



# SPRINGDALE

*Utah*

# Wireless Communications Master Plan

JANUARY 8, 2025

*Prepared by*  
**CityScape**  
CONSULTANTS, INC.

---



# TABLE OF CONTENTS

INTRODUCTION.....	03
EXECUTIVE SUMMARY.....	04
OVERVIEW.....	06
COMMUNITY CHARACTERISTICS.....	07
WIRELESS INFRASTRUCTURE INVENTORY.....	08
WIRELESS COVERAGE MAPPING.....	15
MAPPING ANALYSIS.....	20
POTENTIAL SOLUTIONS.....	23
COMMUNITY SURVEY AND ZONING.....	34
POLICY CHANGES.....	36
APPENDIX 1 - WIRELESS DEFINITIONS.....	41
APPENDIX 2 - WIRELESS INFRASTRUCTURE INVENTORY.....	45
APPENDIX 3 - WIRELESS SURVEY RESULTS.....	50



# INTRODUCTION

**80%**  
of Americans  
consider  
wireless services  
indispensable<sup>1</sup>

**31B**  
connected  
devices predicted  
by the year 2023<sup>1</sup>

By 2025, people  
will interact with  
connected devices  
every  
**18 secs<sup>1</sup>**

The Wireless Communications Master Plan (Plan) has been prepared as a resource to efficiently address the need for improved wireless services in the Town of Springdale (Town) without compromising the magnificent canyon views. The research and analysis in this Plan maps existing wireless facilities, simulates current wireless coverages, identifies areas with gaps in cellular coverage and provides suggested locations for new facilities. The wireless coverage maps identify gaps in services which help direct strategic planning for future wireless communications infrastructure placement and design throughout the Town.

The infrastructure study included a wireless inventory, engineering analysis, propagation mapping and conceptual solutions, public outreach, online survey and presentations and recommendations for code updates.

Key objectives were identified through a community survey specific to future wireless deployments in the Town as follows:

- Improve wireless services throughout the Town allowing for robust wireless connectivity for residents, businesses, emergency management personnel and visitors.
- Protect community aesthetics by planning for well-sited, well-designed, concealed infrastructure consistent with surrounding areas.
- Address small wireless facility buildup standards in public rights-of-way.
- Promote continued use of public assets to allow greater community control over placement and design of new wireless infrastructure to protect the community from visual impacts and improve coverage in hard-to-reach areas.

Wireless definitions of certain technical terms used within the Plan can be found in *Appendix 1*.



# EXECUTIVE SUMMARY

The purpose of the Plan is intended to address any discovered wireless deficiencies by developing a framework for the effectual deployment of wireless communications facilities, to support the Town's wireless demands. A code update allows for the Town to promote streamlined network deployment practices within the Town.

The Plan's study area is made up by the Town's jurisdictional boundary plus a one mile perimeter and includes all known wireless facilities providing services into the Town.

CityScape visited and assessed each wireless facility for a total of eight wireless facilities categorized as follows:

**Structure Type:** 5 Towers, 3 Base Stations

**Antenna Type:** 4 Macro Cell, 1 Public Safety/Macro, 2 Public Safety, 1 Other

**Location:** 4 Private Property, 4 Public Property

**Design Type:** 5 Non-Concealed, 3 Concealed

Site detail available in Wireless Infrastructure Inventory in *Appendix 2*.

Once the infrastructure was identified, wireless coverage maps were prepared to identify existing deficiencies in cell coverage. The wireless analysis takes into consideration how network coverage and capacity changes with seasonal visitors to the Town, the effects of terrain and how future technologies may impact wireless network deployment over the next ten years. The Town's population is based on information obtained from the United States Census, and Zion National Park visitor data provided by the National Park Service.

Scenario maps were created for planning purposes to illustrate the type, number, height, and location of where future sites may be needed. Various options were presented so the townspeople could begin to visualize what complete wireless coverage would look like by all four service providers.

CityScape presented the maps to the Town on January 8, 2024, and to the Town Council at a televised meeting on January 9, 2024. Commentary received from those two meetings narrowed the scenarios to three options. The possible future preferred deployment patterns are as follows:

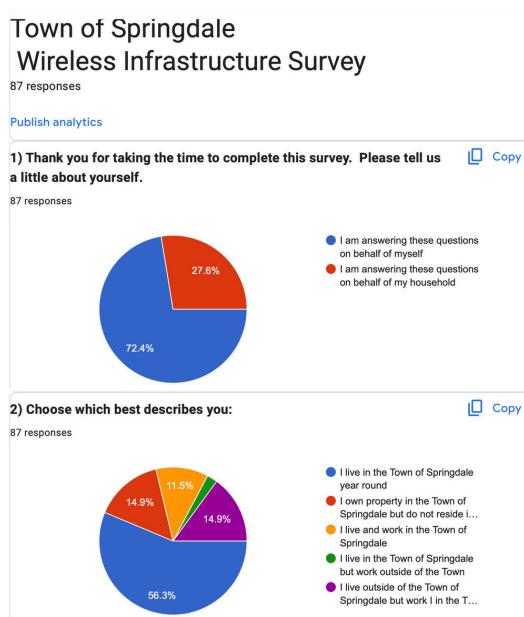
- Scenario 1 - Macro cells only: Nine macro cell sites
- Scenario 2 - Small cells only: Thirteen small cell facilities for each service provider (with the potential for 52 small cells on single tenant poles)
- Scenario 3 - Macro and small cell hybrid: Six macro cell facilities and seven small cell facilities (with the possibility of 28 small cells total for single tenant poles and 14 for two tenant poles)

An online survey was provided to share the maps and to engage residents, staff and elected officials throughout the process. Eighty-seven responses were received which Town staff indicated is a similar number of participants as in other recent community surveys. Highlights of the responses are as follows:

- 85% indicated wireless service is important to them
- 52% noted they would rely more on their mobile device if service was better
- 78% chose new collocation as a preferred structure type over a new tower
- 95% want visually mitigated or concealed infrastructure
- 77% prefer the use of public property over private property as the location for new wireless infrastructure
- 33% prefer the macro cell only design (Scenario 1)
- 20% chose the small cell only design (Scenario 2)
- 46% chose the hybrid design (Scenario 3)

All survey responses are available in *Appendix 3*.

The survey responses are used to guide policy changes to the Town's code and are the basis for proposed text amendments to Chapter 27. The preferred design types and locations are listed as priorities for future wireless infrastructure. Other recommended zoning changes are based on the revisions to the Federal Code of Regulation. These text changes are found in the definitions, review processes, and timelines for review of future applications.





# OVERVIEW

Smartphones and smart wireless devices are a fixture of every day life for millions of people. Consumers using these devices expect fast and uninterrupted network connections to the internet, maps, files, videos, news and music along with the myriad of available applications. For these devices to function optimally a large amount of bandwidth is required. To facilitate the device demands, antennas mounted on towers or other elevated infrastructure is necessary.

**globally in 2021**  
4.32 billion  
unique mobile  
internet users

**90%**  
connect using  
wireless device<sup>2</sup>

Functionality is best when the signal transmits directly from the antenna to the consumer's wireless device(s) without obstruction from buildings, trees and/or ridgelines. Macro cell wireless facilities provide the greatest flexibility and coverages for wireless service providers. Without obstructions these facilities can generally cover a two-mile geographic radius in more densely populated areas and about a four-mile radius in suburban and rural areas with no vegetative or terrain obstructions. Small wireless facilities can be utilized in more populated areas to improve cell services where capacity overloads may be an issue or in areas with viewshed sensitivities. These small wireless facilities typically have approximately a quarter-mile or smaller service radius.

Coverage gaps result from having facilities with a lot of obstructions, too few antennas within a particular service area or in areas where network capacity overloads occur. Capacity overloads are when the number of wireless subscribers simultaneously using their devices exceeds the performance capability of the wireless facility. Additional cellular infrastructure is necessary to improve these coverage and/or capacity concerns.

Understanding, evaluating and formulating for a well-planned wireless approach begins with studying the community characteristics, identifying all existing towers and base stations with cellular antennas and analyzing the existing wireless coverages throughout the Town.





## COMMUNITY CHARACTERISTICS

The Town of Springdale, located near the eastern boundary of Washington County, is approximately 4.62 square miles, was incorporated in 1959, and according to the 2020 U.S. Census has an estimated population of around 523 residents.

Springdale is located within Zion Canyon and is accessible via Highway 9 also known as Zion Park Boulevard which was built through the middle of the Town. The northernmost point of Zion Park Boulevard is the entrance to Zion National Park with many local streets branching off for short distances, generally less than a quarter of a mile, before ending at the steep slopes of the canyon walls.

The North Fork of the Virgin River flows south through the Town and is located east of Highway 9. The canyon floor in the southern area of the Town is around 3,760 feet above sea level and gradually rises to around 3,960 feet in elevation at the northernmost point of the canyon floor. The Town is nestled between Canyon walls over 6,400 feet in height to the east and west of Highway 9.



Most of the commercial establishments and hotels have direct access from Highway 9 and the majority of residential dwelling units are behind the commercial land uses and have access from local streets. Hotels are limited in height to 26' and most single family homes are one-story.

The village-style architecture of local businesses and adobe-style homes create a welcoming ambiance for visitors who come to explore and experience Zion National Park.

Pedestrian-friendly sidewalks and bicycle lanes aid in reducing traffic between lodging and businesses. Town policies limiting nighttime light standards enable the Town to have a dark sky designation for stargazing.

The characteristics of the Town and its surrounding beauty is that to be preserved when considering improved connectivity.



# WIRELESS INFRASTRUCTURE INVENTORY

The Plan begins with an examination of the existing wireless condition throughout the Town. Data is gathered from all existing wireless facilities within the Springdale jurisdictional boundary and a one-mile perimeter surrounding the Town and is defined as the study area.

A wireless facility includes elevated antennas, the structure on which the antennas are mounted, cables connecting the antennas to the ground-based equipment, and other ancillary devices (meters, radios, surge protectors, filters, etc.) necessary for the operation of a wireless network. Entities that use wireless facilities include wireless service providers, broadband providers and public safety.

The structures on which the antennas are mounted are either towers or base stations. Typical tower types are monopole, lattice, and guyed towers. Any other structure that antennas attach to other than a tower, such as a rooftop or water tank, is termed a base station.

Towers and base station can be either non-concealed or concealed behind radio frequency transparent materials. Wireless facilities can be located on private or public property, in street right-of-way, and in electrical utility easements.

As of October 18, 2023, there are a total of eight wireless facilities verified in the Springdale study area. These eight wireless facilities are used for a variety of purposes and consist of five existing towers, two existing base stations, and one approved but not built base station.

Within Springdale's jurisdictional boundary, there are five wireless facilities consisting of two existing towers, two existing base stations, and one approved but not built base station. Site S01 is a concealed tower in Zion National Park; Site S02 is an approved but not built concealed rooftop base station; Site S03 is a tower at a water tank; Site S04 is a non-concealed antenna at the fire station and Site S05 is a concealed rooftop base station.

The service providers on the infrastructure include AT&T, T-Mobile, Verizon Wireless and public safety communications. DISH Wireless is deploying a nationwide network but has not yet installed any facilities in the Town.

The following *Table 1* summarizes the total number of wireless sites and identifies the inventory by structure type, antenna type, location and type of design. The inventory of facilities are further depicted on corresponding maps as follows: *Figure 1* - Structure Type; *Figure 2* - All Antenna Type; *Figure 3* - PWSF Antenna Type; *Figure 4* - Location and *Figure 5* - Design Type.

Site detail including facility picture, location map, ownership, providers, and type of facility along with any other pertinent individual site information is provided in the Springdale Wireless Inventory Catalog in *Appendix 1*.

Springdale, Utah		INSIDE JURISDICTION				ONE-MILE PERIMETER			
TOTAL 8		Existing	Approved Not Built	Proposed Under Review	Inquiry	Existing	Approved Not Built	Proposed Under Review	Inquiry
<b>STRUCTURE TYPE</b>									
<b>Towers</b>	5	2	0	0	0	3	0	0	0
<b>Base Stations</b>	3	2	1	0	0	0	0	0	0
<b>ANTENNA TYPE</b>									
<b>Macro Wireless</b>	4	2	1	0	0	1	0	0	0
<b>Small Wireless</b>	0	0	0	0	0	0	0	0	0
<b>Public Safety/Macro</b>	1	0	0	0	0	1	0	0	0
<b>Public Safety</b>	2	2	0	0	0	0	0	0	0
<b>Other</b>	1	1	0	0	0	0	0	0	0
<b>LOCATION</b>									
<b>Private Property</b>	4	1	1	0	0	2	0	0	0
<b>Public Property</b>	4	3	0	0	0	1	0	0	0
<b>Utility Easement</b>	0	0	0	0	0	0	0	0	0
<b>ROW</b>	0	0	0	0	0	0	0	0	0
<b>DESIGN TYPE</b>									
<b>Concealed</b>	3	2	1	0	0	0	0	0	0
<b>Semi-Concealed</b>	0	0	0	0	0	0	0	0	0
<b>Non-Concealed</b>	5	2	0	0	0	3	0	0	0

