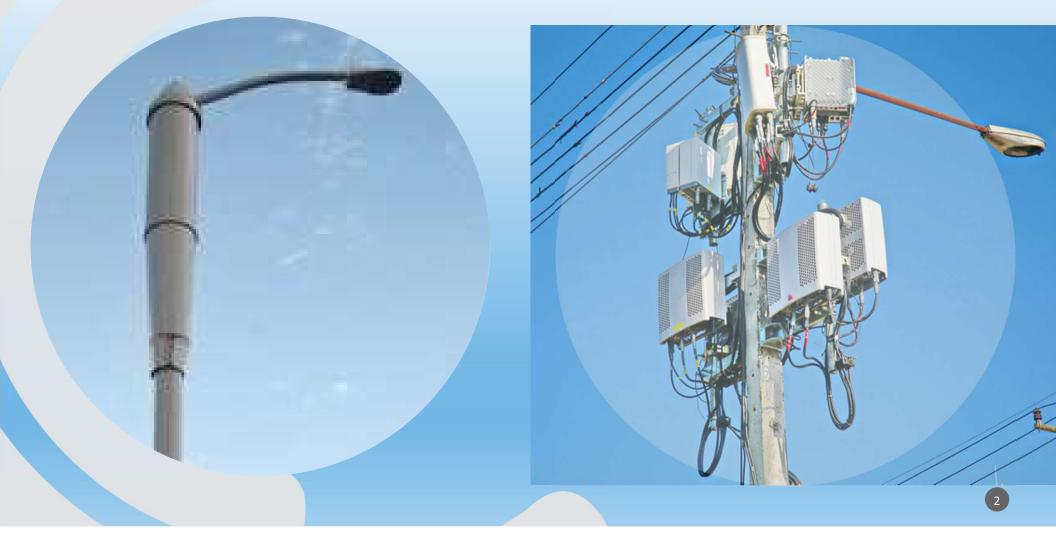
LAND USE STRATEGIES THAT ADDRESS FEDERAL COMMUNICATION COMMISSION DIRECTIVES NOVEMBER 19, 2019

Planning for the Internet of Things (IOT)



5G DESIGN IMPACTS: THE GOOD AND THE BAD



Overview of FCC Regulations – Their Impact on Land Use Decisions

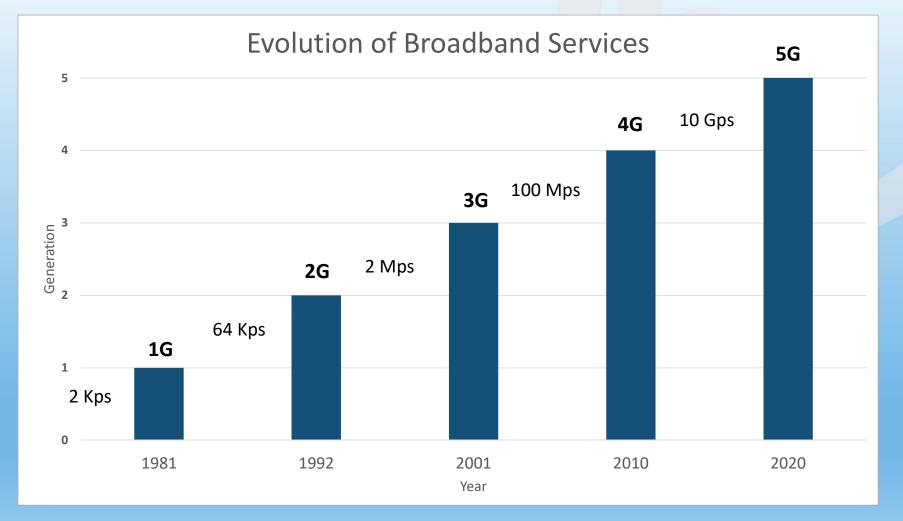
- Background on 5th Generation (5G) Broadband Deployment
- The Vision for 5G A Work in Progress
- Key FCC Regulatory Developments
- The Shot Clock Concept
- What is a Small Wireless Facility?
- Current Zoning Approaches in Western Connecticut
- Elements of the Model Ordinance
- Anticipated Next Steps

Technical Terms Pertinent to 5G

- Hertz a unit of frequency equal to one cycle per second
- Giga Hertz (GHz) a unit of frequency equal to 1 billion cycles per second
- Radio Frequency FCC radio service between 99KHz and 300 GHz
- Radio Spectrum Allocation bandwidth allocated between 9KHz-275 GHz
- Bit a unit of measure to quantify computer data
- Megabits per second (Mbs) a unit of data transfer rate equal to 1,000,000 bits per second
- Gigabits per second (Gbs) a unit of data transfer rate equal to 1,000,000,000 bits per second
- 5G is the fifth generation cellular network technology

Fifth Generation Broadband Deployment (5G)

- Rapid Expansion of Broadband Capabilities a National Mandate
 - Many Goals: Faster, More Reliable, More Coverage, More Secure
 - Expansion of Bandwidth for 5G Growth
- Elimination of Local & State Barriers to 5G Deployment
 - FCC Regulations issued October 2018
- Massive Investments in Robotics, Smart Cities, Internet of Things
 - Future will be data driven to levels beyond anyone's imagination



