

July 2017

Small Cell Infrastructure in Denver



The City and County of Denver is receiving growing numbers of requests from wireless providers and wireless infrastructure companies to construct small cell facilities in the public right of way.

What are Small Cell facilities?

- Small Cell facilities are low-powered antennas that provide cellular and data coverage to smaller geographic areas, supplementing the larger cellular network.
- Small Cell equipment is proposed to be located on poles, wires, or buildings.
- Small Cell equipment is allowed in the public right of way per Federal and State Law just like other utilities.
- Small Cell equipment will initially meet current 4G (LTE) voice and data demands, but we understand it may be modified with future 5G higher speed equipment as technology changes.

What is the role of Denver Public Works related to Small Cell infrastructure?

- Denver Public Works reviews applications for Small Cell equipment in the public right of way.
- Requests for Small Cell equipment on new freestanding poles are processed as Encroachment Permits. State law requires the City to process applications in batches (currently 10 poles or less per application), and in 90 days or less.
- Denver Public Works is working with each proposing carrier to standardize the physical and aesthetic appearance of equipment as much as possible.
- Denver Public Works is having success requesting that applicants limit the height of new freestanding poles to less than 40 feet, similar to existing street lighting in the public right of way.
- Denver Public Works is encouraging co-location of new equipment onto existing poles and infrastructure in the public right of way wherever possible.

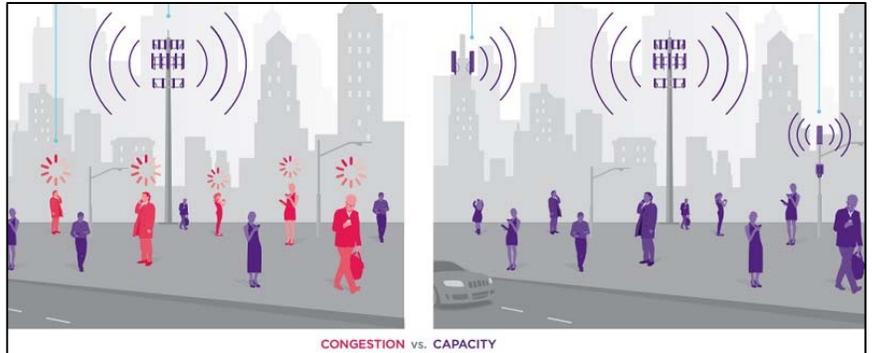


Small Cell Infrastructure is coming to Denver

Here's the current state of Small Cell technology, as we understand it from the wireless carrier industry.

1. Why are we seeing a surge in interest to install wireless infrastructure?

Researchers say mobile data traffic in North America has grown significantly, and is projected to continue increasing at a rapid rate with the proliferation of mobile devices. In our City there has been a surge in population and economic growth, and wireless provider companies are indicating that existing infrastructure is becoming congested and cannot continue to meet the demands of their customers.



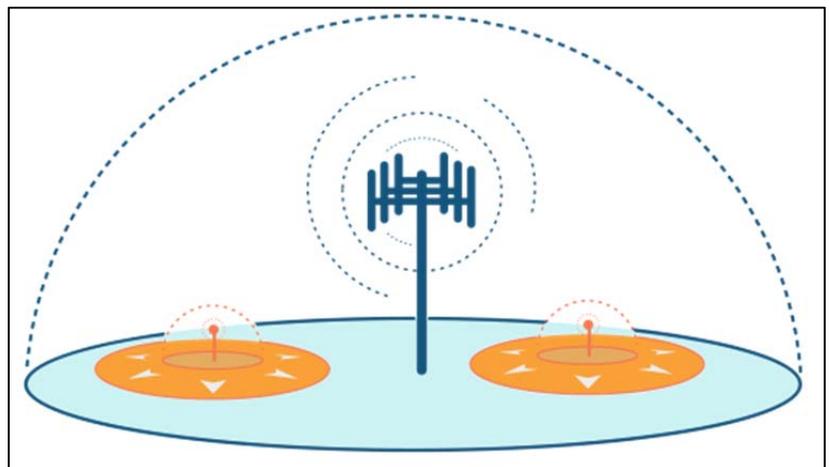
2. What type of infrastructure is needed?