Table 1: Inventory by Structure Type

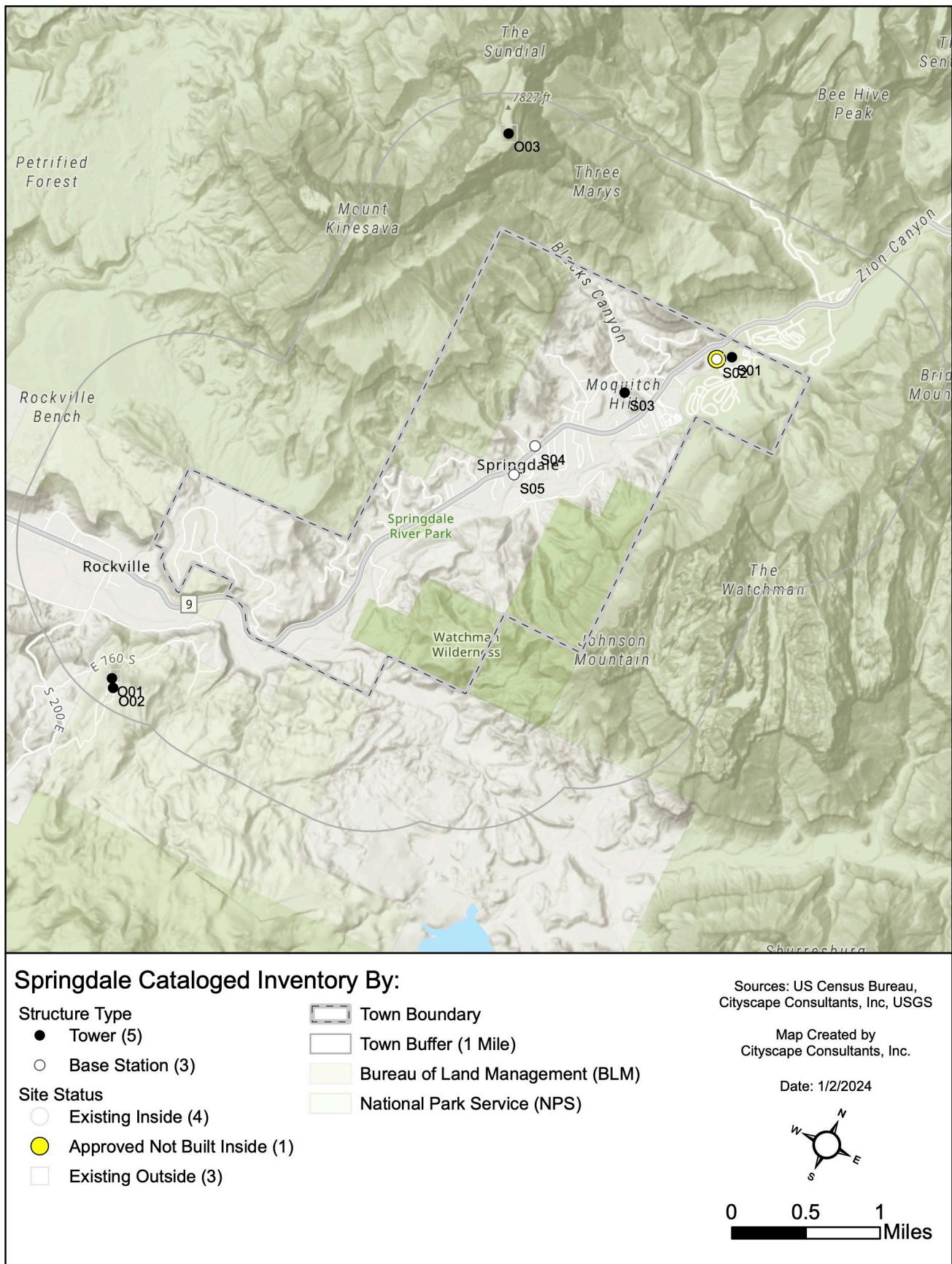


Figure 1: Map of Inventory by Structure Type

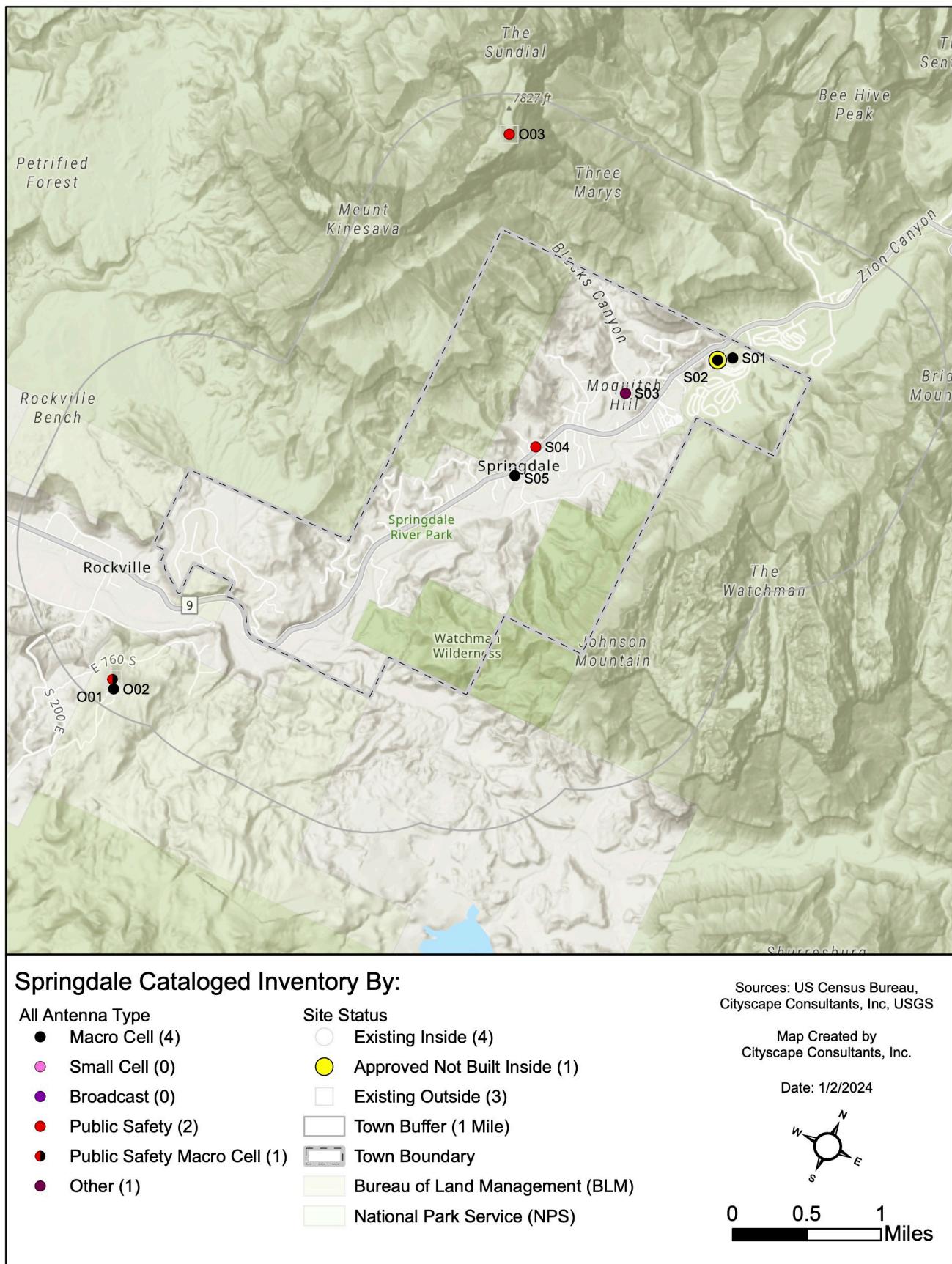


Figure 2: Map of Inventory by All Antenna Type

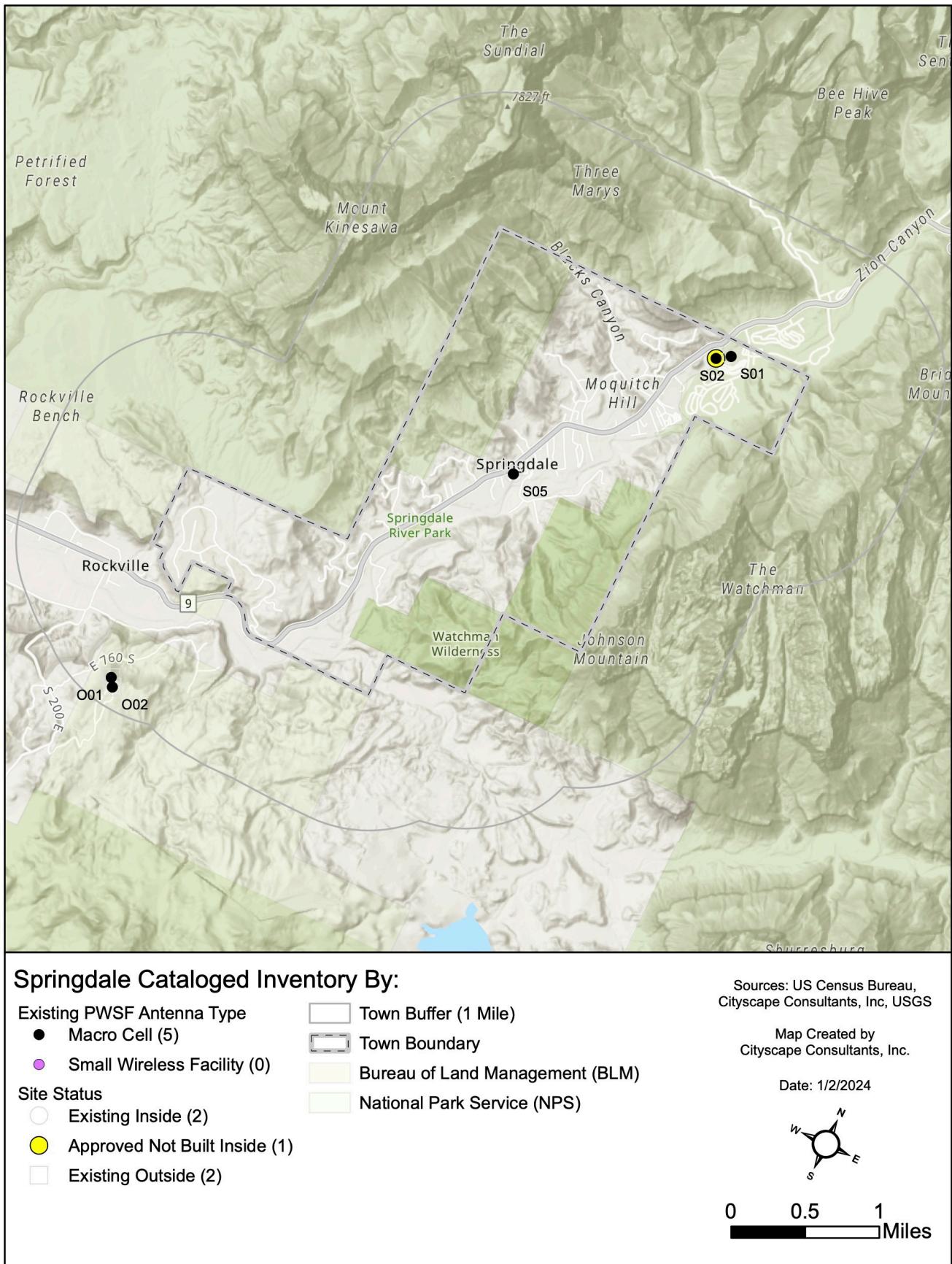


Figure 3: Map of Inventory by PWSF Antenna Type

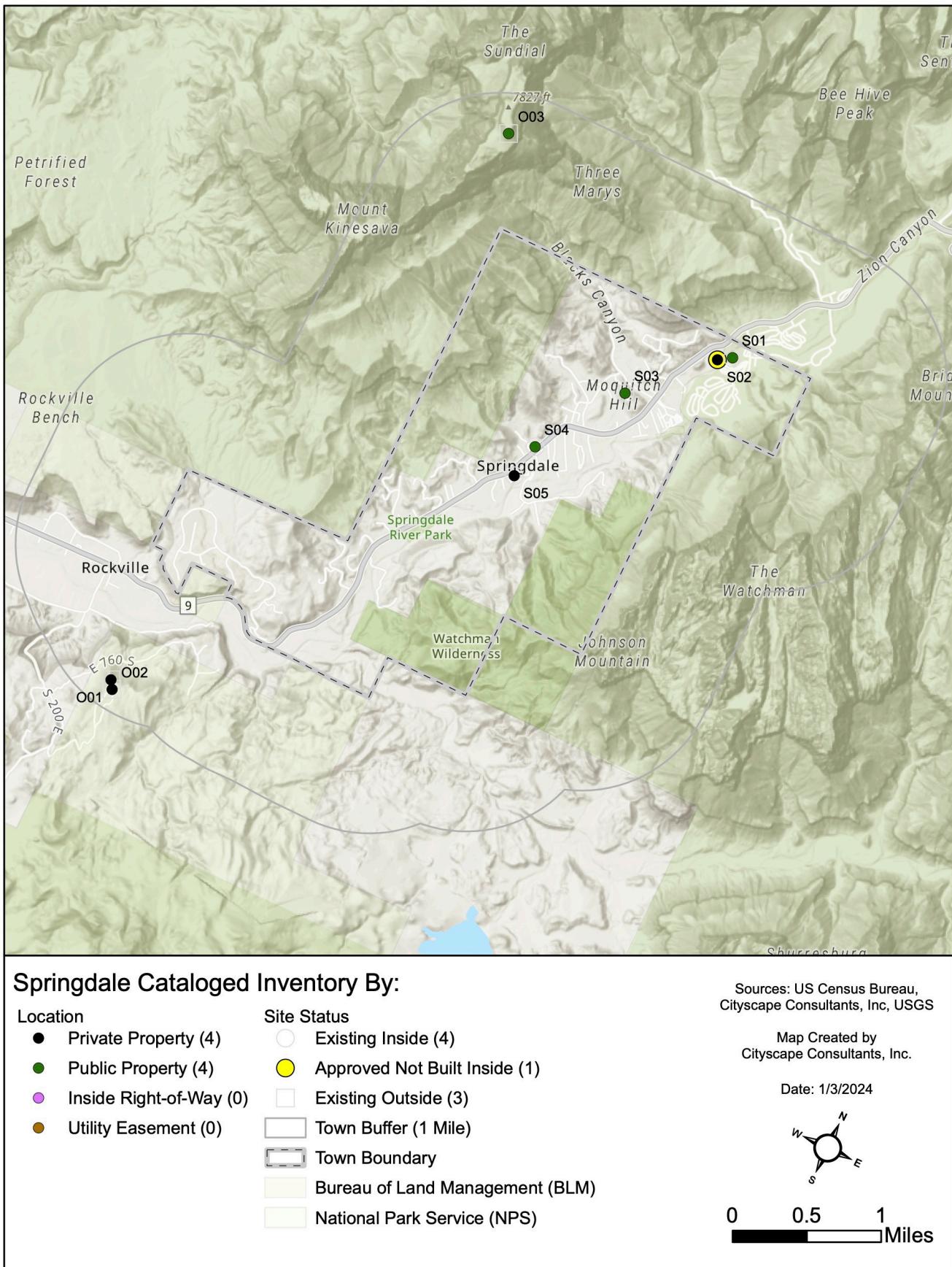


Figure 4: Map of Inventory by Location

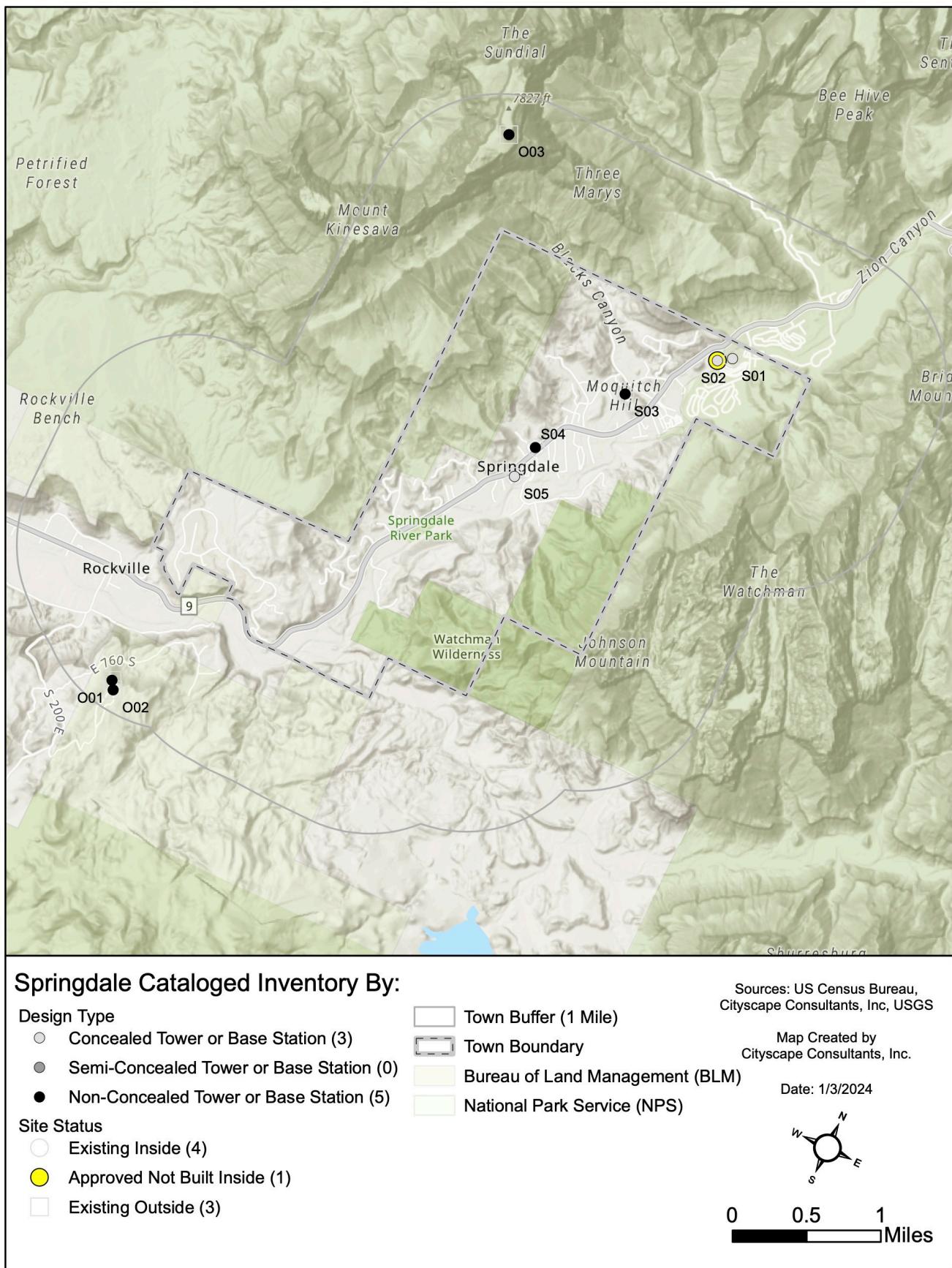


Figure 5: Map of Inventory by Design Type



## WIRELESS COVERAGE MAPPING

Wireless coverage (propagation) mapping is a tool used to simulate wireless coverages indicating antenna signal strength. Signal strength is a term used to describe the level and operability of a wireless device. The stronger the signal between the elevated antenna and the wireless handset device (i.e. cell phone, tablet, smartwatch) the more likely the device and all the built-in features will work as expected. As a wireless device approaches the outer edge of the antenna's service area, the signal strength becomes more prone to degradation, particularly as usage in the area increases or environmental conditions worsen.



A reduced signal causes unsatisfactory service, resulting in slow download or upload speeds and possible dropped calls. Other factors affecting signal strength are any natural or man-made obstructions such as location of buildings, type of building materials, building heights, vegetation, and terrain that comes between the antenna and devices. The use of devices indoors or outdoors is also a factor when determining signal strength. Consider this much like a light bulb in a lamp; the further away you are from the lamp, the dimmer the light becomes. Any obstructions in between you and the lamp dims or obscures the light, similar to signal strength.

Network capacity is the amount of wireless traffic that a service provider's network can handle at any given time within a specific location. Capacity considers the amount of bandwidth being used simultaneously by way of voice calls and data usage. To estimate network capacity, consideration of the characteristics of the community and peak demand times are studied and compared to the number of wireless facilities within the coverage areas from each cell site.

Modern and advancing technologies continue to transform how the wireless industry builds out their networks. Each wireless service provider is in a different stage of fifth generation (5G) deployment and uses different technologies and spectrum. In the evolution of wireless communications 4G technologies are still in use but the wireless industry is rapidly transitioning to 5G wireless networks especially in urban and suburban areas. Both platforms incorporate broadband (high-speed internet) enabling all the Smartphone applications like global positioning services (i.e. Google Maps, Waze Navigation); public safety, medical and banking services; weather, educational, music, games, on-line reading and countless other on demand services. These applications require significant amounts of information to be sent and received within the same radio signal boundary. Network densification is often needed within the coverage area to improve network capacity so subscribers can use all the features on their cell phones and smart devices.

Network densification means wireless service providers need to add more capacity to their networks to handle all the usage and network speeds subscribers expect. There are several ways to add capacity to a network. One is providers buying more spectrum, two is making spectrum more efficient, and third adding more wireless facilities to targeted areas with high subscriber use volumes. Commercial wireless providers are pursuing all three methodologies to prepare for and meet network demands.

The following wireless coverage or propagation prediction maps provided in *Figures 6, 7 and 8* illustrate simulated predicted coverage from the existing and approved but not built personal wireless service facility (PWSF) sites for each wireless service provider operating in the Town. The specific provider is not identified on the maps as these are not exact but simulated predictions of each of their coverages.

The maps are generated using long-term evolution (LTE) standards in the mid-band frequency spectrum 1700-2400 MHz assuming maximum operating power from each antenna on the tower or base station. This simulated propagation considers a generic antenna model like those used by wireless service providers and assumes each provider is located at the highest mounting height on each facility represented.

The gradation of colors from yellow to blue represents the signal strength emanating from each personal wireless service facility. The geographic areas in yellow identify superior outdoor and indoor signal strength, green equates to areas with average in vehicle signal strength and shades of blue symbolize acceptable or poor outdoor signal strength. Areas with no shades show marginal, spotty or no signal. A quick reference of the shades and descriptions are as follows in *Table 2*.

This modeling assumption gives an estimation of the wireless coverage in the study area with considerations of topography, building heights, construction types, and 2022 US census data for the Town.

