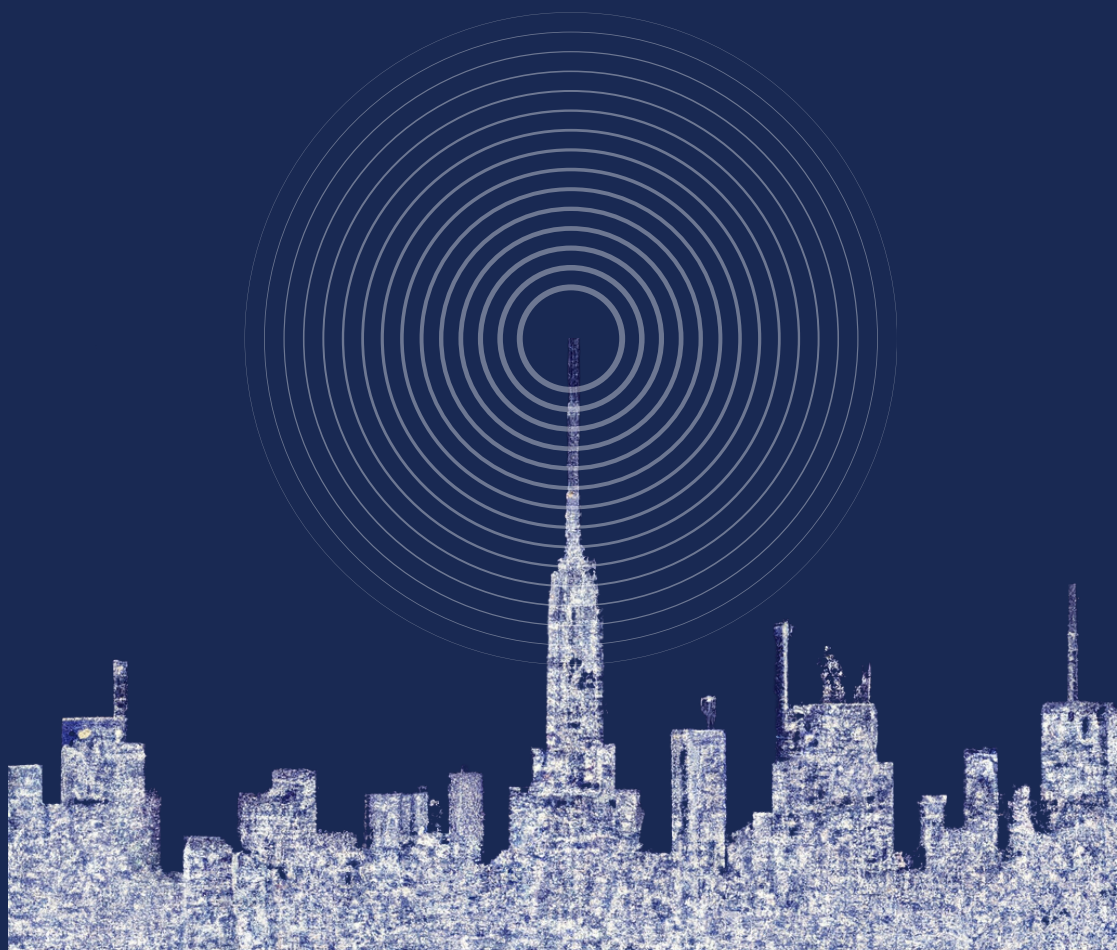# Navigating the 5G Revolution: Solutions for New York City's Connectivity Challenges

November 2023

ALEX BORES

— STATE ASSEMBLYMEMBER —

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State Assemblymember Alex Bores

Introduction

The advent of 5G technology holds immense promise for transforming our cities, revolutionizing communication, and ushering in a new era of connectivity. Manhattan, as the epicenter of the business, tech, and financial world, must embrace 5G to maintain our position as the greatest place to live and work in the world. It will also be critical to our efforts to bridge the digital divide and enhance opportunities for all who call our borough home.

However, the rollout of New York City's (the City) 5G program, known as Link5G, has faced considerable challenges, including a lack of community engagement and divisive design choices. These issues sparked a backlash that threatens our ability to fully leverage the potential of 5G and all its associated benefits. This report proposes alternative approaches and solutions to the concerns raised by our neighbors and communities. By shaping a comprehensive community engagement plan, facilitating easier installation of 5G on existing infrastructure, and fostering collaboration among diverse stakeholders, we can foster a more inclusive and successful 5G deployment.