Demonstration Cities for 5G Deployment



7

The Vision for 5G – A Work in Progress

Innovations which 5G is expected to enable:

| Remote robotic surgery | Biometric authentication |
|--------------------------------|--|
| Internet of Things | 3D printing |
| Enhanced industrial automation | Increased access to virtual medical care |
| Smarter homes and cities | Safer autonomous vehicles |
| Next generation wearables | Artificial intelligence and machine learning |
| Smart grids/energy | Improved emergency response |
| Virtual reality experiences | Advances in genomics |

Source: PSB Survey of 3,588 Business Decision Makers, 2018, p. 124

8

6 FCC Regulatory Developments



Reducing Cost and Time of 5G Broadband

- Shot Clock Concept
- Restriction on Broadband Fees



Limiting Restrictive Land Use Controls

- No Undergrounding Requirements
- Restrict Minimum Spacing of Small Cells



Objective Viewshed and Design Standards

- Reasonable Historic Preservation Standards
- Objective and Transparent Viewshed Requirements

Shot Clock for Small Wireless Facilities (SWF)

- New Shot Clock Concept as of 2019 (SWF)
 - 60 Day Shot Clock for co-location on a pre-existing structure
 - 90 Day Shot Clock for attachment to a new structure
- Previous Shot Clocks Remain in Place (2009) –NOT for SWF
 - 90 Day Shot Clock for co-location applications
 - 150 Day Shot Clock for applications other than co-locations



How the Clock Works?

Shot Clock applies across all permitting programs:

- Zoning, Building, Electrical, Engineering, Architectural, etc.
 - "Act within a reasonable period of time"

Example: Shot Clock for co-located SWF

- Clocks begins with submitted application
- 10 Days to find application complete
- Complete approval in 50 days



What is a Small Wireless Facility?

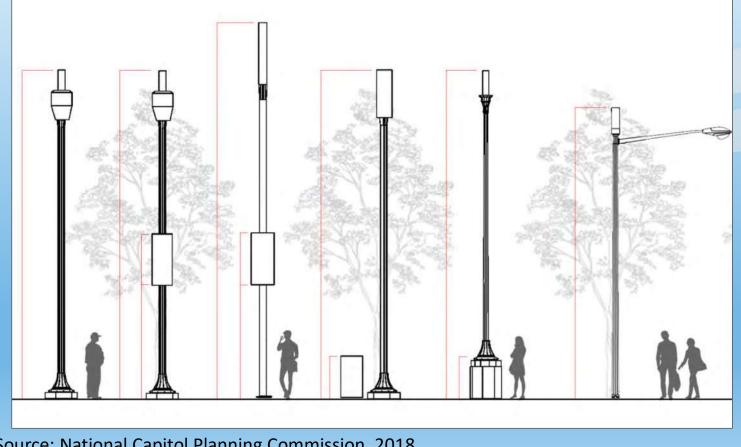
• A SWF must meet the following conditions:

- Mounted on a structure 50 feet in height or less
- Cannot be more than 10% taller than adjacent structures
- Antenna limited to 3 cubic feet
- Other SWF equipment limited to 28 cubic feet
- Radio frequency radiation within FCC safety standards