SIGNAL STRENGTH COLOR	dBm	SIGNAL STRENGTH DESCRIPTION
Yellow	> -90	In Building
Green	-90 to -105	In Vehicle
Blue	-105 to -115	Outdoor

Table 2: Signal Strength Description

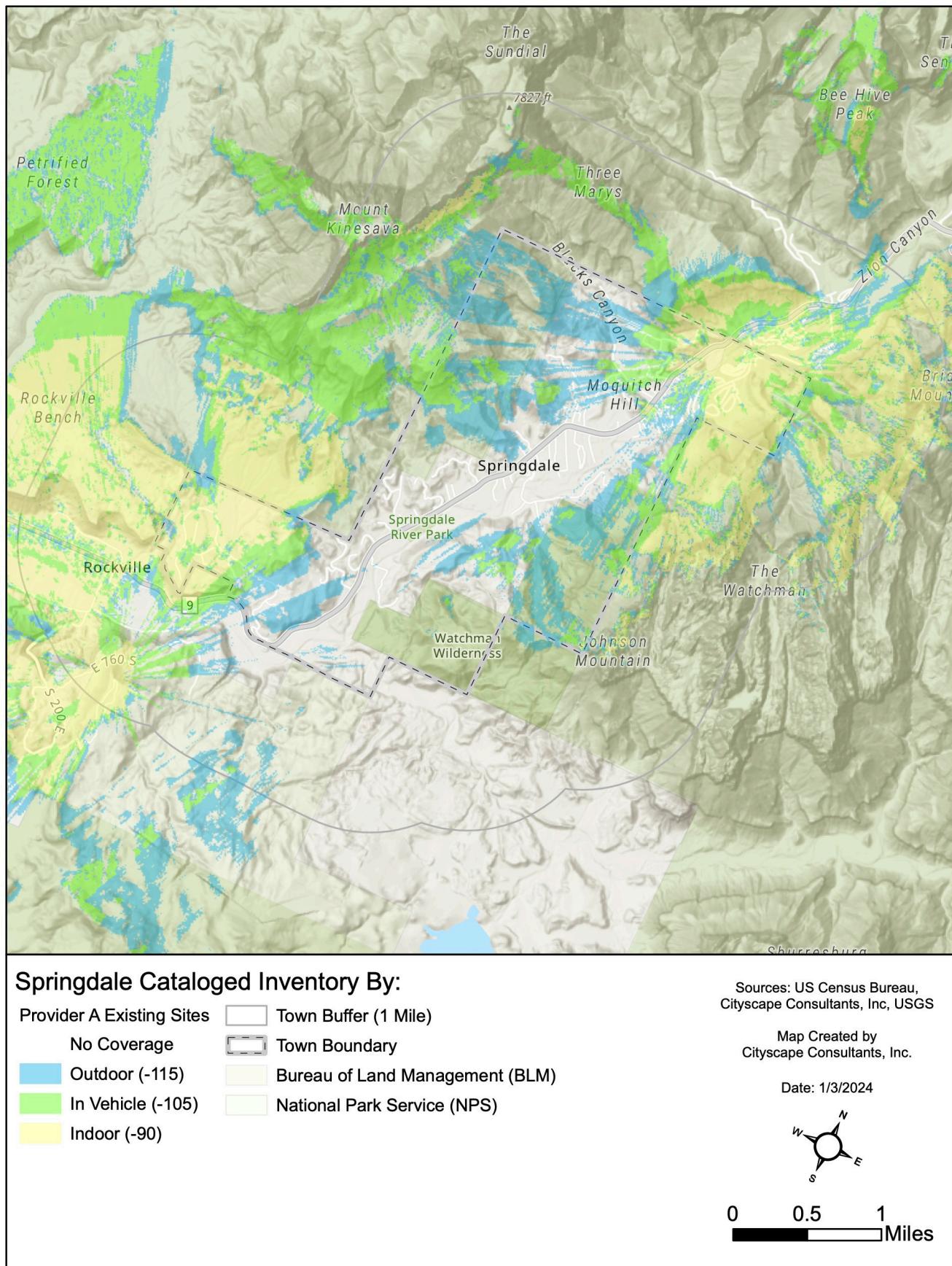


Figure 6: Simulated Coverage Map for Provider A

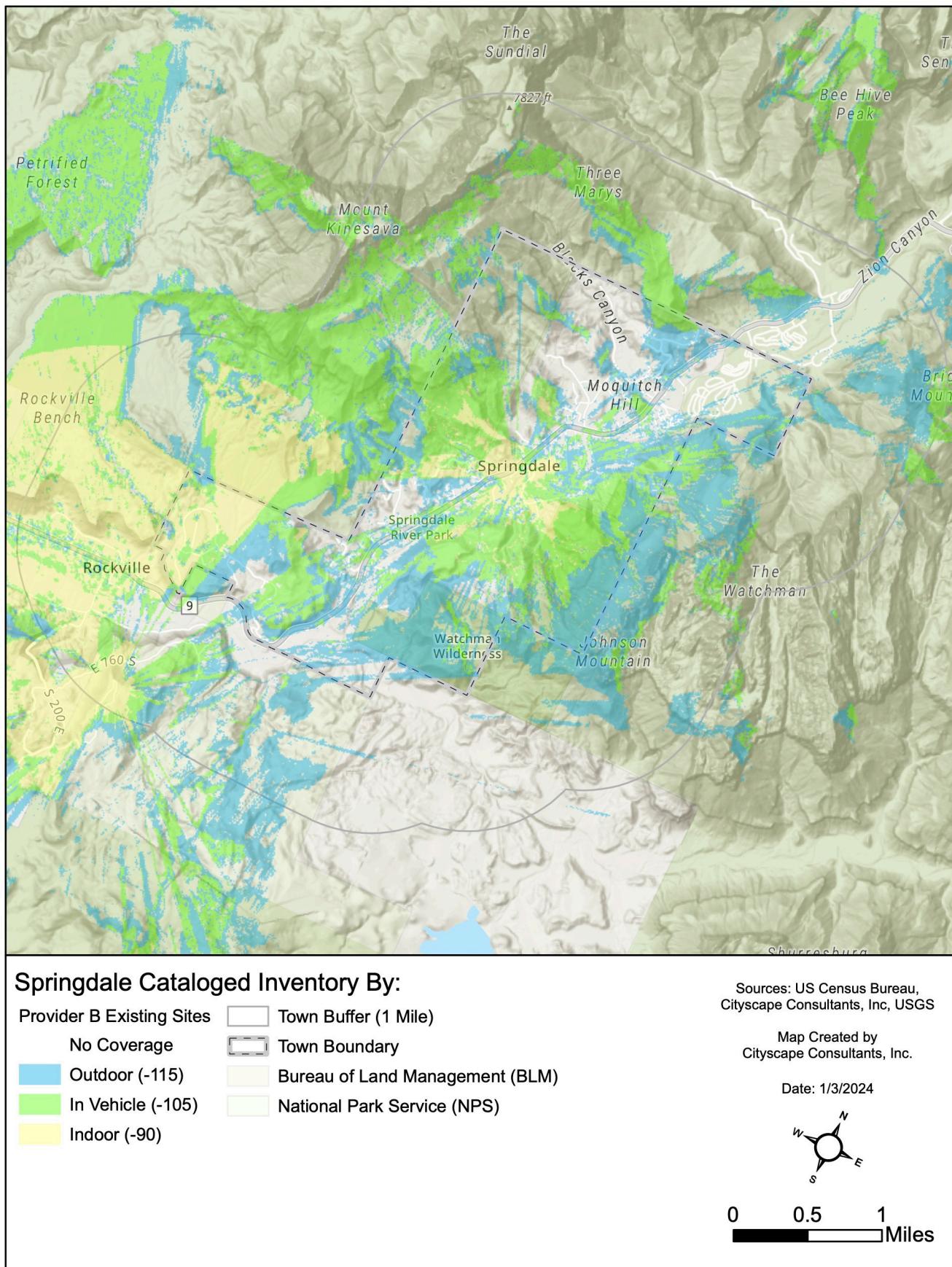


Figure 7: Simulated Coverage Map for Provider B

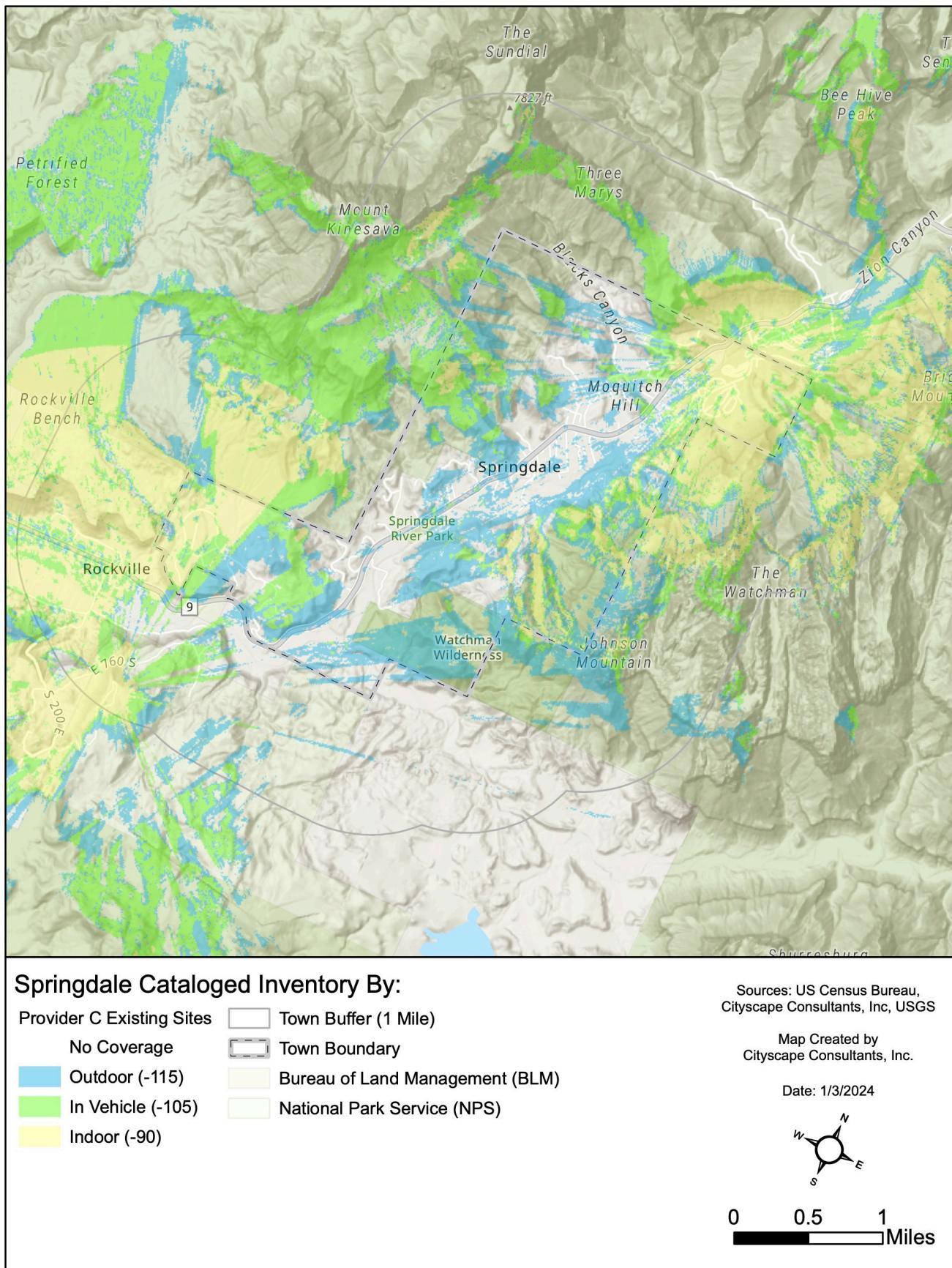


Figure 8: Simulated Coverage Map for Provider C



## MAPPING ANALYSIS

The geography of the Town and existing single-tenant sites at each of the wireless facilities in the Town results in coverage gaps for each service provider. Within the Town's jurisdictional boundary there are two existing wireless facilities and one approved but not built site.

All three facilities are occupied by different service providers. The concealed or to be concealed facilities are in good locations, but the towers and base stations are short in height so they can only accommodate one service provider at each facility. If all three service providers were on each facility, then the gaps in network coverage for each provider would be improved, however, collocations on any of the three existing facilities would make the sites more visible to residents and visitors.

*Site S01* is located near the northernmost portion of the Town's jurisdictional boundary. It is a single tenant concealed facility inside Zion National Park. The design blends in with the existing park buildings and the colors of canyon walls nearby but the tower height is too short to add a second service provider on the tower. This site provides coverage to the most northern portion of Highway 9, Balanced Rock Road, the Zion National Park Visitor Center, the camping area, some nearby trails, and the commercial area south of the entrance to the Park.



Site S01

*Site S02* is an approved but not built concealed roof-top base station just south of existing *Site S01*. The proposed base station will be on the rooftop of the Happy Camper Market and is intended to match the existing chimney-type structure on the building. The rooftop space is too small to accommodate another wireless facility and allowing an extension of the height for a second collocation would make the facility disproportional to the height and character of the existing and nearby buildings.



Site S02 (Simulated Photo)

*Site S02* has a wireless similar coverage footprint as *Site S01*.

*Site S03* and *S04* do not have PWSF equipment therefore are not contributing to the existing wireless coverage in Town.

Near the middle of the Town is *Site S05*, an existing single tenant concealed rooftop base station designed as a faux dormer. Additional collocations on this building would require additional faux dormers or other faux rooftop structures which would need to match the architectural style of the existing building. Coverage from this site serves residential land uses on local roads in the middle of town, and some northern and southern portions of Highway 9.

Two existing non-concealed towers are located south of Highway 9, outside of the Town's jurisdictional boundary but within the study area and are identified as *Site O01* and *O02*. *Site O01* is a monopole with one PWSF provider and public safety antennas and *Site O02* is a lattice tower with equipment for two different wireless service providers.

The coverage from these two towers primarily benefits the Town of Rockville which is southwest of Springdale. Only a small portion of Highway 9 and residents on Anasazi Way in the southern part of the Town receive cell coverage from these two towers.

Of the five facilities in the Town of Springdale, *Site S05* provides the greatest coverage area, but the topography blocks coverage to the most northern and southern parts of the Town. *Sites S01* and future *Site S02* provide coverage to the highly visited entrance to Zion National Park but the shape of the canyon walls south of Lion Boulevard blocks the cell signals from these sites preventing continual signal penetration to the areas south of Lion Boulevard.



Site S05 Concealed Base Station  
(Faux Dormers)



Site O01  
Non-Concealed Monopole Tower



Site O02  
Non-Concealed Lattice Tower

Other variables to contemplate when analyzing existing coverages and network capacity is population surges during peak tourist seasons. The maps provided in *Figures 6, 7 and 8* illustrate wireless coverages that the approximate 526 townspeople can anticipate during months with fewer visitors in town.

According to visitor data from the National Park Service, Zion National Park can expect between four and five million visitors annually with over half a million passing through the park monthly during May, June, July and October, see *Table 3*.

As large numbers of visitors arrive to Town, the capacity of the network becomes overwhelmed. This influx of additional calls, texts and data causes the coverage areas to diminish significantly as the system is overloaded by the simultaneous wireless usage by visitors, residents, business owners, and employees.

The loss of coverage and capacity during these high visitor months also strains public safety communications since so many people during an emergency rely on their wireless devices when seeking help.

#### Recreation Visits by Month Zion NP

*Current year data are preliminary and subject to change. Data will be finalized by the end of the first quarter of next calendar year.*

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
2024	120,910	144,218	417,071	473,570									1,155,769
2023	114,117	130,478	336,226	450,819	514,283	564,036	561,026	458,449	491,799	504,584	284,978	212,443	4,623,238
2022	139,827	168,499	446,308	491,625	539,172	569,975	548,636	437,134	423,654	459,697	291,044	176,846	4,692,417
2021	172,747	160,232	429,455	469,775	610,301	675,799	581,496	466,928	483,180	469,379	308,560	211,983	5,039,835
2020	126,994	133,718	207,400	40,396	178,194	377,425	449,518	450,183	520,987	559,342	319,853	227,244	3,591,254
2019	98,828	102,269	296,316	372,349	529,553	594,896	629,802	535,322	497,443	429,604	230,180	171,706	4,488,268
2018	107,960	127,790	373,523	483,487	500,118	541,464	500,350	459,415	481,507	377,826	218,799	147,794	4,320,033
2017	88,561	110,569	345,476	515,652	509,017	533,252	576,349	529,684	512,940	422,377	222,069	138,866	4,504,812
2016	84,145	117,510	359,920	395,768	447,976	544,890	599,961	477,507	497,825	412,916	232,271	124,438	4,295,127
2015	78,318	106,314	291,118	392,417	400,048	458,546	479,538	455,487	394,201	314,966	180,390	97,503	3,648,846
2014	70,862	74,625	226,424	312,381	391,969	397,753	407,153	391,973	340,855	304,108	169,607	101,986	3,189,696

<https://www.nps.gov/zion/learn/management/park-visitation-statistics.htm> - Click Stats Report

Table 3: National Park Service Visitor Information for Zion National Park



## POTENTIAL SOLUTIONS

When determining and planning solutions for the Town, there are many variables to contemplate. A few that were considered in the scenarios are as follows.

- At least four wireless service providers, AT&T, Dish Wireless, T-Mobile and Verizon own licenses from the Federal Communication Commission (FCC) and have rights to install their networks throughout Springdale.
- Wireless service providers want to deploy as close to their subscriber base as possible which is why recreational and entertainment venues, largely populated residential census blocks, sizable centers of employment, educational institutions, and along major highways and thoroughfares are ideal locations for infrastructure.
- High number of visitors to Zion National Park increases the population and vehicle counts during peak months therefore, the wireless network should be designed to meet the demands so public safety communications is not compromised and residents, business owners, and employees have year-round use of their devices.
- During 2024 and into 2025, fiber optic cable will be installed throughout the Town providing property owners and their families access to Wi-Fi which will help improve wireless networks for residences and businesses. However, this is only one part of a solution. Wi-Fi connection will only provide access at a fixed location and once a user is out of range it will cause the wireless device to disconnect. Additionally, residents and businesses will need to tap into the fiber with a paid subscription.
- Future 6G deployment patterns which is predicted to launch around 2030 should be considered. While there is not a rush to 6G currently and the technology is still a work in progress, it is the planned successor to 5G. It is stated that the 6G networks will operate in higher frequencies in an effort to bring rapid upload and download speeds to wireless devices.