Typical large cellular antenna

Up until recently, wireless phone service in general has been managed using large antennas mounted on towers located on both public and private property. Those antennas served relatively large areas, or "cells" up to several miles away. Many carriers have explained that existing cell sites are already becoming congested and that installing more cell towers will not keep up with projected demand that is growing rapidly.

To meet wireless demands, providers have begun using new low-powered antenna technology to "offload" cellular traffic from the larger cell towers. Each of these antennas serves a much smaller area. This type of wireless infrastructure is commonly called "Small Cell."



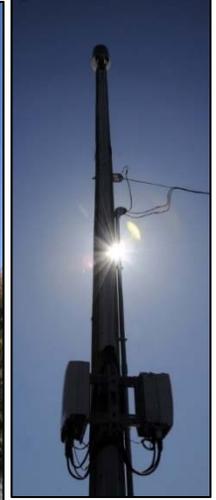
Data is transferred from Small Cells to large antenna

Small Cell antenna equipment is typically the size of a suitcase and must be under 20 cubic feet in total volume according to State law. The types of equipment and method of deployment being proposed in Denver will vary widely and depend upon the network needs and technology requirements of the various wireless providers. Typical antenna locations are expected to be:

- Mounted onto existing buildings on public and private property.
- Placed on or within new poles erected in the public right of way.
- Mounted on existing utility or street lighting poles.
- Strung on wires between existing poles.

There are an estimated 60,000 plus Small Cell units already operating nationwide. Requests for Small Cell antenna installations in the City of Denver are expected to rise in the coming years as wireless companies work to meet the increasing data demands of their customers. We understand hundreds, if not thousands, of additional Small Cell antennas may be proposed in Denver by cellular provider companies.

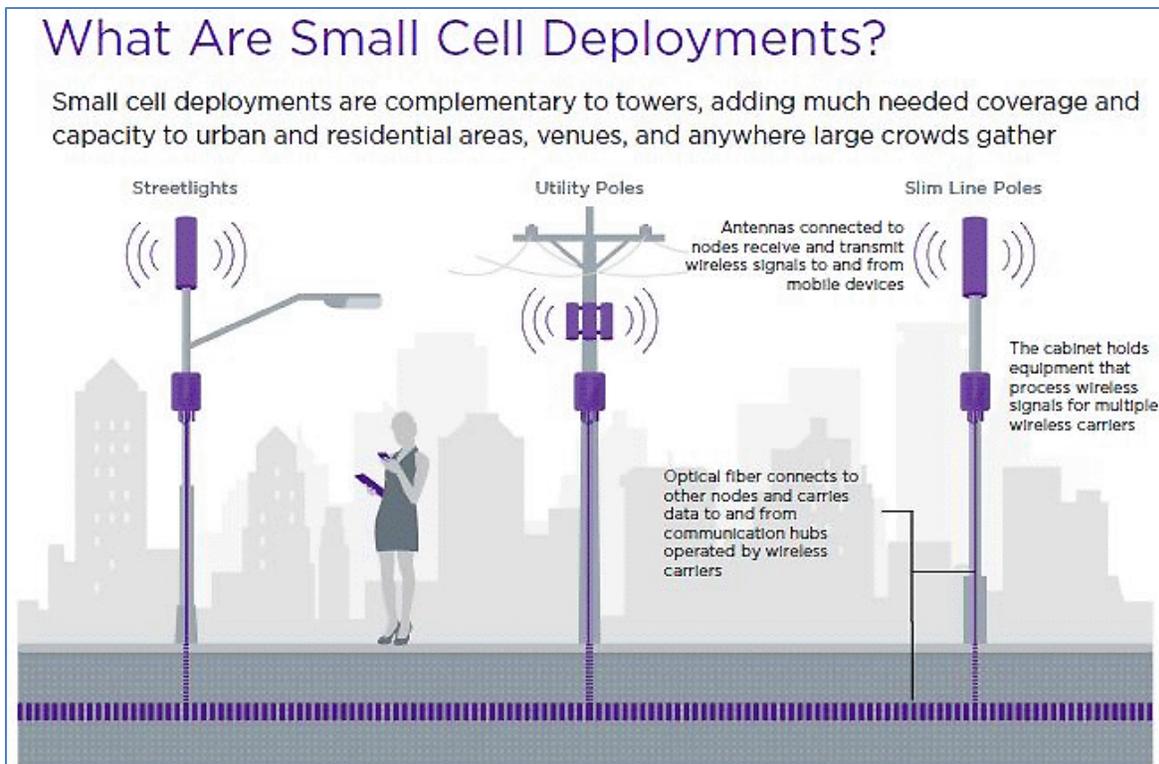
At this time, it appears that most new infrastructure being proposed today is servicing current 4G (LTE) cellular and data needs. However, wireless programs are already preparing plans for 5G wireless infrastructure of the future (higher speed data from densely placed antennas).