17

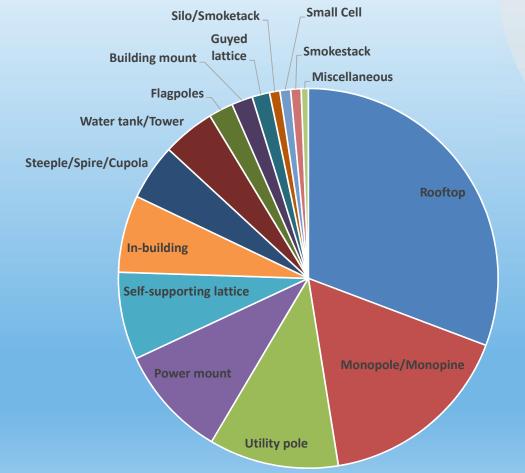
Aesthetic Street Poles Designed for 5G



13

Source: National Capitol Planning Commission, 2018

Tower/Small Cell Locations in Western CT

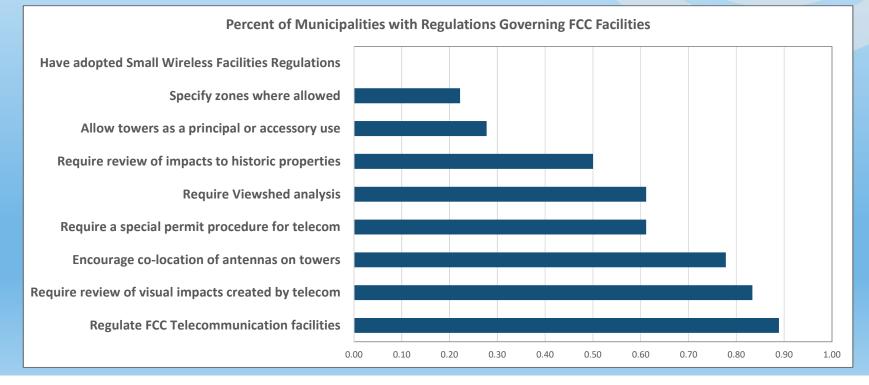


Source: Connecticut siting Council Database, November 18, 2019

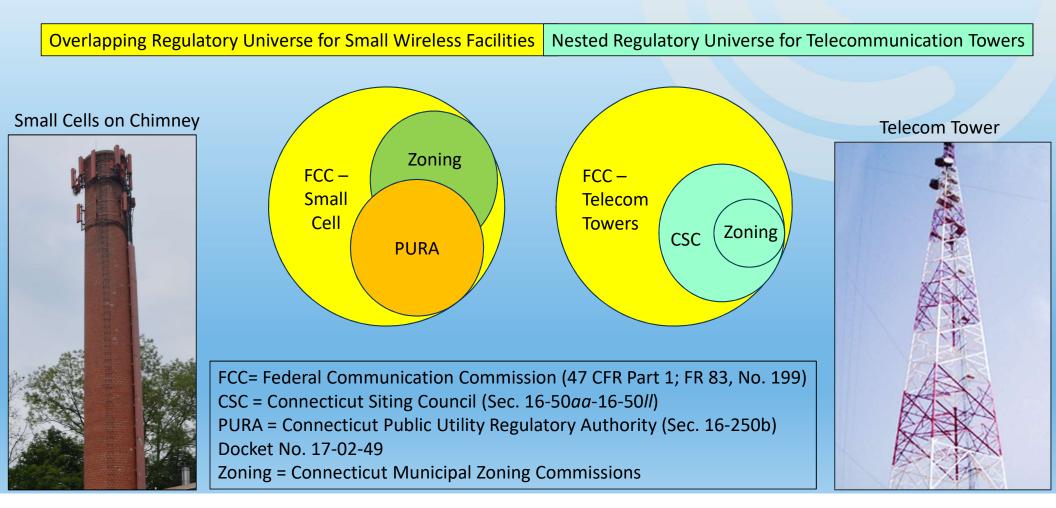
- Rooftop
- Monopole/Monopine
- Utility pole
- Power mount
- Self-supporting lattice
- In-building
- Steeple/Spire/Cupola
- Water tank/Tower
- Flagpoles
- Building mount
- Guyed lattice
- Silo/Smoketack
- Small Cell
- Smokestack
- Miscellaneous

Current Zoning for Small Wireless Facilities

- Major Finding from a 2019 review of Municipal Zoning Regulations
 - Significant Revisions are required to Zoning in all Municipalities



The World of Broadband Regulations Impacting Connecticut Municipalities is Complex



FCC Model Zoning Code Streamlines Broadband Deployment

Broadband Deployment Advisory Committee created a Model Ordinance

- 5 Key Elements of the Model Ordinance follow:
 - 1. SWF permitted use with height limits
 - Discretionary review procedures for projects on private property
 - 2. Strict Time limits on Application Approvals
 - Failure to act deemed approval by the passage of time
 - 3. SWF Authorized in Public Right of Way
 - Limits Pole heights in ROW to 50 feet
 - 4. Detailed regulation of Municipally owned poles
 - Enables construction of poles/vertical structure where none exist
 - 5. Design Standards for Stealth and Concealment

Anticipated Next Steps

- Convene Regional Task Force to Address 5G Deployment
- Elements of a Task Force Strategy Include:
 - Revise municipal permit procedures to comply with FCC requirements
 - Convene Planner's Lunch on FCC Requirements
 - Use model Ordinance for Small Wireless Facilities as a Guide
 - Identify Priority Zones for Small Wireless Facility Deployment
 - Consult with Business and Industry Leaders & Broadband Service Providers
 - Develop a 5G strategy that Makes Western CT a Digital Leader
 - Consider CT Public Act 19-163 in decision making

A Regional 5G Task Force is key to a coordinated development strategy.

References

- 5G Economy Global Public Survey Report Commissioned by Qualcomm, PBS Research, December 2016
- How 5G will Change the World World Economic Forum, January 18, 2018
- Global Race to 5G, Spectrum and Infrastructure Plans and Priorities, David Abecassis, et. al. April 2018
- Declaratory Ruling and Third Report and Order, Federal Communication Commission, September 27, 2018
- Model Code for Municipalities, FCC Broadband Deployment Advisory Committee, Model Code for Municipalities Working Group, July 19, 2018
- Accelerating Wireless and Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment, Federal Communications Commission, Final Rule, Federal Register, Vol. 83, No. 199, October 15, 2018
- Municipal Action Guide: Small Cell Wireless Technology in Cities, National League of Cities, 2018
- Presidential Memorandum on Developing a Sustainable Spectrum Strategy for America's Future, Donald J. Trump, October 25, 2018
- Annual Report on Spectrum Repurposing, U.S. Dept of Commerce August 2019