Radio waves in higher frequencies are able to penetrate the walls of buildings better which, in essence, will improve wireless access indoors. The drawback is the higher frequency radio signals travel at a much smaller distance.

Planning for the anticipated number of sites, that could be needed, over the next ten years, assists the Town as standards are prepared. Criteria that mitigate the visual impact of the wireless infrastructure on the landscape and views of the canyon and maintain public safety communications are a top priority for the Town when planning for the wireless future.

The existing wireless facilities in the study area that potentially have available space for new collocations are Sites *O01* and *O02*. Both locations are primarily providing coverage to the Town of Rockville and are outside the Town's jurisdiction. The two existing facilities and the one approved but not built sites located inside the Town are single tenant facilities, each utilized by a different service provider and have no realistic availability for collocations. For this reason, it is best to plan future sites using a blank canvas because that is most likely what a service provider will have to do when launching new or expanding services in Springdale.

To improve the existing poor and no wireless coverage areas in Springdale, six other considerations specific to the Town affecting wireless design were deliberated.

1. Terrain Obstacles: Canyon wall formations throughout the Town create terrain obstacles blocking wireless signals between sites.
2. Distance: Distances between existing antennas on towers and base stations are spaced too far apart for adequate hand-off linking the connections between cell sites.
3. Visitors: Seasonal visitors to Zion National Park using their PWSF devices influence the wireless coverage by exceeding the capacity of the existing wireless network resulting in a reduction and elimination of wireless access in areas where coverage is satisfactory during months with fewer visitors to the park.
4. Viewsheds: Protection of canyon walls and vista views cannot be compromised by tall towers on ridgelines or along the canyon floor. Concealed rooftop antennas and concealed poles in the street right of way will also look better aesthetically.
5. Collocation: Building towers that can accommodate multiple service providers on one facility is called collocation and will reduce the number of overall towers necessary for all the providers of wireless services but will require the towers to be taller, potentially changing the line-of-sight.
6. Antenna Type and Function: Type of antennas installed affects the size and height of the wireless facility to which they attach. A macro cell antenna and associated radio units are very heavy and require a sturdy structure like a tower or rooftop. The unblocked signal from a macro cell can cover approximately a two mile radius. Small cell wireless antenna sizes are at most three cubic feet in volume and can be installed on streetlights or on decorative poles in the right-of-way and parking lots and on towers and base stations. The signal from these antennas covers an approximate 500-foot radius and is used mostly to boost network capacity. The small wireless facilities are usually single tenant poles so it's possible to find three and four individual small wireless facilities necessary on the same Town block.

In consideration of viewshed protection and the need to plan for a ten year wireless strategy for all wireless service providers, eight different simulated engineering solution options were prepared. Many configurations were modeled including the best uses for new macro cell and small cell antennas of various heights at different Town-owned and public properties, the use of small cell sites in the right-of-way and private property if public lands are not available.

These eight variations were presented to the community and the Town Council at two different meetings held on January 8, 2024, and January 9, 2024. Commentary from those meetings helped narrow down the preferred deployment patterns to the decided upon three types of scenarios.

**Scenario 1 (macro cell facilities only):** Macro cell facilities provide the greatest wireless coverages but these sites have large antennas and ground equipment making them more difficult to conceal. The macro cell only solution includes nine possible locations including additional facilities at existing sites at S02, S03 and S04 as shown in *Figure 9*.

**Scenario 2 (small cell facilities only):** Small wireless facilities are typically around 35' in height but by federal code definition allowed up to 50'. The small cell sites have a smaller profile in comparison to the macro cell facilities and it would potentially take about thirteen small cell facilities along the 3.4-mile stretch of Zion Park Boulevard for each service provider. This would equate to approximately 52 single tenant poles and/or 26 two tenant poles to achieve a similar coverage footprint as shown for the nine macro cells in Scenario 1. This scenario is shown in *Figure 10*.

**Scenario 3 (a hybrid of macro cells and small cells):** This scenario consists of six macro cell facilities and seven small cell facility that could equate to approximately 28 small wireless facilities for single tenant poles or 14 for two tenant poles. This scenario is illustrated in *Figure 11*.

These three scenarios achieve similar coverage objectives and are useful to illustrate what future potential deployment plans may be needed for wireless infrastructure. The scenarios are not an exact replica of a wireless service provider deployment plan but a planning tool to proactively anticipate the possibilities of antenna types and locations over the next ten years.

## Scenario 1 Macro Wireless Facilities Only

**Figure 9** provides a closer look at the LTE coverage predictions from nine potential locations for macro cell facilities in the study area. The areas in yellow illustrate predicted indoor, in-vehicle, and outdoor wireless coverage from the vicinities of the suggested nine new towers and base stations. This scenario contemplates adding additional sites in the vicinity of existing sites *S02*, *S03* and *S04* and includes the existing tower at *O02*. Six suggested fill-in locations for new macro cell towers or base stations in areas where there are no existing personal wireless service facilities are represented as proposed macro (PM) followed by a number.

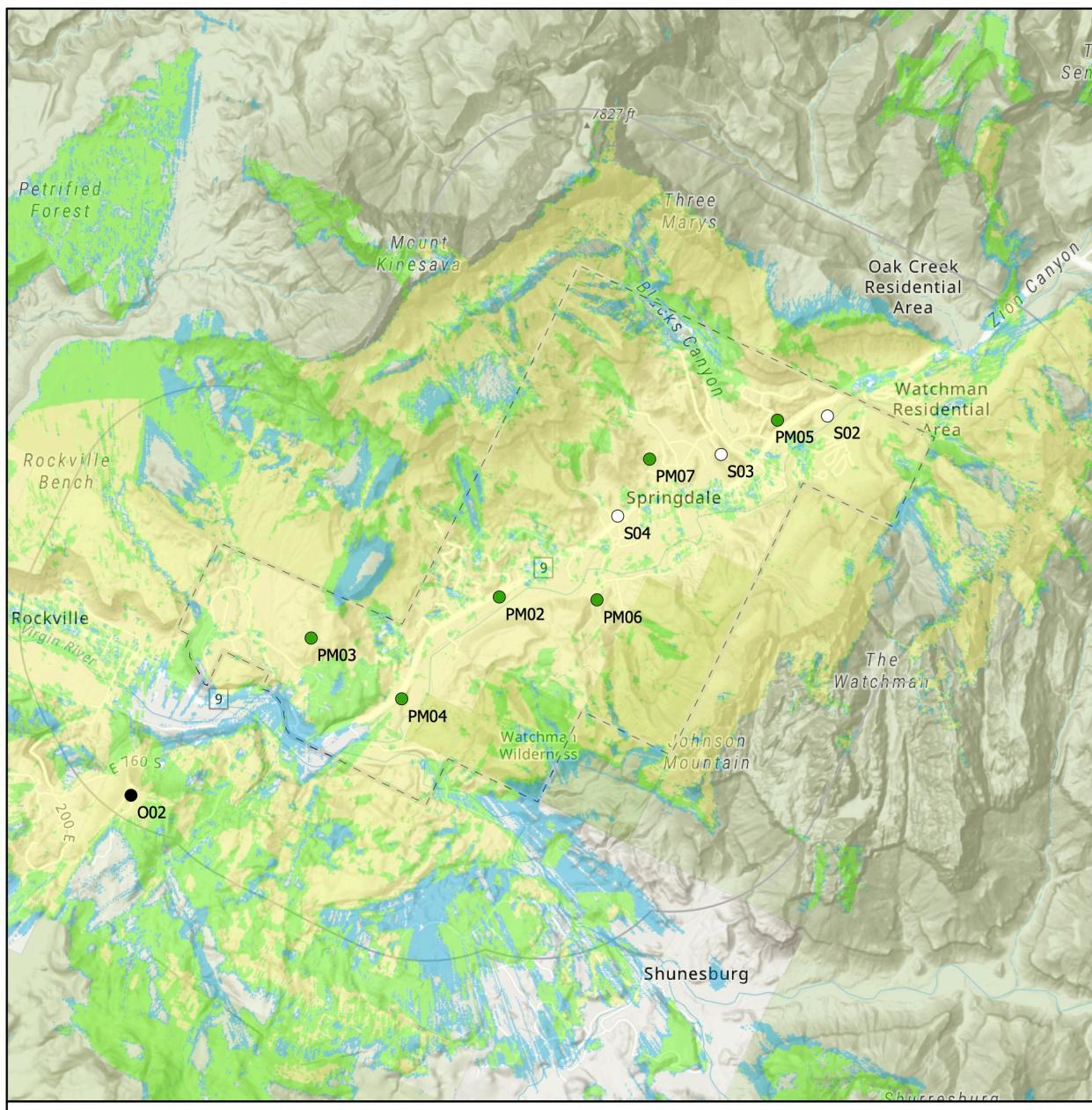


Figure 9: LTE Coverage Predictions Macro Wireless Deployment Only

## Scenario 1 Macro Wireless Facilities Only

The following list is a summary of the suggested macro cell locations shown in Scenario 1 for the Town.

- S02: Additional concealed rooftop attachments up to 35' in height within the same commercial area as the approved but not built Site S02 for other service providers (see simulated image on page 20 for visual of example of concealed rooftop attachments).
- PM05: A proposed new 50' facility on the west side of Highway 9, on Town-owned land, near an abandoned water tank could provide coverage north and west of Hummingbird Lane.
- S03: A possible 15' attachment on the existing Town-owned water tank (30' above ground level) would provide coverage along a portion of Highway 9 and westward down Lion Boulevard.
- PM07: A proposed new 70' concealed tower on Town-owned property outside the utility easement could provide coverage north and south of Paradise Road, Highway 9, and east of Highway 9. If both technically feasible and compliant with all Town land use and grading standards, a tower here should be located immediately to the south or west of the substation, in order to be better screened from residential properties on Redhawk Drive.
- S04: The Rockville and Springdale Fire Departments rooftop could be used for a 12' concealed rooftop attachment and/or a possible new 35' concealed tower to provide coverage to the middle of the Town.
- PM06: Possible 15' concealed facilities in the Foothills Residential Zone to connect coverages between Site S04 and proposed Site PM02 could be designed to look like faux boulders to blend with canyon walls.
- PM02: A potential 35' concealed facility either freestanding or a roof attachment at the George A. Barker Springdale River Park would provide coverage to the park and along Highway 9 south of Dilly Holler Drive toward Valley View Drive (see image of Site S01 on page 20 for visual of example of concealed rooftop attachment).
- PM04: Proposed concealed 30' rooftop attachment or a concealed 50' tower on private property is needed to provide coverage to the southern portion of the Town along Highway 9 (see Site S05 in the Wireless Infrastructure Inventory in *Appendix 2* for visual of example of concealed rooftop attachment). The precise location will be guided by the Town's preferential zoning order, which is as follows: 1) Village Commercial Zone; 2) Foothill Residential Zone. A facility at this location must be situated on the west side of Highway 9.
- PM03: A concealed 30' tower next to the water tank would provide coverage along Anasazi Way.
- O02: An existing tower outside of the Town and within the one mile perimeter of the Town has room for additional collocations and could complete wireless coverage in the area west of Anasazi Way.

## Examples of Macro Wireless Facility Types



Faux Boulder  
Example for PM06

\*picture courtesy of Valmont



Unipole with Flag  
Example for S04



Unipole without Flag  
Example for PM03, PM04,  
PM05



Painted Monopole  
Example for PM07



Short Tower  
Example for S03 and PM06  
\*Ehresmann Engineering product



Inside of Short Tower  
\*Ehresmann Engineering product

## Scenario 2 Small Wireless Facilities Only

The Town's current code promotes the use of small wireless facilities over the use of macro cell sites. *Figure 10* provides a closer look at the LTE coverage predictions from the vicinities of thirteen possible small-cell facilities (per service provider). Areas in blue illustrate very poor to non-existent wireless coverage that appears because the small wireless facility antenna provides less range of coverage than the macro cells in Scenario 1.

Each shown location for a suggested new small cell site would represent the need for potentially two to four new poles within the same area to accommodate each service provider.

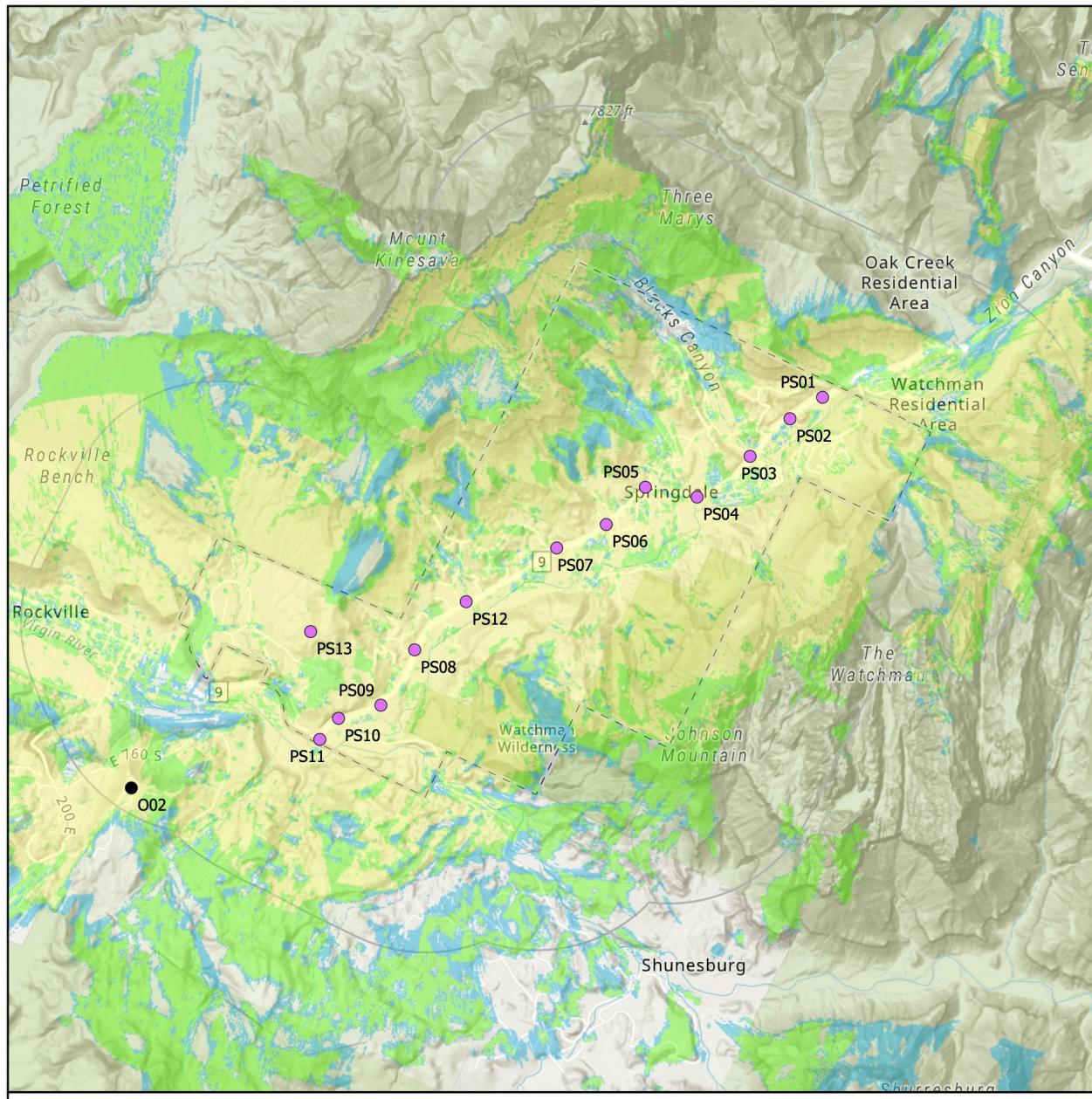


Figure 10: LTE Coverage Predictions Small Wireless Deployment Only

## Scenario 2 Small Wireless Facilities Only

The data in *Table 4* provides a summary of all the suggested small cell sites in the right of way (ROW) along Highway 9. Small wireless facilities on existing poles or new poles in the ROW are identified as PS followed by a number. These potential small cell sites would provide coverage along Highway 9 and properties within an approximate 500-foot radius. Areas near Blacks Canyon, S. Zion Shadow Circle, Paradise Road, Juniper Lane and Watchman Wilderness are shown in this scenario to still have poor coverage due to the smaller range of small cell antennas.

Small cell antennas can be mounted on existing non-concealed utility poles owned by Rocky Mountain Power Company, provided the service provider can meet the utility company's Cellular Communication Site Installation Guidelines. New poles in the ROW will most likely be new decorative poles characteristically similar to the existing poles in that same vicinity.

Ten of the thirteen areas identified for new small wireless facilities are 30' in height and designed for two wireless service providers. The remaining three locations would need taller poles approximately 50' for two wireless providers due to the topography in these areas.

Depending on the collocation options of the individual small cell pole design, there could be an additional one to four small wireless facilities in the same vicinity for all the various wireless service providers.