3. Types of Applicants

Denver has learned that the companies that intend to build Small Cell infrastructure follow different business models. Some companies will construct their own infrastructure to service wireless demand from their own customers (AT&T and Verizon Wireless, for example). Other companies will construct wireless infrastructure and then lease or sell service to wireless providers that do not wish to construct and own their own equipment (Crown Castle for T-Mobile, and Mobilitie for Sprint, for example).

4. Federal and State Law on Small Cell Infrastructure





Cell, and now Small Cell infrastructure is subject to the parameters of Federal and State law. Of note, the State of Colorado recently approved a new law in March of 2017 that establishes that wireless providers have the legal right to locate or co-locate Small Cell equipment in the public right of way in Colorado.

Most importantly, this new State law does not allow Denver to entirely deny or preclude legal Small Cell infrastructure. The City must also be non-discriminatory and competitively neutral, treating Small Cell infrastructure the same as other users of the right of way. The City still maintains the authority to regulate based on public health, safety, and welfare, and deny or require change to equipment that conflicts with other uses of the public right of way or

is otherwise unlawful.

Immediately following the passage of this State House Bill, the City experienced new interest and has received multiple applications for construction of cellular equipment in the public right of way.

5. Why can't they just place equipment on current poles in the right of way?

The City and County of Denver does not own or maintain most existing street lighting, utility, or traffic signal poles in the public right of way. Most of these poles are owned and maintained by Xcel Energy or other utility companies.

For years, Xcel and other utility companies have allowed the mounting of cellular equipment onto utility poles. These locations are preferred by Cellular companies as they already have electrical power. However, space on utility poles is becoming rarer, and increasingly eliminated as unsightly overhead lines are located underground.



Just recently, Xcel Energy announced its intention to allow companies to mount (or "co-locate") Small Cell equipment on existing **street light** poles in Denver. There are over 58,000 such poles throughout the City; however, it is unknown how many could possibly support additional equipment. The City estimates that once Xcel begins permitting co-locating on street lights, it will take a number of months for each company to reach final agreement with Xcel Energy, then additional time for individual pole location to be reviewed and approved. The City would not be responsible for directly permitting such installations.



It should also be noted that Xcel Energy also owns and maintains most of the traffic signal poles in Denver (typically located at street intersections). The City of Denver has an exclusive agreement with Xcel Energy to locate traffic signal and communication equipment, emergency response, and other safety equipment (cameras, etc.) on traffic signal poles. The City is carefully evaluating whether it will be possible for Xcel Energy to allow additional equipment on these poles, without conflicting in any way with current traffic or safety equipment.

6. Why can't cellular infrastructure be located on private property?

There is quite a bit of cellular infrastructure already located on private property. A quick glance around most parts of Denver will reveal some type of antenna on private property. Because of the complexities and length of time to create agreements with individual property owners, many companies have disclosed to the City that it is not feasible to deploy Small Cell equipment (that typically requires more locations in a given area) in this manner.

However, if and when a company identifies a good location for mounting Small Cell equipment on private property, it will be regulated by the City's Community Planning and Development Division using requirements of the current Denver [Zoning Code](#). The Zoning Code includes parameters for height, size, placement, etc. on private property to preserve the intent and character of the zoning district. Zoning Code requirements do not apply in the public right of way.



7. Why can't cellular infrastructure be combined onto one pole?

For now, the City understands that the siting of Small Cell antennas is dictated by the wireless provider and its customer's needs, terrain, and radio frequency modeling results. Each wireless provider has different objectives and may not need the same locations. Each carrier, who owns rights to a spectrum of operating frequency, states that some separation with competing antennas is necessary to avoid signal interference.

With that said, the City understands that Small Cell technology is evolving rapidly towards the ability to share antennas or even poles between multiple carriers. The City is exploring all options and is encouraging pilot combination or sharing programs that demonstrate how impact to the public right of way can be minimized.