The suggestions presented in this report seek to help us bridge the gap between technological progress and community interests. By actively involving our communities, experts, telecommunications providers, and key City agencies, we can create a 5G program that is not only efficient and innovative but also respects the unique characteristics and aspirations of New York City's diverse neighborhoods. Through real collaboration, we can shape a 5G-friendly city that promotes equitable access, ensures community character, stimulates economic growth, and strengthens our position as a world leader on technology.

What is 5G?

5G internet is the latest generation of mobile wireless technology that offers significantly faster internet speeds, greater capacity, and better reliability compared to previous wireless technologies.[1] 5G is designed to transmit data wirelessly via cellular towers, enabling high-speed internet connectivity without the need for a wired connection.[2]

The rapid acceleration of 5G implementation in the United States can be largely attributed to the 2018 rules adopted by the Federal Communications Commission (FCC).[3] These rules aimed to simplify the deployment of 5G infrastructure and limit local governments' authority to impede or excessively delay small cell installations.[4] Their goal was to facilitate nationwide connectivity and expedite the rollout of 5G networks. Consequently, 5G technologies experienced substantial growth, with coverage now reaching almost a third of North America.[5]

Unlike previous wireless technologies, 5G networks utilize a combination of different types of signals to ensure widespread coverage. Tower transmitters, known as "macro" sites, operate at lower frequency ranges and are often located on rooftops.[6] To deliver the fastest and most reliable service in densely populated urban areas like New York City, additional "small cell" transmitters are deployed closer to street level, typically on existing utility or light poles. This overlapping coverage is necessary because the higher-frequency radio waves used in "high-band" 5G have a limited range and are easily obstructed by physical barriers like walls, windows, and even trees.[7] By placing small cell transmitters in close proximity, the network can compensate for these limitations and maintain consistent connectivity within urban environments.

5G in New York

Both government and the private sector have been working diligently to expand access to 5G internet in recent years. Verizon and T-Mobile both offer 5G home internet and wireless coverage for mobile customers throughout Manhattan.[8] In addition, AT&T offers 5G wireless coverage for its mobile customers.[9] The City began pursuing the goal of free and equitable access to internet service with the LinkNYC program — which provided kiosks placed on sidewalks offering free wi-fi, domestic calling; 911 and 311 access; and USB outlets — then shifted its sights to broadband as the technology advanced.[10]

In 2021, the City "rebooted" the LinkNYC program to help increase access to 5G throughout five boroughs and began developing design proposals along with the operator.[11] That December, the City's Public Design Commission (PDC), which has jurisdiction over permanent structures that will be located on or over City-owned property, approved the design of the towers for placement in commercial and industrial districts.[12] As part of the authorizing resolution, the PDC directed the City to continue developing the siting criteria and to engage designers to further study the thickness of the advertising panels, in order to "streamlin[e] the attachments and overall dimension of the structures." The PDC also permitted the City to submit a proposal for the installation of towers in residential and historic districts, "noting that such proposal shall include data showing the success of the program in bridging the digital divide and proven demand in proposed districts."[13]

The City attempted to address some of the PDC's initial concerns in a June 2022 filing with the Commission, writing that it was "diligently" working to reduce the width of thickness of the screens, but that it was "not clear at this time whether a safe solution exists."[14] With regard to siting, the City claimed the towers would be subject to a "rigorous" three-level review process: approval of the City's Chief Technology Officer for "every single 5G site location," notice to Borough Presidents and Community Board District Representatives for "new" sites, and compliance with the City's rules, regulations, and building and construction codes.[15] The City noted that the June 2021 franchise agreement amendment created new siting restrictions, layered on top the requirements that applied to the earlier LinkNYC kiosks, including a limit of one tower per block on each side of the street, that towers must be at least 200 feet apart, and that no towers can be within 10 feet of a corner quadrant or building line.[16]

5G in New York

The approved design allowed for towers that are 32 feet tall, reaching up to the third story of a building.[17] Two variations can be used - one with advertising screen and one without. The first of the towers, branded as Link5G, was installed in the Bronx in July 2022.[18] Today, there are 87 active Link5G towers, 205 permit applications for 5G towers with advertisement screens, and 90 permit applications for towers without screens.[19]