SMALL CELL SUGGESTED SITES			
SITE NAME	LATITUDE	LONGITUDE	HEIGHT
PS01	37.200069	-112.989762	30'
PS02	37.197594	-112.991619	30'
PS03	37.193805	-112.993434	30'
PS04	37.189382	-112.996214	30'
PS05	37.188377	-113.000913	30'
PS06	37.184634	-113.002683	30'
PS07	37.181478	-113.005864	50'
PS08	37.170117	-113.013606	50'
PS09	37.165339	-113.014197	30'
PS10	37.163102	-113.017193	30'
PS11	37.161099	-113.017907	30'
PS12	37.174982	-113.011248	50'
PS13	37.167991	-113.023003	30'

Table 4: Suggested Small Wireless Fill-In Sites

## Examples of Small Wireless Facility Types



Black Metal Pole  
with Ground Cabinet



Concealed  
with Components Inside  
Pole Shaft  
\*product of Raycap



Concrete Pole  
with Ground Cabinet



Dual Purpose  
with Street Light



Black Metal Pole with  
shrouded pole components



Dual Purpose  
Light and Banner Pole

\*picture courtesy of Raycap

## Scenario 3 Hybrid Macro and Small Wireless Facilities

The following *Figure 11* illustrates the LTE coverage predictions from a blend of macro cell and small cell facilities. Constructing both small cell and macro cell sites in the same service area is common practice for service providers to provide ample bandwidth to areas with large numbers of subscribers who either reside, work, or visit the area. The hybrid model has six potential macro cell sites (including sites in the vicinity of S03 and S04) seven small cell sites (with the possibility of an additional two to four poles for each provider in same vicinity), and the use of the existing tower at site 002.

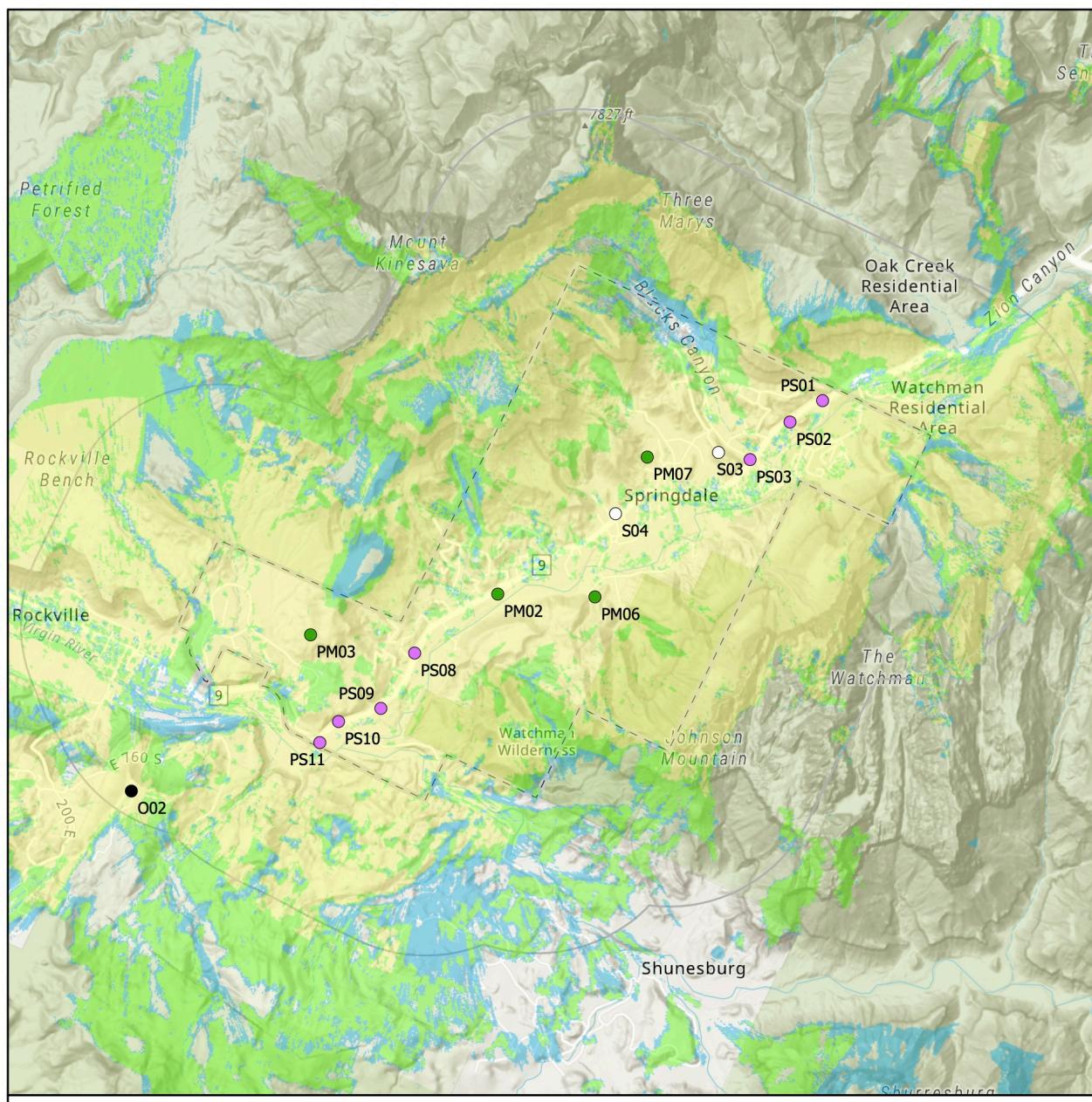


Figure 11: LTE Coverage Predictions Macro and Small Wireless Deployment

## Scenario 3 Hybrid Macro and Small Wireless Facilities

The hybrid model contemplates macro wireless facilities on the Town's existing water tank at site *S03*, a proposed new 70' concealed tower in the vicinity of *PM07* (on Town-owned property used for the Public Works Shop or on Town-owned property outside the utility easement\*), a 15' tall facility on private property in the vicinity of site *PM06* located in the Foothills residential area, a 35' tower or base station on property in the vicinity of *PM02* and a 30' tower or base station for a macro cell or small cell facility on the Town-owned existing water tank at site *PM03*.

The hybrid model scenario also includes seven potential small wireless facility locations (potentially up to 28 for additional providers) and the existing tower at site *O02*. The following *Table 5* are the suggested macro wireless options and *Table 6* provides a summary of the suggested small wireless facility areas.

MACRO CELL SUGGESTED SITES		
SITE #	SITE NAME	HEIGHT
S03	Concealed Water Tank Attachment or short tower	10'
PM07	Concealed Tower at Public Works Property owned by the Town*	70'
S04	Concealed Base Station or Tower on Public Property	30'
PM06	Concealed Faux Boulders in Foothills Residential Area	15'
PM02	Concealed Base Station or Tower	35'
PM03	Concealed Base Station or Tower at Water Tank owned by the Town	30'

Table 5: Suggested Macro Fill-In Sites for Hybrid Solution

SMALL CELL SUGGESTED SITES			
SITE NAME	LATITUDE	LONGITUDE	HEIGHT
PS01	37.200069	-112.989762	30'
PS02	37.197594	-112.991619	30'
PS03	37.193805	-112.993434	30'
PS08	37.170117	-113.013606	50'
PS09	37.165339	-113.014197	30'
PS10	37.163102	-113.017193	30'
PS11	37.161099	-113.017907	30'

Table 6: Suggested Small Wireless Fill-In Sites for Hybrid Solution

\*Set back by a minimum of 600' from the front of the property line.



## COMMUNITY SURVEY AND ZONING

The Town promoted the use and participation in a Wireless Infrastructure Survey (Survey) to engage the townspeople in the wireless master planning process. The main objective was to gather information regarding thoughts, concerns, and preferences related to the Town's existing and future wireless infrastructure facilities.

The Survey sought opinions and experiences regarding the importance of the current state of wireless connectivity and the aesthetics of the infrastructure in the Town. The Springdale survey opened on February 22, 2024, and closed on March 29, 2024. During that time 87 people participated in the survey.

Of those who participated in the survey 85% indicated the quality of wireless service is very important to them and 52% agreed entirely that they would rely more on their mobile devices if the network was better. Fifty-one percent rated the wireless coverage where they reside as poor or inconsistent, 34% ranked wireless service where they work as acceptable or excellent and 51% specified service as inconsistent or poor when they travel through the Town.

After studying the three different solutions for future wireless deployments, 46% of respondents preferred Scenario 3 (Hybrid Cell design) as their first choice, 33% preferred Scenario 1 (Macro Cell only) as their first choice, and 21% preferred Scenario 2 (Small Cell only) as their first choice.

Concerning the appearance of wireless facilities, 78% chose base stations (antennas on existing rooftops and water tanks) over new towers and 95% specified they want visually mitigated facilities over non-concealed facilities. Boulders painted to blend with the canyon walls were the most favored concealment method for new wireless infrastructure followed by a unipole tower with a flag (40%), a painted monopole (38%), and a new unipole without a flag (33%).

Seventy-seven percent support the use of public property for future sites to control overall design, aesthetics, and maintenance of the facility and also to create revenue for the Town through leases with wireless providers who build sites on public lands and structures.

The most notable observations from the survey are shown in *Table 7* with the entire collection of responses and comments provided in *Appendix 3*.

RESPONSES	
<b>PARTICIPANTS</b>	87
<b>Average Number of Devices</b>	6
<b>Use of Devices</b>	
<input type="radio"/> Personal Recreation/Leisure	99%
<input type="radio"/> Employment Related	69%
<b>Wireless Coverage at Residence</b>	
<input type="radio"/> Excellent or Acceptable	41%
<input type="radio"/> Poor or Inconsistent	51%
<b>Wireless Coverage at Work</b>	
<input type="radio"/> Excellent or Acceptable	34%
<input type="radio"/> Poor or Inconsistent	33%
<b>Wireless Coverage Traveling Around Town</b>	
<input type="radio"/> Excellent or Acceptable	48%
<input type="radio"/> Poor or Inconsistent	51%
<b>Would Rely More on Device if Network was Better</b>	
<input type="radio"/> Entirely Agree	71.9%
<b>Quality of Wireless Service Is Important to Me</b>	
<input type="radio"/> Entirely Agree	52.3%
<b>What is Most Important to You</b>	
<input type="radio"/> Excellent Connectivity	28%
<input type="radio"/> Good Connectivity and Minimal Visual Impact	52%
<b>Prefer Scenario 3: Hybrid Macro and Small Wireless</b>	46%
<b>Non-Concealed Tower Preference - None</b>	41%
<b>Visual Mitigation Preference - Faux Boulders</b>	75%
<b>Base Station / Rooftop Preference - Concealed</b>	86%
<b>Small Wireless Facility Preference - Concealed</b>	79%
<b>Locational Preference in Town - On Electric Utility Poles</b>	54%
<b>Support Use of Public Property for Revenue and Aesthetics and Maintenance- Yes</b>	55.4%
<b>Support Facilities in Foothill Residential Zone</b>	
<input type="radio"/> Faux Boulders Painted to Match Canyon Walls	78%
<input type="radio"/> 15' Painted Monopole	35%
<input type="radio"/> None	16%
<b>Support Facilities at George A Barker Springdale River Park</b>	
<input type="radio"/> Concealed Restroom Rooftop	72%
<input type="radio"/> Unipole with Flag	47%

Table 7: Summary of Notable Survey Responses



## POLICY CHANGES

The Town adopted Chapter 27 titled, Wireless Communication Facilities for inclusion in Title 10 of the Springdale Town Code in 2016 to:

- Protect the iconic scenic view and vistas of Zion Canyon; and
- Accommodate facilities for wireless communication to serve the needs of residents and visitors; and
- Promote sensible development standards addressing appearance, size and scale of future wireless infrastructure; and
- Provide procedures for wireless infrastructure approval as detailed in Utah Code Ann. 10-9z-205 and 10-9a-503.

Since 2016, the Code of Federal Regulation (COFR) amended Title 47, Chapter I, Subchapter A, Part 1, Subpart U titled State and Local Government Regulation of the Placement, Construction and Modification of Personal Wireless Service Facilities. The revised definitions, timelines from approvals and development standards in the COFR must be followed by local governments nationwide when regulating existing and future cell sites.

The Town's approach to implementing the required Federal and State standards for new wireless infrastructure is more comprehensive and focuses on ways to fill in identified gaps in wireless coverage responsibly with as little impact as possible on the community's characteristics. The responses from the Town's survey helped formulate revisions to the Town's siting preferences for future wireless infrastructure.

One of the most notable changes from the 2016 Code regards small wireless facilities. After studying what a small cell wireless facility deployment plan could look like in the Town, (Scenario 2, Small Wireless Facilities only), the townspeople decided the use of both macro cells and some small cells would best for the town going forward. Those who participated in the survey also strongly supported concealed base stations (attachments on existing buildings) over new concealed towers along with the use of public properties for new sites. Using Town owned property allows for greater control over the type of facility installed and the long-term maintenance of the infrastructure.

Furthermore, the proposed Code revisions removes the option to install any future non-concealed wireless facilities, updates the infrastructure definitions and review timelines to be consistent with state and federal requirements.

The final policy changes will be adopted through a separate process from the Wireless Master Plan.

## FEDERAL REGULATIONS

Local government agencies are allowed to regulate personal wireless service facilities (PWSF) as a permitted land use provided local code aligns and does not exceed federal regulations already in place for the industry to follow.

Local codes and land development standards can address concerns related to: proximity of infrastructure to other land uses, zones and scenic viewsheds; visual concerns related to location, height and pedestrian views of a structure's height and ground equipment; setbacks outside rights-of-way; fencing; signage; parking, and certain lighting types.

The Telecommunication Act of 1996 preserves local siting authority but contains a handful of specific provisions that require municipalities to follow federal restrictions. Subsequent congressional legislation and federal regulations adopted by the Federal Communications Commission (FCC) provide the definitions and timelines referenced as "shot clocks" that state and local governments must follow when regulating wireless infrastructure.

### **Telecommunication Act 1996 Section 704(a) (47 U.S.C. § 332(c) (7))**

The Federal Telecommunications Act of 1996 includes Section 704(a) (47 U.S.C. § 332(c) (7)) and preserves local governments the authority to regulate wireless infrastructure. Section 704 states in relevant part that:

- Land use development standards may not unreasonably discriminate among the wireless providers and may not prohibit or have the effect of prohibiting the deployment of wireless infrastructure.
- Local governments must act on applications for new wireless infrastructure within a "reasonable" amount of time.
- Land use policies may be adopted to promote the location and siting of telecommunications facilities in certain designated areas.
- Encourages the use of third-party professional review of site applications.
- Prohibits local government from denying an application for a new wireless facility or the expansion of an existing facility on the grounds that radio frequency emissions are harmful to human health provided the wireless service provider met federal standards.

### **(47 USC § 1455) Section 6409(a) Middle Class Tax Relief and Job Creation Act of 2012**

Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012, referenced as the "Spectrum Act" was enacted by Congress to promote wireless deployments of broadband for public safety and commercial purposes. As stated in the Spectrum Act,

“...a State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station.”

After much debate between the wireless industry and local government the FCC issued a response clarifying definitions and meaning to the Spectrum Act in a Report and Order released October 21, 2014 in W.T. Docket 13-238.

The 2014 Report and Order, clarified the Spectrum Act stating:

“[n]otwithstanding section 704 of the Telecommunications Act of 1996 or any other provision of law, a state or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station.”

Several other subsequent Report and Orders have since been vetted and approved by the FCC and the regularity definitions and shot clocks are provided in the Code of Federal Regulations: Title 47, Chapter I, Subchapter A, Part 1, Subpart U Titled State and Local Government Regulation of the Placement, Construction and Modification of Personal Wireless Service Facilities.

#### **Code of Federal Regulations Reasonable Time Periods to Act on Siting Applications**

When an applicant requests a modification, a state or local government may require the applicant to provide documentation or information only to the extent reasonably related to determining whether the request meets and does not exceed the definitions and requirements for collocation or modification. A state or local government may not require an applicant to submit any other documentation, including but not limited to documentation intended to illustrate the need for such wireless facilities or to justify the business decision to modify such wireless facility.

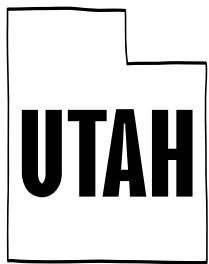
The shot clock date for a siting application is determined by counting forward, beginning on the day after the date when the application was submitted, by the number of calendar days of the shot clock period and including any pre-application period asserted by the siting authority, provided, that if, the date calculated in this manner is a “holiday” or a legal holiday within the relevant state or local jurisdiction, the shot clock date is the next business day after such date.

The presumptively reasonable periods of time for PWSF applications is as follows in *Table 8* unless mutually agreed upon in writing.

INSTALLATION TYPE	TIME PERIOD FOR DECISIONS	REVIEW AND INITIAL TOLLING PROCESS	RESUBMISSION APPLICATIONS TOLLING PROCESS FOLLOWING A NOTICE OF DEFICIENCY
<b>Small Wireless Facilities (SWF)</b>			
New SWF Structure	90 Days*	10 days after submission to determine if application is incomplete and to specifically identify missing information including specific rule or regulation creating the obligation.	If incomplete, the shot clock date calculations <u>restart at zero</u> on the date on which the applicant submits all the documents and information identified by the siting authority to render the application complete. If still an incomplete application, then the review and tolling process continues until application is deemed complete.
Collocation Existing SWF Structure	60 Days*		
<b>Macro Wireless Facilities</b>			
New Macro Facility Structure	150 Days**	30 days after submission to determine if application is incomplete and to specifically identify missing information including specific rule or regulation creating the obligation.	If incomplete, the <b>shot clock</b> date calculations <u>restart where it left off in the count</u> the day after applicant submits all the documents and information identified by the siting authority to render the application complete.
Collocation New Structure	90 Days**	10 days from <b>resubmission</b> to notify if application remains incomplete. If 10 day passes the shot clock may not be tolled for incompleteness.	Tolling process continues if applicant told incomplete during allowable timelines.
Collocation Existing Structure	60 Days**		
<p>*In the event the reviewing authority fails to approve or deny a request seeking approval, under the shot clock stipulations the request shall be deemed granted. The deemed granted does not become effective until the applicant notifies the applicable reviewing authority in writing after the review period has expired (accounting for any tolling) that the application has been deemed granted.</p> <p>**In the event of FCC shot clock expiration for a new macro facility or collocation on an existing PWSF, the applicant is entitled to bring an action in federal court seeking to compel the jurisdiction to grant the permit, which the court is supposed to hear on an expedited basis. The community faces a rebuttable presumption that it violated 47 USC §322 by failing to timely adjudicate the application. The community can then defend and explain why it was unable to do so within the allowable timeframes.</p>			

Table 8: Federal Shot Clock Timelines

## UTAH STATE REGULATIONS



In the State of Utah the Small Wireless Facilities Deployment Act was approved and made effective on September 1, 2018. These regulations generally follow the Federal Code of Regulation except for the size of the small cell antenna. The Utah Code allows each wireless provider's antenna to fit within an enclosure of no more than six cubic feet in volume which twice what is allowable in the Code of Regulation.



