are other communities handling these questions, and are those models a good fit for my city?

The Broadband Development Advisory Committee appointed by the FCC is in the process of developing model codes that detail municipal best practices for providing access to rights-of-way and municipal facilities. Once finalized, these model codes will provide a framework to help cities reach their network goals. However, even with a framework, these issues can be complex. It will be critical for cities to work with consultants, engineers and policy experts to navigate these codes for avenues to achieve their network goals and protect their priorities and interests.

These questions become especially pronounced as 5G wireless technology comes closer to market. 5G is estimated to be available in many markets by 2020, so PWS providers and associated infrastructure providers (collectively, "providers") are gearing up now. Cities must prepare now for the coming deployments. Doing nothing is not an option.

The effective deployment of next-generation wireless networks in any community will depend on the technical and aesthetic guidelines that cities establish and the regulations that emerge from state and federal bodies. Developing guidelines that conform with regulations will, in turn, require technical expertise, legal understanding, sound engineering and regulatory guidance. It's a lot for communities to tackle, and it can be tempting simply to rely on a provider's recommendation in the hope that the end result will meet community needs. However, this approach can result in a solution that favors one provider over another and may not meet the needs of the city or its citizens.

To ensure citizens enjoy all that the new broadband technologies have to offer, each city should proactively develop an approach inherently aligned with its goals. The building blocks of one such approach are described below.

## UNDERSTAND THE RISKS

The ubiquitous availability of wireless broadband enhances commerce, education and quality of life. But as more and more people depend on wireless devices, the demands placed on wireless networks increase rapidly. These demands are not only for basic communications but also for access to increasingly demanding internet content, such as ever-higher-definition video, as well as for the internet of things (IoT) and for mission-critical applications, such as autonomous vehicles.

Meeting those demands will require many more wireless facilities than are typically deployed today. 5G networks will have many more cells than current wireless technologies, and each cell will serve a much smaller geographic area than today's cells. Though traditional macro cell towers have been getting somewhat smaller and closer together to increase overall broadband capacity, 5G networks will have to use very closely spaced deployments of small cells. Small cells also permit the low-power use of very high, millimeter-wave frequencies. These frequencies have significantly higher capacity to carry broadband, but they have been largely unusable for mobile broadband to date because of their very short range. Over time, small cells will likely cover entire communities, but initially they will likely be deployed in densely populated areas.

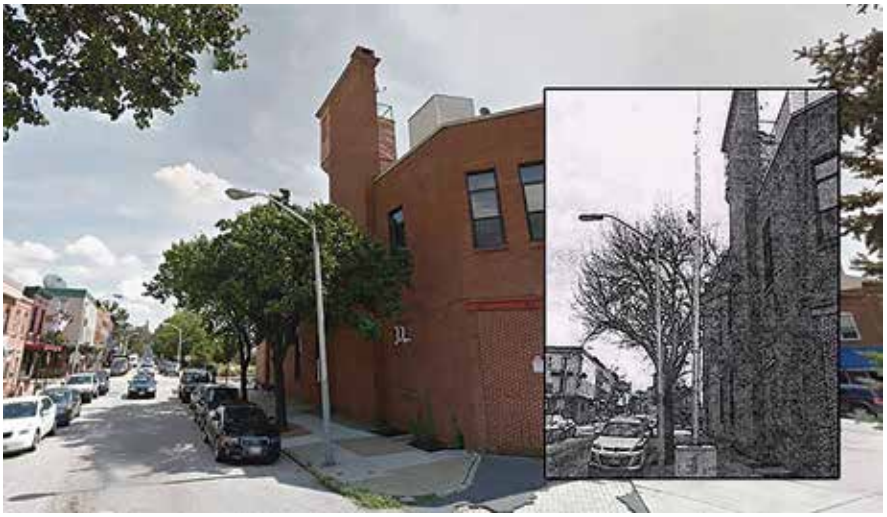


Photo by Omar Masry, AICP

In Baltimore, a wireless infrastructure company apparently installed a new pole on the sidewalk without permits (inset photo to right, on concrete base).