Link5G　　　　　**Link5G (with screen)**　　　　　**Link**
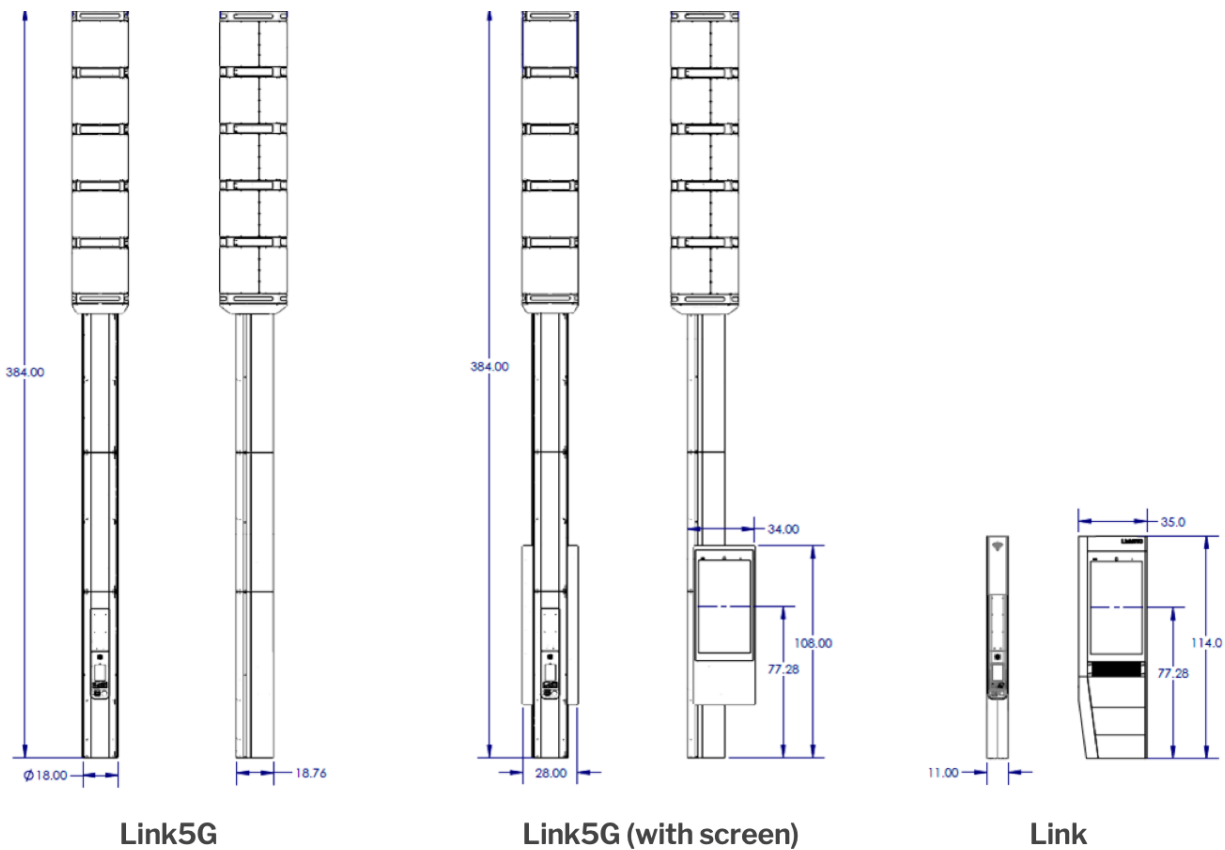
Because of the somewhat limited range of 5G small cells and the need for service throughout the five boroughs, the program is required to include the installation of a minimum of 4,000 kiosks by 2025.[20] To ensure equity of distribution, the City committed to allowing only 10% of the new structures to be located in Manhattan below 96th Street.[21]

5G in New York

The historic preservation review opened up a potentially significant, new opportunity for communities to weigh in on Link5G program. The National Historic Preservation Act (NHPA) created a process to consider the impact of certain actions on historic resources, such as historic districts, sites, buildings, or structures.[32] This process, known as a Section 106 review, involves four steps:

- determining if the action requires review;
- identifying historic properties that might be affected;
- assessing whether the action would cause adverse effects on historic properties; and
- finding resolutions to address any adverse effects through consultation with relevant entities, like state historic preservation officers.[33] For New York, this entity is the New York State Historic Preservation Office (SHPO).[34] In addition, certain stakeholders, known as consulting parties, assist in assessing impacts and mitigation plans.[35]

The role of government in 5G implementation

Federal Communications Commission	State Historic Preservation Office	City Office of Information Technology & Public Design Commission
• Controls access to spectrum used to deliver 5G. • Restricts ability of localities to limit the deployment of 5G. • Mandates reviews for facilities using FCC-licensed spectrum.	• Reviews submissions concerning existing and proposed tower locations pursuant to Section 106.	• OTI supervises CityBridge's franchise and the Link5G program. • PDC approved the tower design and authorized a pilot for historic and residential districts.