8. How is the City handling Small Cell infrastructure proposed in the public right of way?

The City is currently reviewing all new pole applications in conjunction with federal and state law, as well as Denver Rules and Ordinances. Denver Public Works is the responsible entity for permitting any infrastructure, object, or construction in the public right of way.

Public Works currently performs careful consultation with top executive and program management staff from each wireless provider about its infrastructure program before the provider is allowed to submit any applications for approval. This ensures that each provider approaches the City in a consistent manner, and that the City's current policies and permitting procedures are well known at the outset.

Per State law, the City must allow each company to propose their infrastructure in the public right of way. Additionally, the City must offer permitting procedures that can process "bulk" Small Cell programs in batches, in 90 days or less, in lieu of requiring individual permits/approvals for each pole/antenna.

In response to these requirements, Public Works has established a plan review and permitting program that combines existing Utility Plan Review and Encroachment Permitting into one contiguous process. Each Small Cell program may submit batches of 10 or fewer new antenna poles per application. Each application will result in a revocable Encroachment Permit for each batch. The first Encroachment Permit from each unique company program requires approval of City Council. Each approved Encroachment Permit requires a \$200 annual fee to be paid, and every permit is revocable by the City under specified

circumstances. This system ensures that each Small Cell application follows the same procedures and satisfies the same standards as any other user of the public right of way, while minimizing City processing and administration labor.

Each application requires a complete and public-facing plan review process. The City Public Works Department logs each application for review by internal and external stakeholders (such as affected utility companies, etc.) on an electronic plan review website. The City attempts to notify affected special Districts or known neighborhood groups whenever it is notified of same; however, each applicant is responsible for proper communication of their proposed infrastructure. Although not required by current permit procedures, the City is currently studying whether current permit review practices should be amended to require an applicant to notify all adjacent property owner(s) of their proposed infrastructure during the review phase.

Any comments received from City regulatory staff or any interested stakeholders are accepted and must be addressed by the applicant. Comments that have technical merit (identifying unlawful or conflicting proposed infrastructure) are required to be fully resolved by the applicant.

If an Encroachment Permit is issued, each batch of new poles is approved to proceed to Right of Way Construction permitting.

9. Can the City limit or standardize Small Cell infrastructure?

As mentioned above, the City is currently exploring its policies and ordinances for Small Cell infrastructure within the parameters of Federal and State law. Under current law, it is not clear how the City can restrict height, design, or location (unless conflicting) of Small Cell infrastructure. However, as the City a whole considers new policies and rulemaking, the City Public Works Department is having success in coordinating expectations and recommendations through enhanced communication efforts at the outset of each company's program. So far each applicant has been receptive to:

- Considering standardizing pole design elements, color, location, etc. to meet intent and character of existing infrastructure in the public right of way.
- Limiting pole heights to match existing street lighting and other poles in the public right of way.
- Generally avoiding placing poles adjacent to parks and historical places.
- Encouraging pole and equipment designs that enclose as much equipment as possible to minimize visual impact.
- Co-locating equipment onto existing infrastructure wherever feasible.
- Installing consistent infrastructure that does not discriminate based on neighborhood type, demographic, or character.
- Exploring new concepts in combining equipment from multiple companies into specially designed poles.



Public Works has placed top priority in coordinating design elements for proposed Small Cell infrastructure, and how companies should maximize aesthetics while minimizing congestion of the public right of way. Below are several examples of Small Cell equipment recently constructed in Denver.



10. Who can I contact?

The City and County of Denver strongly encourages direct communication with the specific wireless provider or company who is installing specific equipment. City and County of Denver staff is also available to discuss processing and policy related questions. The following list of contacts that have approached the City so far is provided for your convenience:

NAME	EMAIL ADDRESS	AFFILIATION
Nancy Kuhn Denver Public Works, Communications & Marketing:	pw.comms@denvergov.org	
Jon Reynolds Denver Public Works Engineering, Regulatory & Analytics:	denver.pwera@denvergov.org	
Verizon Wireless Jennifer Sedillo	Jennifer.Sedillo@VerizonWireless.com	
Mobilitie (currently servicing Sprint): Erik Nelson	enelson@mobilitie.com	 
Crown Castle (currently servicing T-Mobile): Scott Harry	Scott.Harry@crowncastle.com	 
Zayo Group: Alec Geist	alec.geist@zayo.com	
AT&T Wireless: Artie Moscola	Am283c@att.com	