



Office of Innovation and Sustainability  
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# Agenda



- Introductions
- Background
- What is 5G?
- What are the benefits of 5G?
- Are there safety concerns with 5G?
- How does 5G work?
- 5G Regulations
- City's Role

# Introductions



# Background – SmartCOS

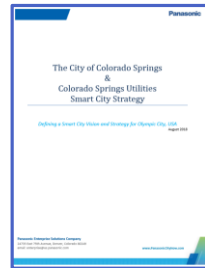


## Strategy Development

November 2017  
Ideation Summit

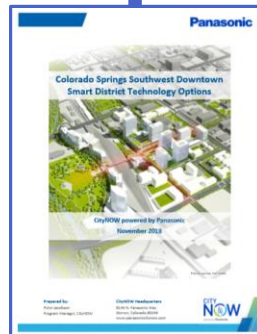


August 2018  
Smart City Strategy



January 2018  
Proclamation

November 2018  
Smart District Tech Options



## Pilot Implementation Phase

Q4 2019  
Smart Streetlights



Q4 2019  
Small Cell / 5G

2020  
Micro-grid



2020  
Smart District

# Background



## More Devices

Population in Colorado Springs is growing. More people are using wireless devices than ever before.

## More Data

Cisco projects the United States will use 5.6 Exabytes\* of mobile data per month in 2021 vs 1.3 Exabytes per month in 2016.

## More Demand

Wireless providers are rushing to catch up with demands of customers.

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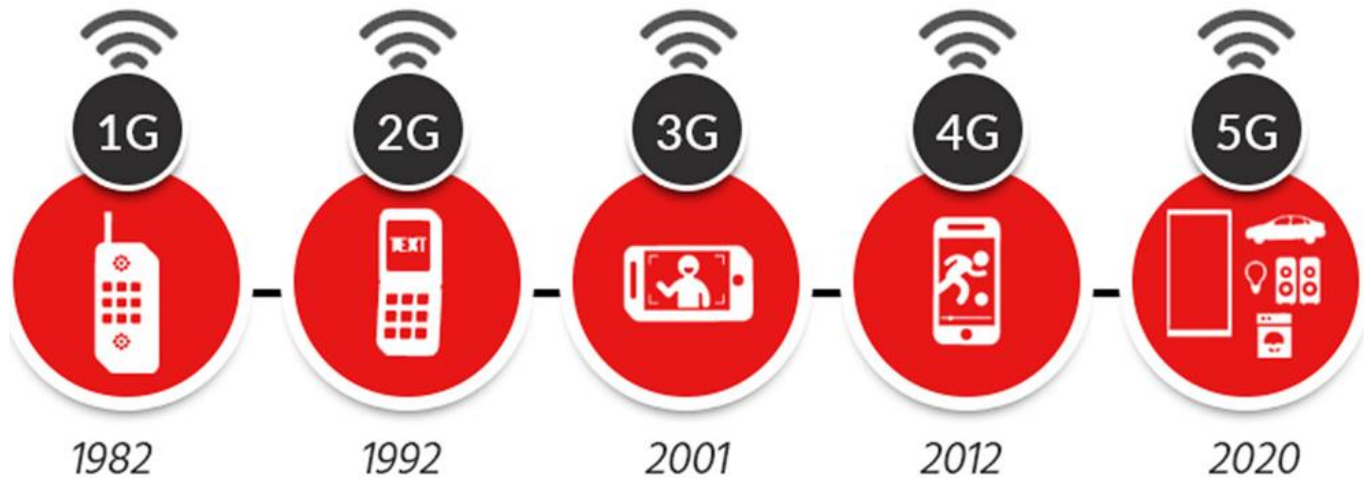
\*an Exabyte is 1 billion Gigabytes

Source: [Cisco VNI Complete Forecast Highlights](#)