5G in New York

Applicants subject to Section 106 review, such as LinkNYC, must engage in consultations throughout the process to craft potential solutions for avoiding, minimizing, or mitigating adverse effects on historic properties. Specifically, consultation is defined as the "process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process."[36] NHPA doesn't mandate the best avoidance option but instead provides implementing regulations that offer ways to address adverse effects.[37]

Shortly after the FCC's determination that the new towers were subject to Section 106, the review process commenced, with many local historic preservation and neighborhood organizations applying for and obtaining consulting party status. However, this outpouring of interest combined with the complexity of the process proved daunting for LinkNYC, leading a group of preservation organizations to alert the FCC to major issues in the process, including a lack of clarity on the role that consulting parties would play and incomplete information regarding the towers. In response, in July 2023, LinkNYC announced that it was pausing all new submissions under Section 106 and that the New York SHPO was pausing its review of existing submissions.[38]

Recommendation 1:
Ensure real community engagement

Robust community engagement is vital for garnering the support and acceptance of communities when implementing new 5G infrastructure. This is a problem that's not unique to New York — cities around the world have experienced backlash and resistance to the deployment of 5G infrastructure. The resulting community protests, lawsuits, and negative press often overshadow the benefits that 5G could bring to cities. But this is a fixable problem and the current "pause" on the installation of towers presents the perfect opportunity for a reset. It's not too late for us to learn from these global experiences and actively involve our neighbors in the process. From Inwood to the Financial District, every part of the borough can benefit from cutting-edge technology, but if we insist on a one-size fits all, take-it-or-leave-it approach, we'll all suffer.

Improve transparency
The first step in improving trust between government and communities is transparency. People naturally mistrust and fear things they do not know - doubly so when it feels like that information is being withheld. Compared to other cities around the country, New York City is behind on providing communities with information about the location of 5G towers and small cells, as well as the approved designs.

Recommendation 1:
Ensure real community engagement

LinkNYC's website only provides a current list of kiosks, without allowing you to search for 5G towers, as opposed to the older, 4G models[39] – leaving one to scour the City's Open Data portal for information on locations and permits for future sites. According to the amended agreement, LinkNYC is required to provide the City with a periodic installation schedule and buildout documentation for its review and approval. According to the City, as of May 2022, LinkNYC has followed this requirement and that those reports would be made to the public,[40] but we were unable to locate them on the City or LinkNYC's websites.

The City should also share more information on the approval and design process. The PDC's website does not include the presentations made on the program, feedback received from the public, nor any information on the status of the pilot. In addition, to even access the authorizing resolutions and the conditions the PDC set for the program, one must scroll through bundled lists of other business from individual meetings. There is no way to search for or easily access this information, creating yet another barrier between communities and the program.

Recommendation 2:
Optimize installation on existing infrastructure

The best solution for expanding 5G access in New York is one that's already started here and is being used throughout the globe — taking advantage of existing street furniture.

Pole-top reservation program
Under Mayor de Blasio, the City committed to making 7,500 street poles available to mobile telecommunications franchisees through an online reservation portal.[41]

Example of Approved Standard Mobile Telecom Pole Attachment

The planned release of around 1,500 poles per quarter over the next 15 months would double the number of poles currently reserved by the City. This increase would enable the equitable expansion of 5G networks, with 75% of the poles being made available in historically underserved neighborhoods and under-connected areas, including those in the outer boroughs and above 96th Street in Manhattan.

Under the new program, wireless companies with one of twelve mobile telecommunications franchise agreements with the City would install and operate mobile equipment on City-owned light poles and privately-owned utility poles.[42] The City should put sufficient resources into the pole-top reservation plan and streamline the process so providers can quickly and cheaply expand their networks.