## APPENDIX 1

### WIRELESS DEFINITIONS



## WIRELESS DEFINITIONS

For purposes of the Plan the following terms are used throughout and provided as reference as follows:

Bandwidth - A range of frequencies used to transmit a signal. The channel width (bandwidth) affects how much data can transmit per unit time. Each service provider has their own designated finite amount allocated to them by the Federal Communications Commission (FCC).

Base Station - Equipment and non-tower supporting structure at a fixed location that enables wireless telecommunications between user equipment and a communications network. Examples include transmission equipment mounted on a rooftop, water tank, silo or other above ground structure other than a tower. The term does not encompass a tower as defined herein or any equipment associated with a tower. “Base Station” includes, but is not limited to:

- Any structure other than a tower that supports or houses radio transceivers, antennas, coaxial or fiber optic cable, regular and back-up power supplies and comparable equipment, regardless of technological configuration; and
- Equipment associated with wireless telecommunications services such as private, broadcast, and public safety services, as well as license-free wireless services and fixed wireless services such as microwave backhaul and broadband.

Concealment - A tower, base station or utility pole that is not readily identifiable as a wireless communication facility and that is designed to be aesthetically compatible with existing and proposed building(s) and uses on a site or in the neighborhood or area. Some of the types of concealment found in the City are faux dormers, faux facades, parapets, steeples, faux chimneys and unipoles.

Macro Wireless Facilities - Traditional support structures for personal wireless service facilities (PWSF) identified as macro cell facilities consist of multiple provider use towers and base stations. Macro facilities are taller infrastructure usually between 50 and 100 feet in height and have been the most commonly utilized infrastructure over the last thirty years. Macro facilities are considered the backbone of the network and allow service providers the most flexible options when deploying their usable spectrum and providing signal over the greatest area. It also allows the flexibility to target the desired signal to a specific location.

Personal Wireless Service Facilities (PWSF) - Facilities for the provision of personal wireless services. Personal wireless service facilities include transmitters, antennas, structures supporting antennas and electronic equipment that is typically installed in close proximity to a transmitter that provides commercial wireless services.

Radio Frequency (RF) - A range of frequencies that are allocated to be transmitted/received through the air without wires, with the use of transmitters/receivers and associated antennas. Radio waves are generated for fixed and/or mobile communication. A frequency or band of frequencies suitable for use in telecommunications.

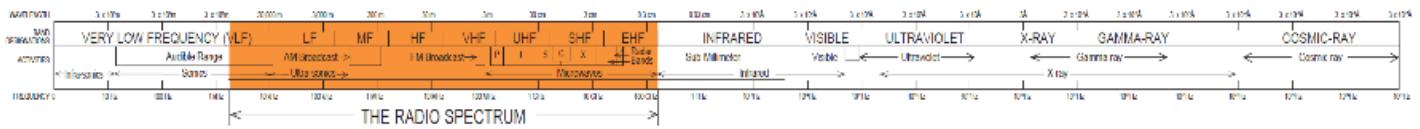
Small Wireless Facilities - Small wireless facilities have antennas mounted at lower heights, generally the height of a utility pole. The equipment is mounted on or inside these smaller poles and are interconnected with fiber optic cables which allows for greater bandwidth and faster transmission speeds. For a single service provider, the small wireless facilities are typically spaced every 650 feet, although there are many variations, creating a densification of the transmitting signals for the network. The ideal service area for a small cell is a specified corridor or neighborhood. According to Colorado Revised Statutes a small wireless facility must meet the following criteria:

- Each antenna associated with the facility must be located inside an enclosure of no more than three (3) cubic feet in volume, or in the case of antenna that have exposed elements, each antenna and all of its exposed elements must be able to fit within an enclosure of not more than three (3) cubic feet in volume; and
- All other wireless equipment associated with the facility is cumulatively no more than seventeen (17) cubic feet in volume. The following ancillary equipment is not included in this calculation: electric meters, concealment elements, telecommunications demarcation boxes, ground-based enclosures, grounding equipment, power transfer switches, cutoff switches, vertical cable runs for the connection of power and other services, and utility poles or other support structures.

Tower - Any support structure built for the primary purpose of supporting antennas and associated facilities for commercial, private, broadcast, microwave, broadband, public, public safety, licensed or unlicensed, and/or fixed or wireless services. A tower may be concealed or non-concealed.

Utility Pole - Any pole or structure designed to maintain, or used for the purpose of lines, cables, or wires for communications, cable, electricity, street lighting, other lighting standards, or comparable standards.

Wireless Spectrum - Consists of electromagnetic radiation and frequency bands. The wireless spectrum frequencies used in communication are regulated by national organizations, which specify which frequency ranges can be used by whom and for which purpose. Spectrum refers to the invisible radio frequencies that wireless signals travel over. These signals enable the use of wireless devices. The frequencies used by the wireless service providers are only a portion of what is considered electromagnetic spectrum. An invisible electro-magnetic transmitting and receiving resource determined and defined by wavelengths and found between the audible hearing range and light. The frequencies referenced for this purpose are located in spectrum used for personal wireless services and are only a small portion of what is called the electromagnetic spectrum.





## APPENDIX 2

# WIRELESS INFRASTRUCTURE INVENTORY

S01	Zion National Park	Springdale
Structure Type	Tower	<b>Facility Owner</b>
Facility Type	Faux Building	Verizon
Antenna Type	Macro Cell	<b>Facility Owner Site Name/ID</b>
Design Type	Concealed	UT4 Zion
Location	Public Property	<b>Service Providers</b>
Latitude	37.199920	Verizon
Longitude	-112.987724	<b>Notes</b>
Height	34'	
Zoning		
Parcel Number		



S02	95 Zion Park Blvd	Springdale
Structure Type	Base Station	<b>Facility Owner</b>
Facility Type	Roof	AT&T
Antenna Type	Macro Cell	<b>Facility Owner Site Name/ID</b>
Design Type	Concealed	Happy Camper Market
Location	Private Property	<b>Service Providers</b>
Latitude	37.199213	AT&T
Longitude	-112.989074	<b>Notes</b>
Height	35'	
Zoning	Zoning	
Parcel Number	Parcel Number	



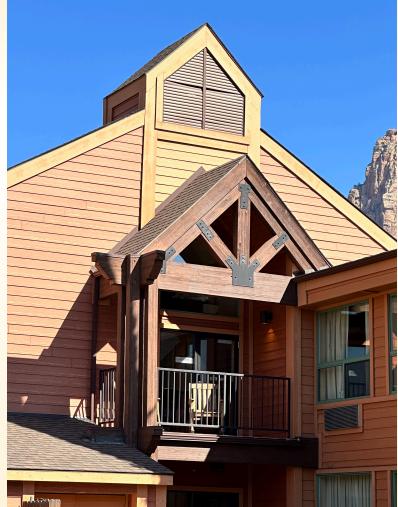
S03	228 Winderland Lane	Springdale
Structure Type	Tower	Facility Owner
Facility Type	Guyed	Town of Springdale
Antenna Type	Other	Facility Owner Site Name/ID
Design Type	Non-Concealed	
Location	Public Property	Service Providers
Latitude	37.193263	None
Longitude	-112.996355	Notes
Height	12'	
Zoning		
Parcel Number		



S04	1130 Zion Park Blvd	Springdale
Structure Type	Base Station	Facility Owner
Facility Type	Rooftop	Town of Springdale
Antenna Type	Public Safety	Facility Owner Site Name/ID
Design Type	Non-Concealed	Rockville • Springdale Fire & EMS
Location	Public Property	Service Providers
Latitude	37.18587084	None
Longitude	-113.00247003	Notes
Height	20'	
Zoning		
Parcel Number		



S05	1215 Zion Park Blvd	Springdale
Structure Type	Base Station	Facility Owner
Facility Type	Roof	T-Mobile
Antenna Type	Macro Cell	Facility Owner Site Name/ID
Design Type	Concealed	Holiday Inn Express
Location	Private Property	Service Providers
Latitude	37.182896	T-Mobile
Longitude	-113.003137	Notes
Height	30'	
Zoning		
Parcel Number		




O01	Eagle Crags Loop	Rockville
Structure Type	Tower	Facility Owner
Facility Type	Monopole	American Tower Corporation
Antenna Type	Public Safety Macro Cell	Facility Owner Site Name/ID
Design Type	Non-Concealed	209531/Rockville
Location	Private Property	Service Providers
Latitude	37.152502	AT&T
Longitude	-113.032196	Notes
Height	63'	
Zoning		
Parcel Number		




O02	Eagle Crags Loop		Rockville
Structure Type	Tower	Facility Owner	
Facility Type	Lattice	KGI	
Antenna Type	Macro Cell	Facility Owner Site Name/ID	
Design Type	Non-Concealed	28386	
Location	Private Property	Service Providers	
Latitude	37.151810	T-Mobile, Verizon	
Longitude	-113.013645	Notes	
Height	100'		
Zoning			
Parcel Number			

O03			
Structure Type	Tower	Facility Owner	
Facility Type	Lattice	Washington County Dispatch	
Antenna Type	Public Safety	Facility Owner Site Name/ID	
Design Type	Non-Concealed	The West Temple	
Location	Public Property	Service Providers	
Latitude	37.20879	None	
Longitude	-113.019389	Notes	
Height	30'		
Zoning			
Parcel Number			



## APPENDIX 3

# WIRELESS INFRASTRUCTURE SURVEY RESULTS

# Town of Springdale Wireless Infrastructure Survey

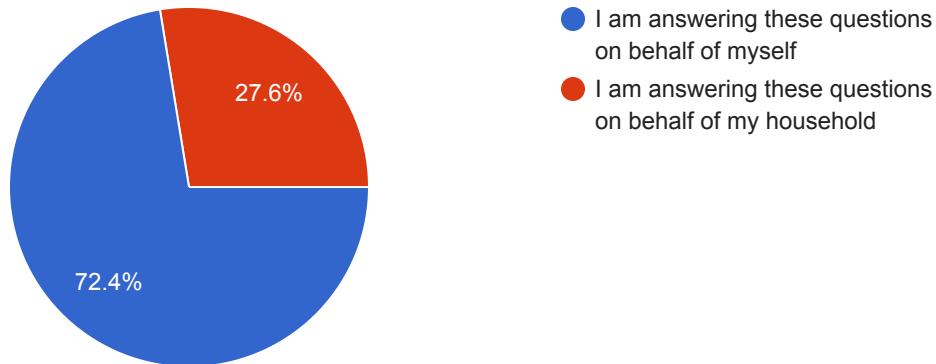
87 responses

[Publish analytics](#)

**1) Thank you for taking the time to complete this survey. Please tell us  
a little about yourself.**

87 responses

 [Copy](#)

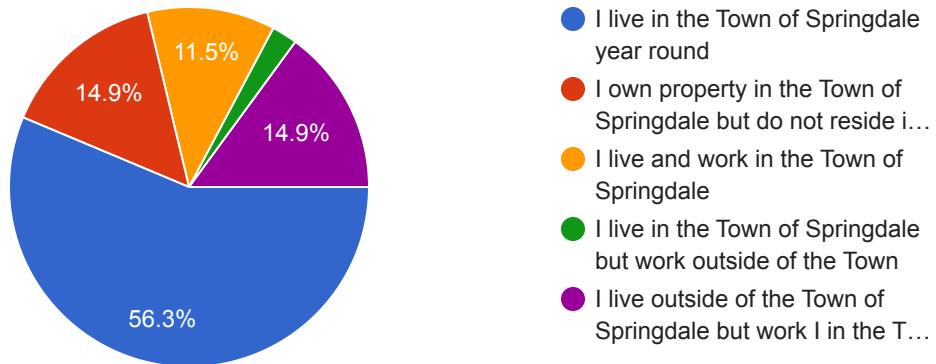


- I am answering these questions on behalf of myself
- I am answering these questions on behalf of my household

**2) Choose which best describes you:**

87 responses

 [Copy](#)



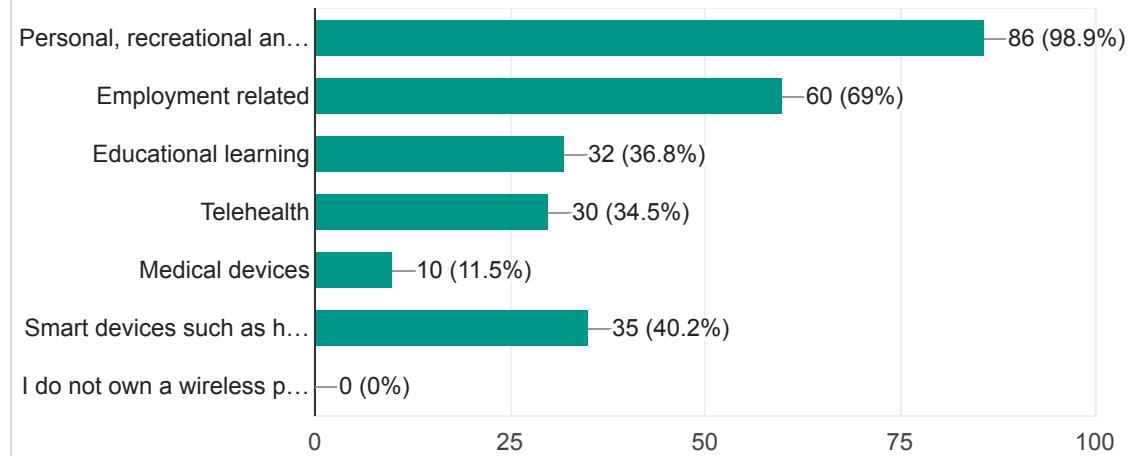
- I live in the Town of Springdale year round
- I own property in the Town of Springdale but do not reside in it
- I live and work in the Town of Springdale
- I live in the Town of Springdale but work outside of the Town
- I live outside of the Town of Springdale but work in the Town



**3) I use personal wireless services for the following purposes: (check all that apply):**

[Copy](#)

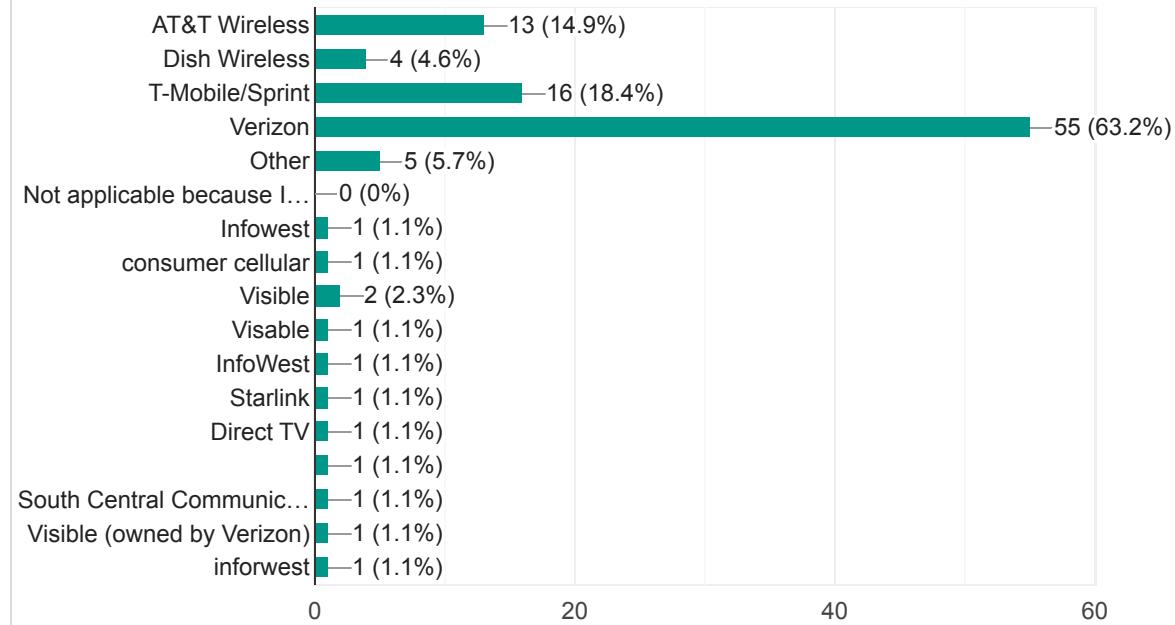
87 responses



**4) My Wireless Service Provider is (if you have multiple wireless providers then please mark all that apply):**

[Copy](#)

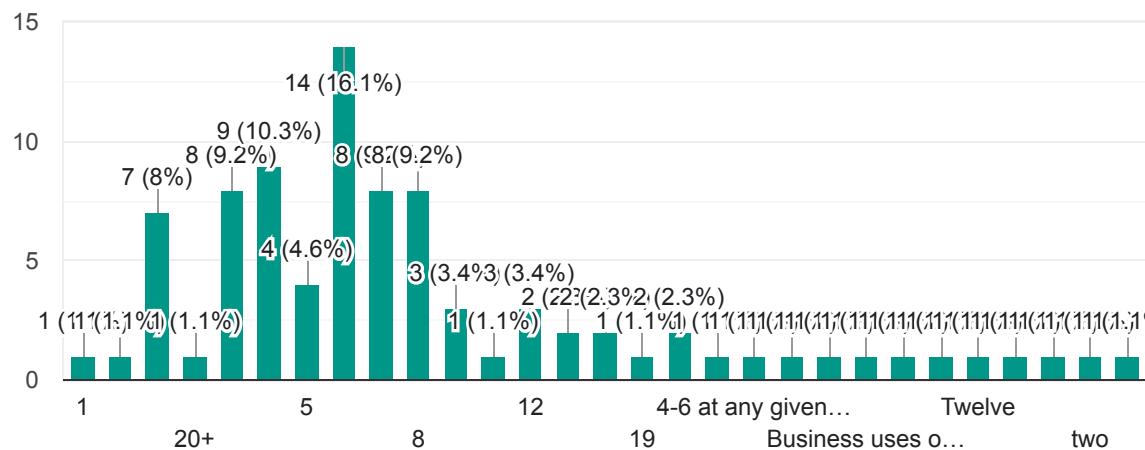
87 responses



**5) How many wireless devices are used in your household? (Devices include but are not limited to: cell phones, laptops, iPads, android tablets, watches, home security services, pet tracking and computers and any device which is using your home internet. Do not include items like garage door openers or smart home items unless they use wireless services.)**