# What is 5G?



- 5G is the fifth generation of cellular network technology



- 5G will replace 3G and 4G LTE in the long run

# Benefits of 5G



## Faster Download Speeds

- 4G LTE: 10-15 Mb/s
  - 5G: 10-20 Gb/s, real world 600+ Mb/s
- 

## Lower Latency

- 4G LTE: 20 ms
  - 5G: 1-4 ms
- 

## Greater Device Density

- 4G LTE: 100,000 devices/ km<sup>2</sup>
- 5G: 1,000,000 devices/km<sup>2</sup>

# Safety of 5G



Antennas used for cellular transmissions result in exposure levels thousands of times below safety limits. [LINK](#)



RF radiation is non-ionizing, unlike X-rays and UV light. RF radiation has lower energy than visible light and infrared. Most studies support the idea that RF waves don't damage DNA directly. [LINK](#)



RF radiation is classified as group 2B, or possibly carcinogenic to humans. Eating red meat, working night shifts, and drinking very hot beverages are all considered more carcinogenic. [LINK](#)

# How does 5G work?



- Short-range cell sites (small cells) are used to compliment macro cell towers
- Small cells are typically placed on existing vertical structures
- Small cells will increase reliability and coverage for 4G LTE network
- 5G antennas will be deployed by end of 2019
- Providers will need approximately one 5G antenna per City block
- 5G enabled devices will be required to access 5G network