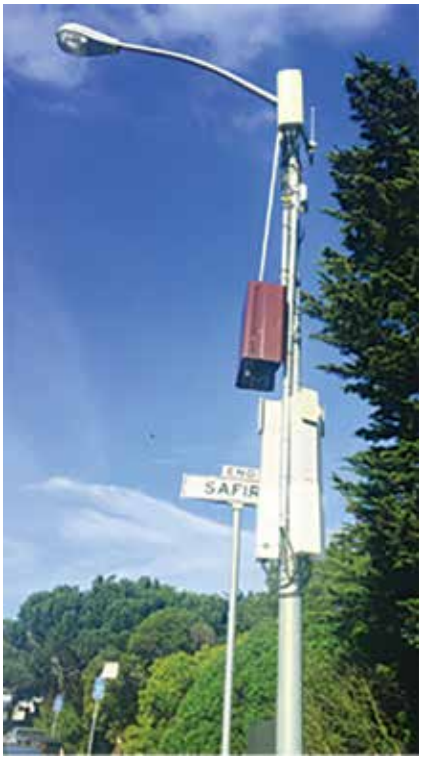
Small-cell deployments could, in many cases, be accomplished in these areas using private property, but using public rights-of-way is often more economical and allows carriers to deploy much faster. Unfortunately, these deployments will likely occur in the very areas where cities have invested or plan to invest in area beautification or seek to promote development through aesthetic design standards, requirements for placement of utilities underground, and so forth. That investment and the city's aesthetics are at risk if wireless facilities of varying designs, sizes and conspicuousness are placed throughout these areas. In addition, adding new structures in the rights-of-way can present significant risks to vehicular safety and pedestrian access if not done properly.

## ESTABLISH COMMUNITY PRIORITIES AND RESOURCES

Any useful plan relies on a clear direction for a city's goals and priorities. A plan for advanced wireless capabilities is no different. What are your goals as a city? What trade-offs are you willing to make to achieve those goals? What priorities must be balanced?

No two communities will answer these questions the same way, and it is important to discuss them openly and honestly and to have as much information available as possible. Here are items to consider:

- Understanding the evolving wireless services and their level of desirability for the city, including support for current or potential smart-city applications
- Deployment areas, ranging from narrowly targeted to citywide enhanced mobile broadband and IoT coverage
- Status and location of fiber optic deployment and ownership of duct in each area



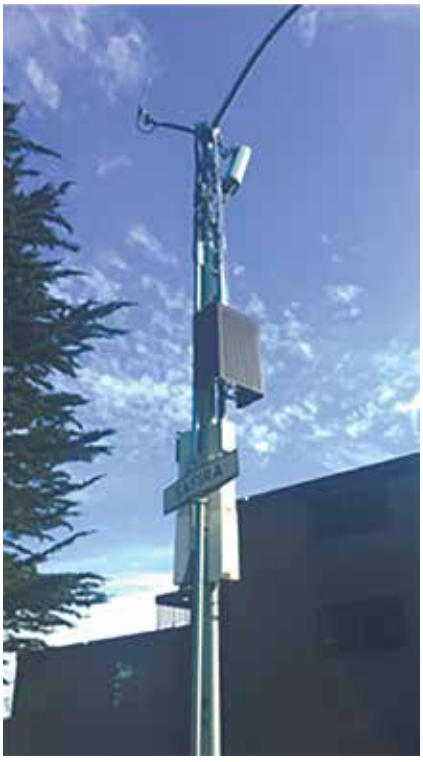


Photo by Omar Masry, AICP

A neutral host carrier built antennas and equipment for two wireless carriers without proper permits.

Photo by STEALTH® Concealment Solutions

Small cells can be made to conform with city aesthetic standards.

- Community aesthetic preferences for each area
- City capacity for expenses such as liability and ongoing administrative and maintenance costs
- Fees associated with access to rights-of-way or to city-owned or -controlled assets within them, such as streetlight poles or other street furniture
- Willingness of utility companies that own poles to cooperate in small-cell deployment
- Willingness and ability of the city to enter into long-term, public-private partnerships with providers or vendors
- Precedents set by or conflicts with any other city contract arrangements, including franchise agreements.

## WHY A REACTIVE APPROACH IS RISKY

Evaluating wireless facilities applications on a case-by-case basis without having a master plan in place poses additional risks.

For example, say carrier 1 provides applications for multiple sites in a city. Two weeks after these applications are approved, carrier 2 submits applications for sites that overlap carrier 1's locations. Carrier 2 is denied and sues. Alternatively, carrier 2 is also approved, and the city ends up with rights-of-way that are crowded and unsightly. Historic areas provide even more challenges to determining which applications are approved.

Cities that take a proactive approach to generating a master plan will go a long way to heading off difficult and expensive problems down the road.

Once a city has defined its goals and available resources, it has laid the groundwork for a solution that will allow it to address cohesively the legal, technical, regulatory and engineering hurdles to permitting 5G developments in a manner that honors the city's values and citizens' sensibilities.