 Copy

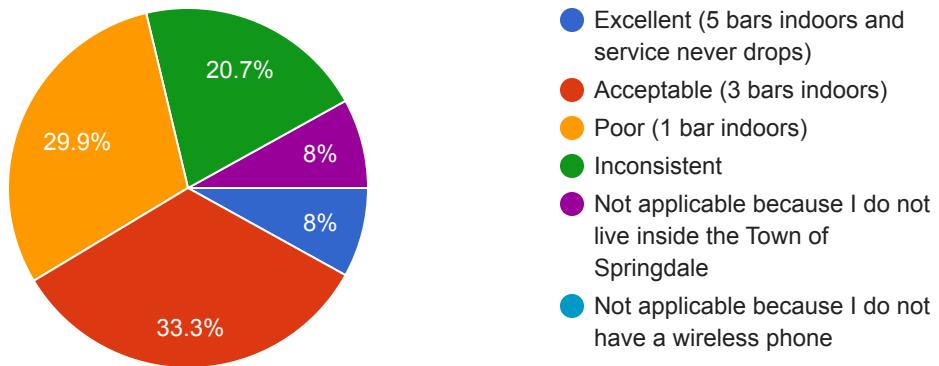
87 responses



**6) Wireless cell phone coverage where I reside (full time or seasonally) in the Town of Springdale is:**

 Copy

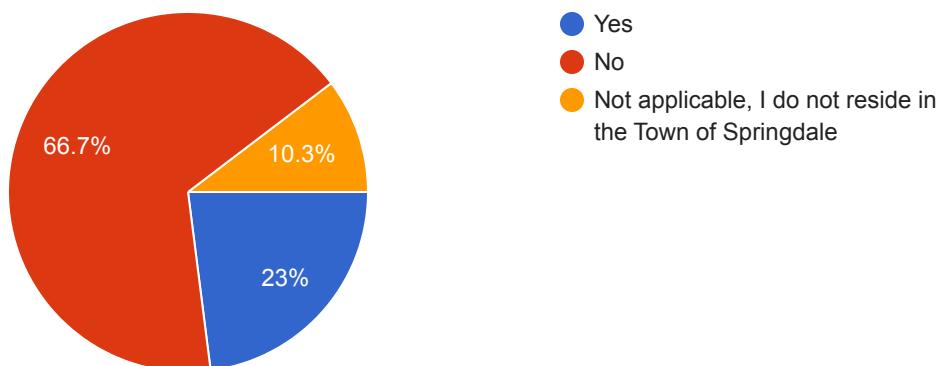
87 responses



**7) While residing in the Town of Springdale, do you have a network extender (booster) to enhance your wireless service from your provider?**

 Copy

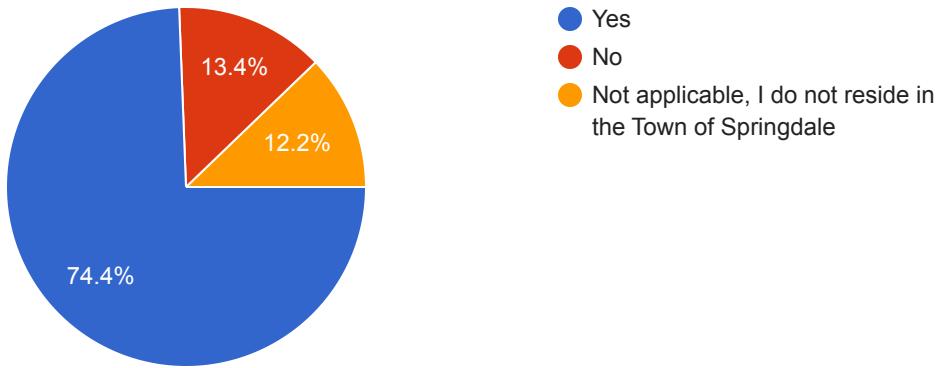
87 responses



8) While residing in the Town of Springdale, do you rely on Wi-Fi to improve your wireless service at your residence?

 Copy

82 responses

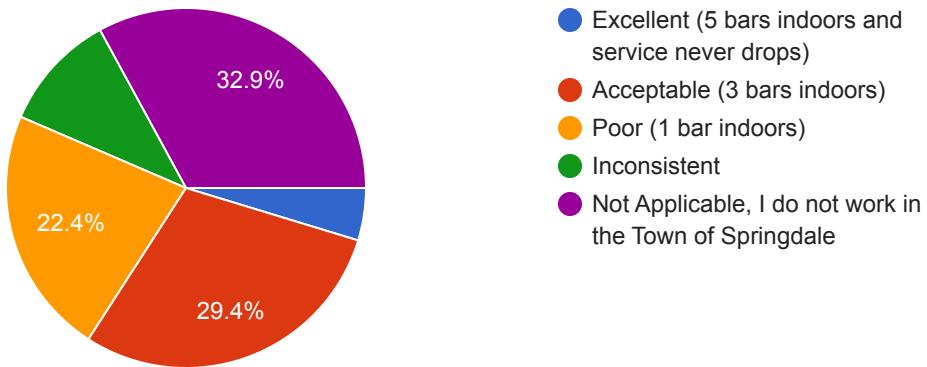


- Yes
- No
- Not applicable, I do not reside in the Town of Springdale

9) The wireless network coverage where I work in the Town of Springdale is:

 Copy

85 responses

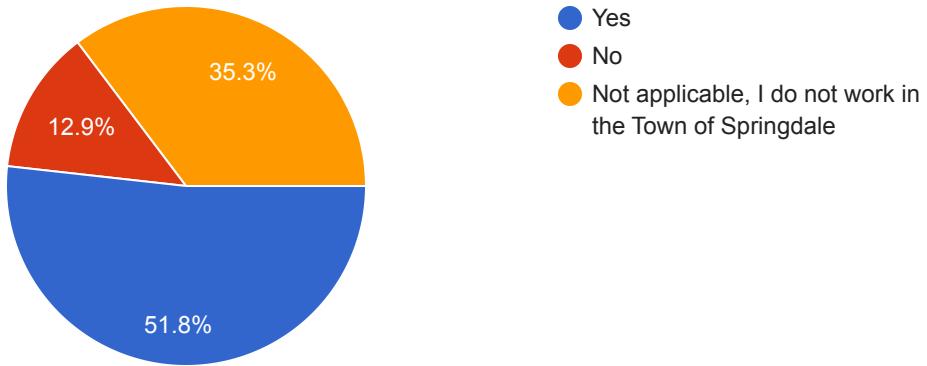


- Excellent (5 bars indoors and service never drops)
- Acceptable (3 bars indoors)
- Poor (1 bar indoors)
- Inconsistent
- Not Applicable, I do not work in the Town of Springdale

10) Do you rely on Wi-Fi to improve your wireless service at your place of employment?

 Copy

85 responses

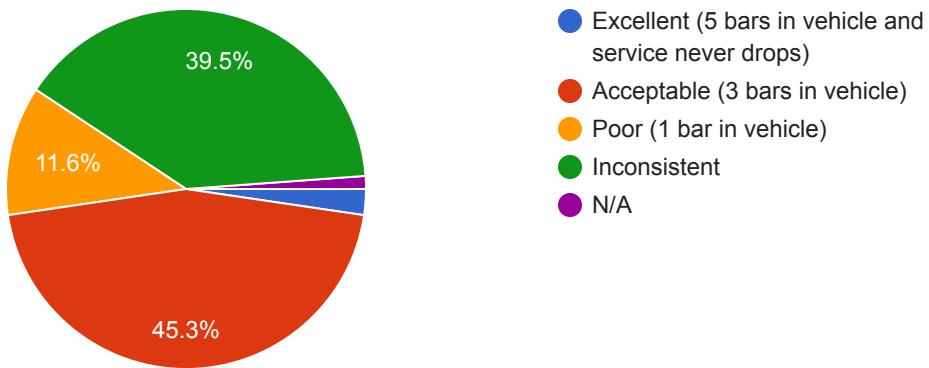


- Yes
- No
- Not applicable, I do not work in the Town of Springdale



**11) When I travel in and around the Town of Springdale my network coverage is:**

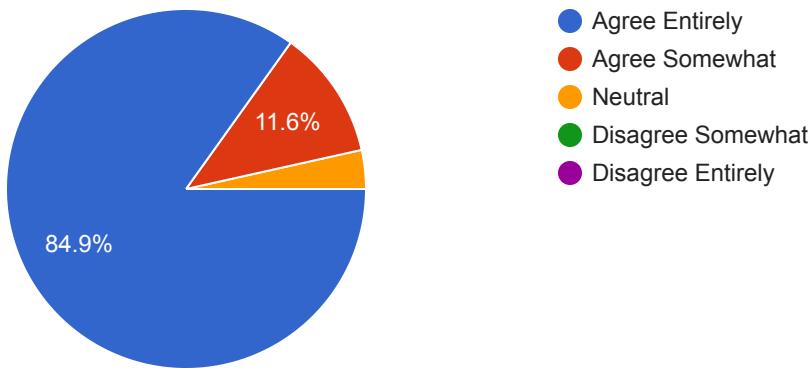
86 responses



Copy

**12) The quality of wireless service is important to me.**

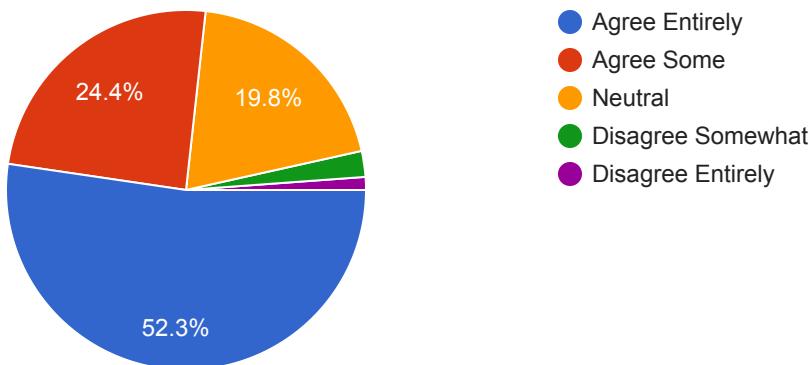
86 responses



Copy

**13) I would rely more on my mobile device(s) if the network service was better.**

86 responses



Copy



**14) Are there specific areas of the Town of Springdale where your service is poor? If yes, please explain below.**

60 responses

Service at Valley View Drive is poor

Lion Blvd

Near the Park entrance.

My home, most places in town

Lion Blvd, Watchman Dr.

Gifford Park

Anywhere past the post office towards the park entrance

Balanced Rock Road

Red Hawk Drive

Town Hall, city park

Certain stretches of SR-9 and at the CCC

In my experience, T-Mobile service does not work reliably between Lion Boulevard and the border of Zion National Park.

various locations within my home as well as in my yard area.

Near the pickleball courts. And in Canyon springs, where we live

Lion Blvd. Upcanyon of Flanigans, cemetery, my house varies on Juniper Ln

Reception at my work, Flanigan's Inn is terrible at best. The cemetery, recycling Bonnie's, Town Hall, and Majestic View are also lousy.

No sure

Once in Zion National park. Also between Rockville and virgin.

Canyon Springs in some pockets, at the entrance area of ZNP, at Cable Mountain Lodge.

Community Center. Brew Pub, Cemetery, Dog Park



Moenave area

My home

Barely one bar on Trapper Circle

Outskirts of Town

Canyon Springs Estates

The ball field adjacent to the own offices

Redhawk area

Town office complex

Around the Village/Zion Brew Pub/Zion National Park

Canyon Springs

Townhall

Our home up Serendipity Ln, and that drop spot on Hwy 9 either side of Lion Blvd.

My home! (Gifford Park)

No service north of school

Redhawk Drive has poor cell service and the Community Center has poor cell phone service.

Yes in any building if not on WiFi and anywhere near OC Tanner or park

Coming out of the park down to the Desert Pearl

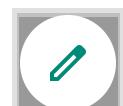
yes, evening when the tourist come back from Zion throughout town

Post Office Area - Downtown Springdale is always spotty for AT&T

I feel that it used to be really terrible up by the park entrance and I couldn't drive through town without a call dropping. But it's much improved!

Town park

Within the Kinesava Ranch Subdivision, because we are in a side canyon wireless network coverage is virtual nonexistent, even with an external signal booster, because there just isn't any signal to boost.



## Community Center

North of the center of town and south of the center of town. Also Lion Blvd.

## Red Hawk

Middle of town near Oscar's cafe is poor

Cable Mountain area, park entrance, community center

at my home

Lion Blvd to Zion entrance, Lion Blvd to OC Tanner, Wanda Ln to Majestic

Near the Brew Pub/Park entrance (but service picks up inside the park up to a point)

Heading down river, it is always very poor about the West Home down around the bends by Anasazi. It is also very poor by Flanningans. It is also poor on Foothill Lane, the cemetery area, and of course up Lion Blvd. Yesterday, March 20, 2024, I couldn't use cellular at all without WiFi and it would drop calls even with the WiFi. That was at work in the center of town.

Anything North of Desert Pearl

Inside buildings

Where our road crosses the Virgin River.

Service is a bit spotting in various locations.

Up near the park

In the side canyons/Lion Blvd

There's a specific section between the chevron and Majestic Lodge where signal is extremely inconsistent. It can rang anywhere between three bars, down to no service at all.

during the high season and in ZNP

All VERY POOR

## Location Preferences of Wireless Facilities

### Predicted Cell Phone Coverage Maps



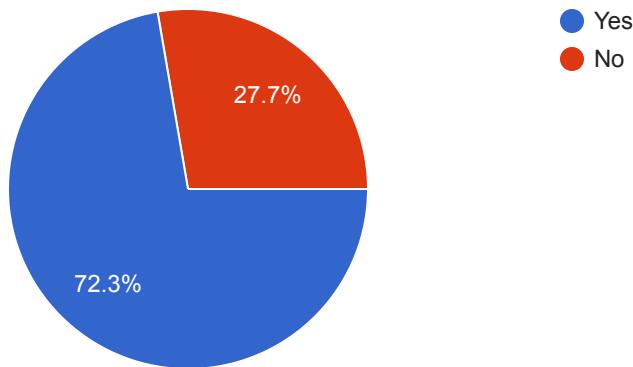
## Potential Macro Cell Sites Only

 Copy

[\(Click here to access an enlarged map\)](#)

**Could you support this type of macro cell wireless build-out with greater planning of the potential locations?**

83 responses



## 16) Scenario 2: Predicted Small Cell Wireless Site Solution

### 13 Potential Small Wireless Sites Only for one service provider.

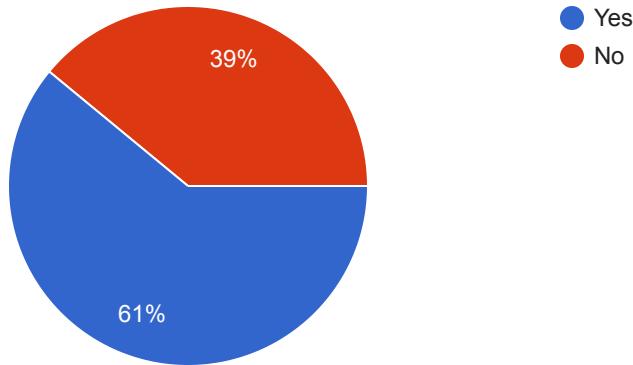
 Copy

[\(Click here to access an enlarged map\)](#)

**Keep in mind if a second or third service provider wants to install small wireless facilities the 13 sites number could double or triple.**

**Could you support this type of small cell wireless build out (between 20-40 utility type poles) with greater planning of the potential locations?**

82 responses



## 17) Scenario 3: Predicted Hybrid Macro Cell and Small Cell Wireless Facility Simulation



6 Potential Macro Sites, 7 Potential Small Wireless Sites (one provider)

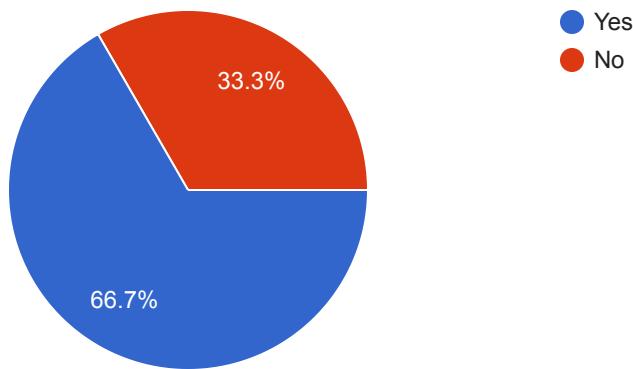
 Copy

\*20 Small wireless sites may be needed to accommodate the other providers

[\(Click here to access an enlarged map\)](#)

Could you support this hybrid type of macro cell and small cell wireless build-out with greater planning of the potential locations?

81 responses

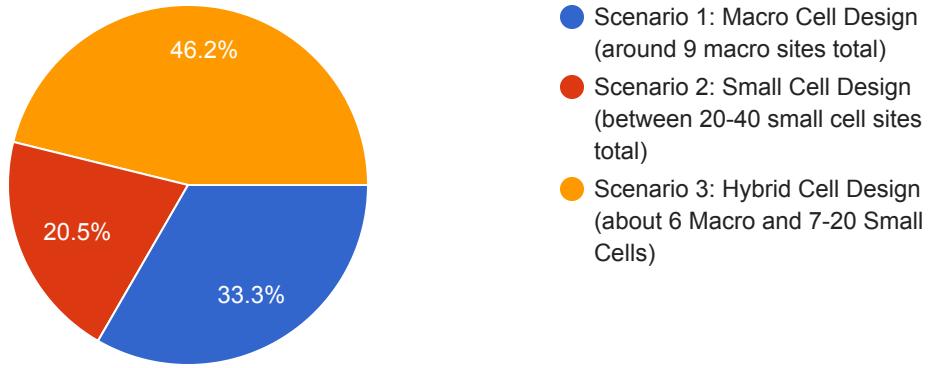


18) Of the three potential scenarios for possible wireless cell coverage build-outs which do you prefer?