# How does 5G work?



## Macrocells for wide area coverage



## In-building and street small cells

# How does 5G work?



S. Cascade & E. Vermijo



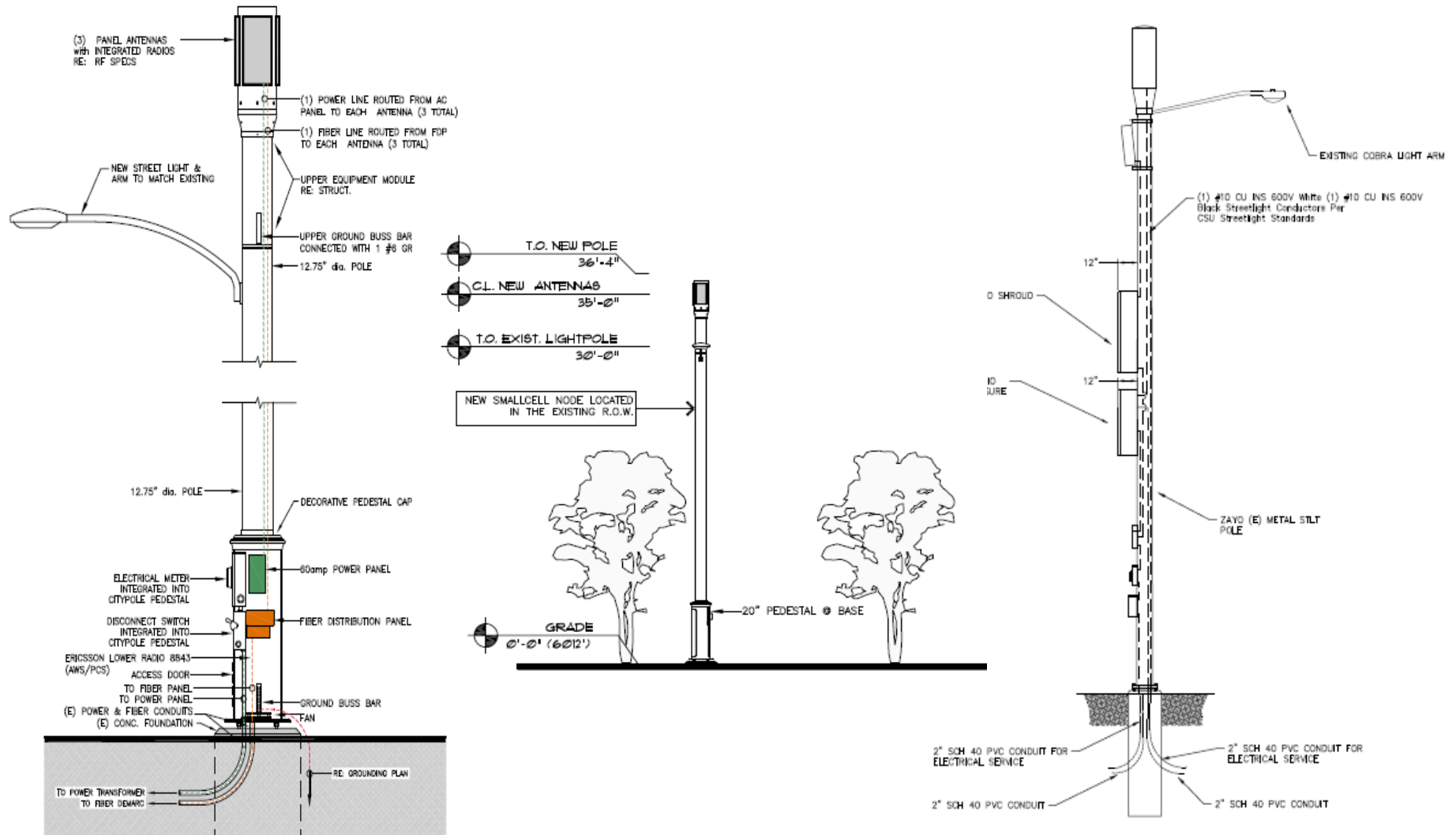
N. Nevada & E. Boulder



N. Weber & E. Bijou



# How does 5G work?



# 5G Regulations



## Telecommunications Act of 1996

|             |                                                                                        |
|-------------|----------------------------------------------------------------------------------------|
| Section 253 | Local gov't can't prohibit any entity from providing telecom service                   |
| Section 332 | Local gov't must act on applications for deployment within a reasonable period of time |

## Federal Communications Commission 18-133

|               |                                           |
|---------------|-------------------------------------------|
| Paragraph 79  | Sets presumptively reasonable fees        |
| Paragraph 89  | Requires published aesthetic standards    |
| Paragraph 105 | Sets presumptively reasonable shot clocks |

# 5G Regulations



## Colorado State Statutes

|                     |                                                                                        |
|---------------------|----------------------------------------------------------------------------------------|
| C.R.S. 29-27-403    | Sets mandatory shot clock of 90 days                                                   |
| C.R.S. 29-27-404    | Small cell siting, construction, operation is a permitted use by right                 |
| C.R.S. 38-5.5-104.5 | Telecom providers have the right to locate small cells on light poles, traffic signals |
| C.R.S. 38-5.5-107   | Fees must be reasonably related to costs incurred by local gov't                       |

# 5G Regulations



## Colorado Springs City Code

7.4.608.A.1

Facilities should be architecturally compatible with the adjacent buildings and land uses and integrated through design, materials, color, and location to blend in with the existing characteristics of the site to the maximum extent possible.

7.4.608.B.3

The height, bulk, and scale... should be compatible with adjacent buildings and land uses.

# City's Role



## **Look Out for the Interests of Our Community**

- Aesthetic requirements – sensitivity to residential areas and conformity with existing infrastructure
- Location requirements – priority to deploy on existing poles
- Inventory information – map of small cell locations annually

## **Encourage 5G Deployment**

- Economic development – 5G will bring many new economic opportunities
- Streamline internal processes – upfront explanation of permits, fees, requirements, permit review
- Build relationships with Providers – the more knowledge we have, the better

# City's Role



# City's Role



## **Council Liaison:**

Bill Murray

## **Q3 2019:**

- City Telecom Webpage
- [Small Cell Aesthetic Requirements](#)
- [Small Cell MLA](#)

## **Q4 2019:**

- Chapter 3 Code Changes – Dig-Once
- Chapter 7 Code Changes – WCFs