## ESTABLISH EXPERTISE, POLICY AND PROCEDURES

City codes or processes are particularly necessary for areas in which a city has invested heavily in aesthetic improvements (or will in the future). Cities should work with counsel and consultants knowledgeable in telecommunications public policy to develop the right set of best practices that will allow for smooth deployment of advanced wireless infrastructure in a manner consistent with community values. Achieving the city's goals can be accomplished only through good planning – not by chance.

Well-developed policies and procedures are also needed to minimize the resources that otherwise would

## KEY QUESTIONS FOR WIRELESS DEPLOYMENT AND SMART-CITY PLANNING

- Does your city have existing guidelines for aesthetics? Who is responsible for enforcing adherence to them? Do guidelines fluctuate based on area/neighborhood/zoning classification?
- Are city assets, such as utility poles or existing buried fiber, electronically documented?
- Does your city have an updated right-of-way code?
- Does your city have existing procedures for placement of equipment such as that required for a dense, 5G, small-cell network?
- What city-operated, next-generation technology services is your city exploring? These may include, for example, citywide public Wi-Fi and/or more advanced and emerging smart-city applications.
- How can your city identify and sift through all the emerging smart-city applications, free of one-sided vendor promotion, to determine what applications may be useful and evaluate, weight, rate and prioritize them?

be required to review the onslaught of applications that could involve hundreds of towers from numerous providers and ensure that the results are best for the community. An overly simplistic approach that only provides physical scale limitations into which proposed installations might fit, regardless of their appearance, is grievously inadequate for protecting the city's economy and its aesthetic needs.

Properly established policy and procedures will help

- Limit placement of new structures in the rights-of-way
- Ensure uniformity of design within an area, consistent with covenants or guidelines for its development

A right-of-way code that is in sync with federal and state regulations can help protect a city's ability to obtain needed information and approve or disapprove applications.

- Create a design standard that covers all parts of a wireless facility and thus allows for more rapid approval of applications that meet the approved design standard – also reducing the work of city staff to accommodate approvals
- Provide for periodic review of technology to ensure that impacts on the public and property are minimized
- Provide for fair allocation of right-of-way assets and locations to PWS providers for licensing while preventing any one entity from monopolizing or warehousing scarce resources. "First come, first served" has been a de facto policy for many communities, but this may not be the best way to protect a city's interests or to speed deployment in some areas. A well-thought-out, provider-agnostic policy will speed and simplify deployment compared with the multiple reviews that otherwise may be required on a location-by-location basis.
- Move toward deployments that can accommodate future smart-city applications to improve efficiency, facilitate commerce and enhance quality of life. Many of these applications will be wireless and must be supported by or coexist with PWS deployments and their use of city assets, such as poles and street furniture.
- Set forth the delineation of responsibilities and obligations between the city and potential PWS providers.

With these decisions made, a community is well-positioned to face the coming applications and plans for small-cell wireless deployments. You will have a solid understanding of the risks of both action and inaction; a firm set of community priorities to guide your decision-making and a set of policies and procedures in place by which to review incoming proposals from PWS providers. You also will have identified areas in which you are limited in resources, expertise or capacity and can search for partners to accommodate these needs.

The demands small-cell deployments place on cities will be unlike those for any infrastructure build that has occurred in the past. Unique, specialized expertise will be required. The city should consider a partner that understands the comprehensive nature of the challenges, including both the legal and technical considerations. The partner should possess a deeply rooted understanding of the history and nature of PWS providers, as well as in-depth expertise in both wireless access and back-office data networks and security (including both physical and cybersecurity). Additionally, this expertise should be partnered with sufficient legal resources to address the rapidly changing federal or state laws, requirements, and regulations pertinent to the technology being considered.

A city that has well-defined policies and procedures will not only minimize the impact on the city's staff and resources but also allow faster deployment of the PWC network and benefit its citizens. That's a smart decision for any city. ❖

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## IS YOUR RIGHT-OF-WAY CODE CURRENT?

Federal and some state regulations provide legal frameworks that cities must follow when evaluating wireless applications. Do you have a right-of-way code and/or a process for evaluation that is in line with these laws?

For example, depending on the type of application submitted, there may be a 60-, 90- or 150-day shot clock for application determination. The shot clock may be tolled if the application is incomplete and the city communicates the missing items within 30 days of receipt of the application. A city that does not have a process in place for application intake and review may not have recourse to obtain critical pieces of information after the initial 30-day period. In addition, without a streamlined checklist and review process, the city may find that the incomplete application must be deemed approved at the end of the shot-clock period.

Cities should review their current right-of-way codes to make sure they are in sync with federal and state laws and clearly communicate the application submission requirements. From such a code, a city will be able to generate an intake process and evaluation checklist for internal use that will guide the process.