Recommendation 2:
Optimize installation on existing infrastructure

Some of the most successful 5G programs in the country rely almost exclusively on placing small cells on existing street furniture. Compared to building new cell towers or infrastructure, utilizing existing poles significantly reduces the time and cost required for network expansion. Pole-mounted small cells can be deployed more quickly, as they generally require fewer permits and minimal infrastructure modifications. This agility enables telecommunications providers to respond faster to capacity demands, provide coverage in underserved areas, and accommodate temporary events.[43]
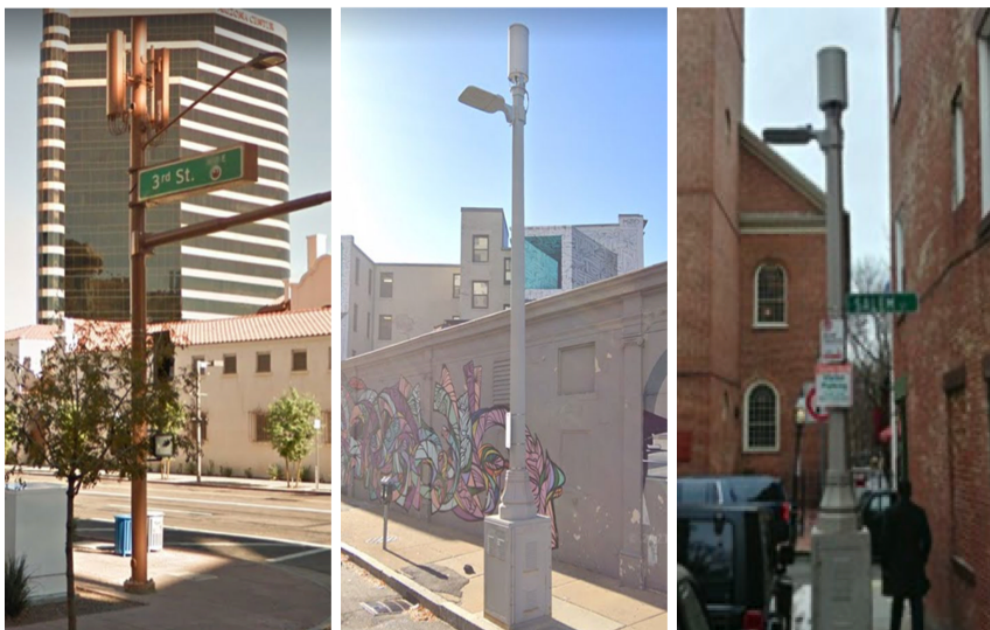
Small cells on existing poles in Phoenix and Boston[44]

Installing small cells on existing poles helps preserve the visual aesthetics of the surrounding environment. Rather than constructing new, standalone cell towers, small cells integrated with existing poles blend more seamlessly into urban landscapes. This approach reduces the visual impact and potential objections from communities concerned about the appearance of large cell towers.

Recommendation 2:
Optimize installation on existing infrastructure

In some cities, the design guidelines for small cells include specifications to ensure that the installations integrate seamlessly. Others, like New Orleans, strive to make the additions cohesive with the unique character of a neighborhood.

Antenna must include a smooth transition between upper pole and antenna

Conduit, wiring, mounting bracket, and other hardware must be hidden behind an antenna, shrouding, or inside the upper

Madison, Wisconsin[45]

5G cells are also being installed in existing infrastructure to enable future urban planning advances. For example, cities in Georgia,[47] Pennsylvania,[48] and Japan[49] have installed 5G cells on traffic lights, giving them uninterrupted line-of-sight in four directions, thus requiring fewer cells. Additionally, these cells are being tested for whether they can provide additional benefits to the community, like making the traffic lights smarter and more efficient, reducing congestion. These potential benefits are hampered if the 5G cells are not integrated with existing infrastructure.

New Orleans, Louisiana[46]

Recommendation 3:
Foster innovative designs

The current approved designs in New York City for light poles and utilities poles were created through a collaboration between OTI and wireless companies,[50] but communities and external design professionals were left out. Likewise, the design for the Link5G towers was developed without an opportunity for communities and outside experts to meaningfully weigh in. This approach has left New Yorkers feeling as if 5G was foisted upon them.

As we saw above, many cities strive to make the rollout of 5G as quick and seamless as possible though adding small cells to existing poles. Others have elected to work with innovative companies to build towers that blend into the local communities. A number of cities in California use faux palm trees to mask larger 5G antennas.[51] Companies in Europe developed unique designs including hiding antennas in church spires, on rooftops, and into structures that look like trees.[52] Arizona incorporates 5G infrastructure into fake cacti and kitschy local signs.[53]

These ideas don't necessarily translate into perfect solutions for New York City, but they illustrate that creative solutions that reflect the needs and desires of unique communities – from the deserts of the American Southwest to quaint, historic villages in the Netherlands – do exist. Before we put thousands of towers in our beloved, historic neighborhoods, let's take the time to develop something that's truly worthy of New York City.

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