 Copy

[\(Click here to access an enlarged map\)](#)

78 responses



Visual Preferences of Wireless Facilities Section

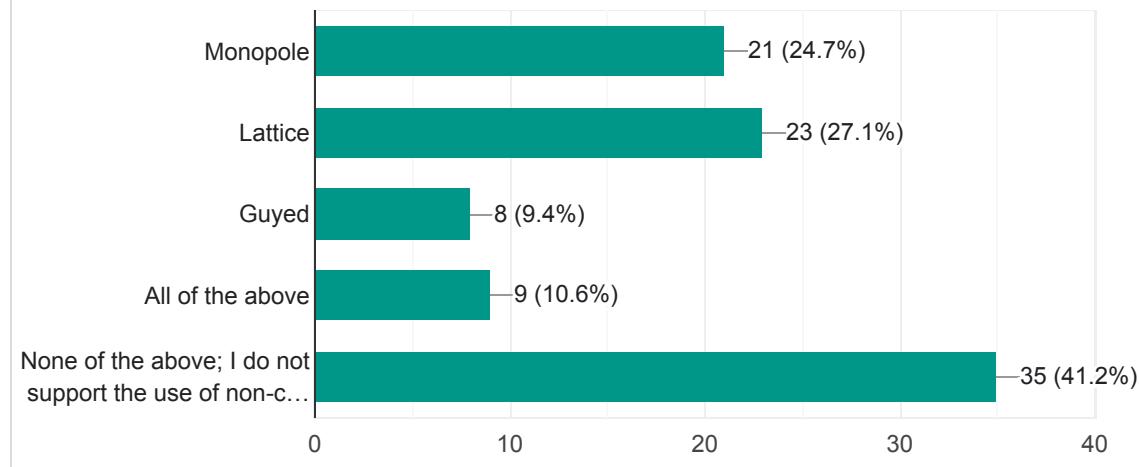


Non-concealed infrastructure means you can see the antennas, ancillary equipment and cabling on the tower but they provide the most flexibility for collocations resulting in potentially fewer towers in the community.

 Copy

**19) Which non-concealed tower facility do you prefer? Check all that apply.**

85 responses

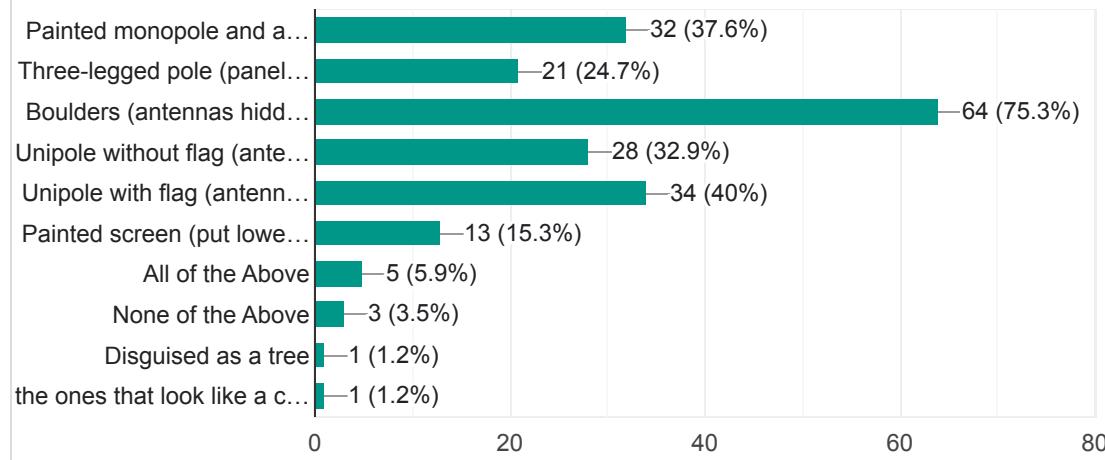


Visual mitigation measure means the antenna and all other equipment is disguised to look like something else.

 Copy

**20) Which visual mitigation measures for towers do you prefer? Check all that apply.**

85 responses

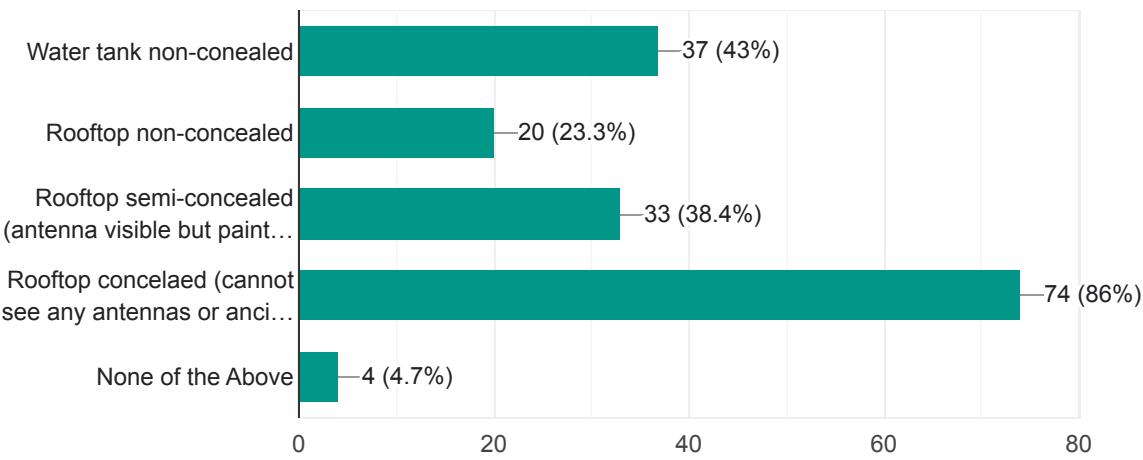


A "base station" is any existing structure other than a tower that can accommodate wireless antennas. Examples include rooftops, water tanks, stadium lights, electrical utility poles.

 Copy

## 21) Which base station do you prefer? Check all that apply.

86 responses

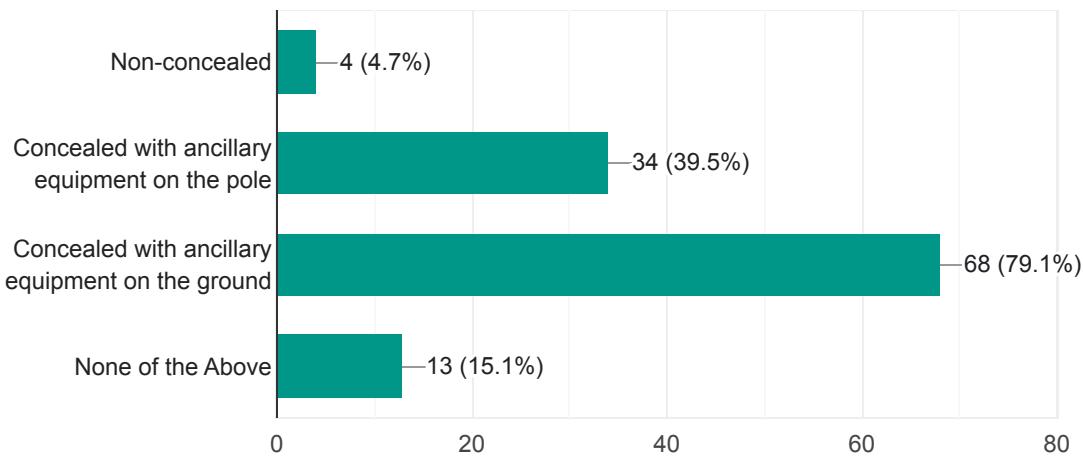


Small wireless facilities are shorter (50ft or less) and offer less coverage range.

 Copy

## 22) Which small wireless facilities do you prefer? Check all that apply.

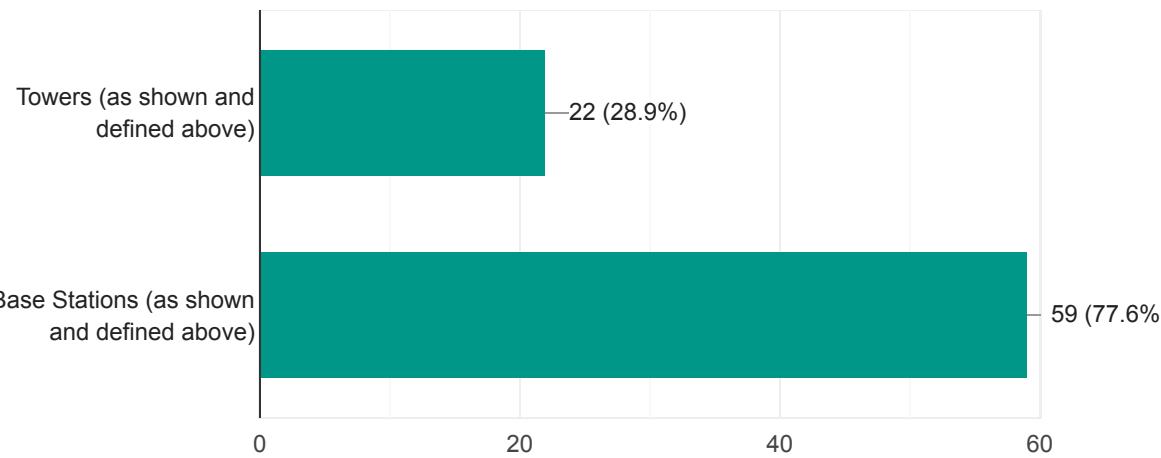
86 responses



### 23) Which structure type do you prefer?

 Copy

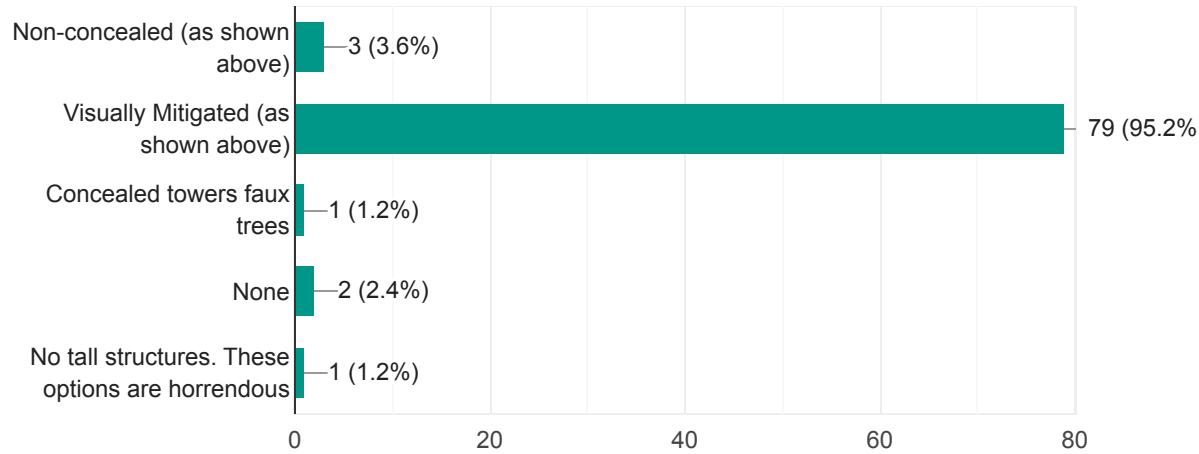
76 responses



### 24) Which design type do you prefer?

 Copy

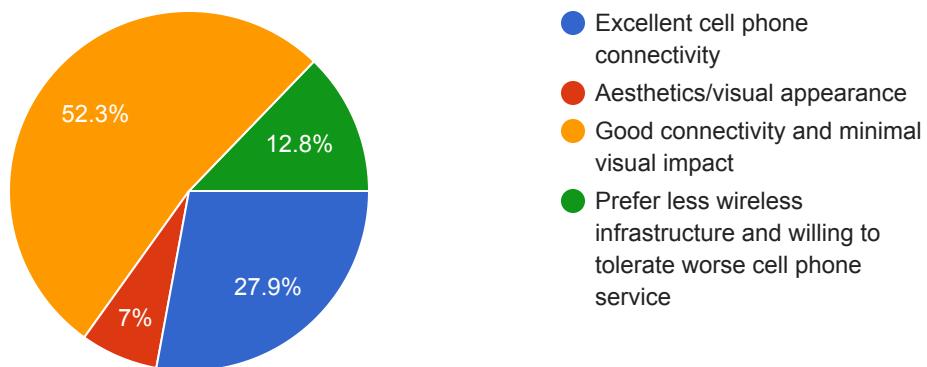
83 responses



### 25) What is most important to you?

 Copy

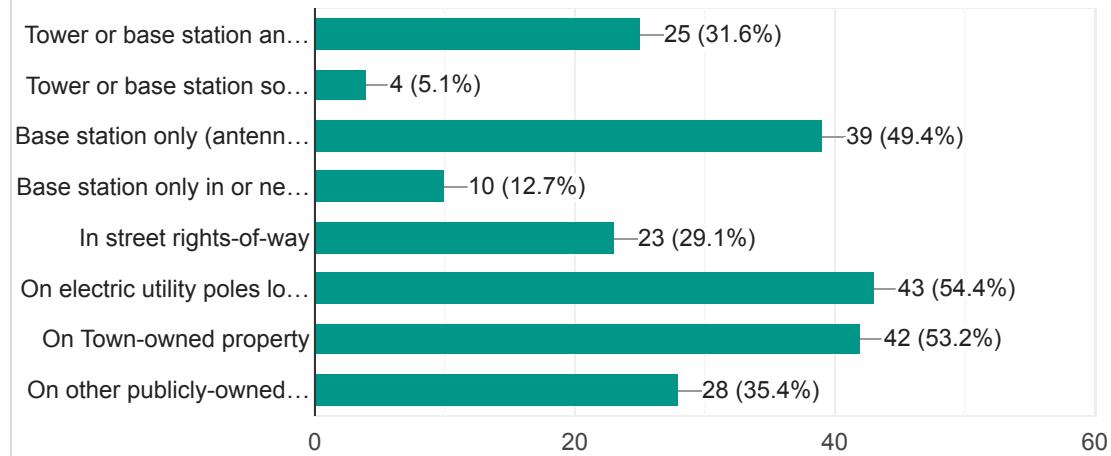
86 responses



**26) Please identify the locations you support for new wireless infrastructure. Please check all that you would support.**

 Copy

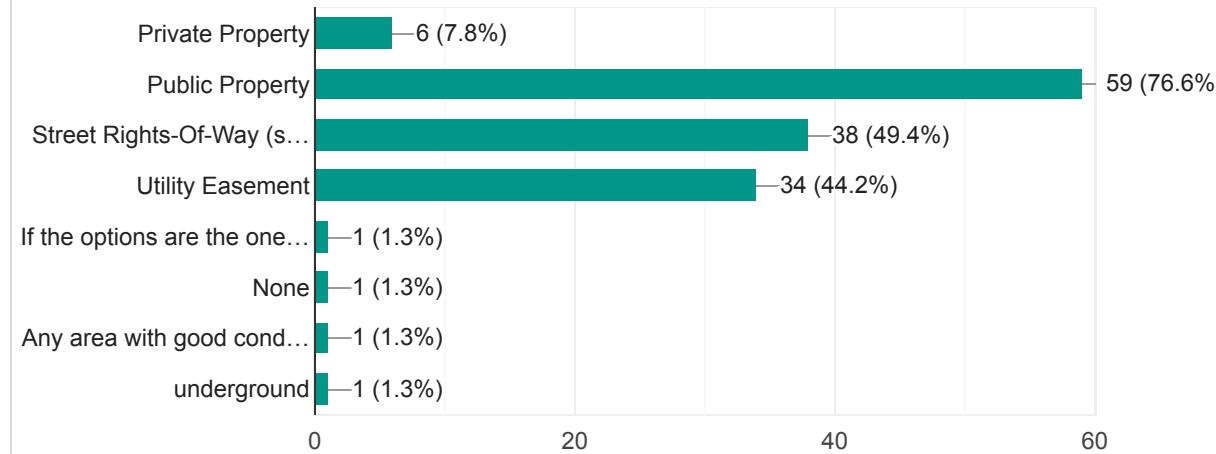
79 responses



**27) Which of the following locations for new wireless infrastructure do you most prefer?**

 Copy

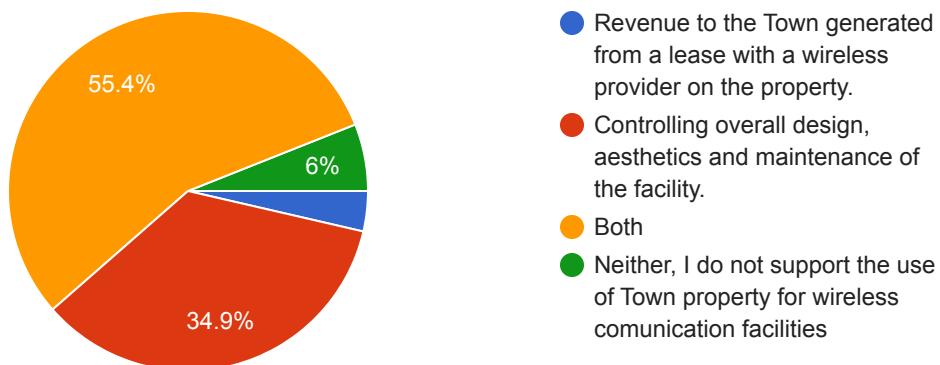
77 responses



**28) If you support using Town-owned property please choose which is more important to you.**

 Copy

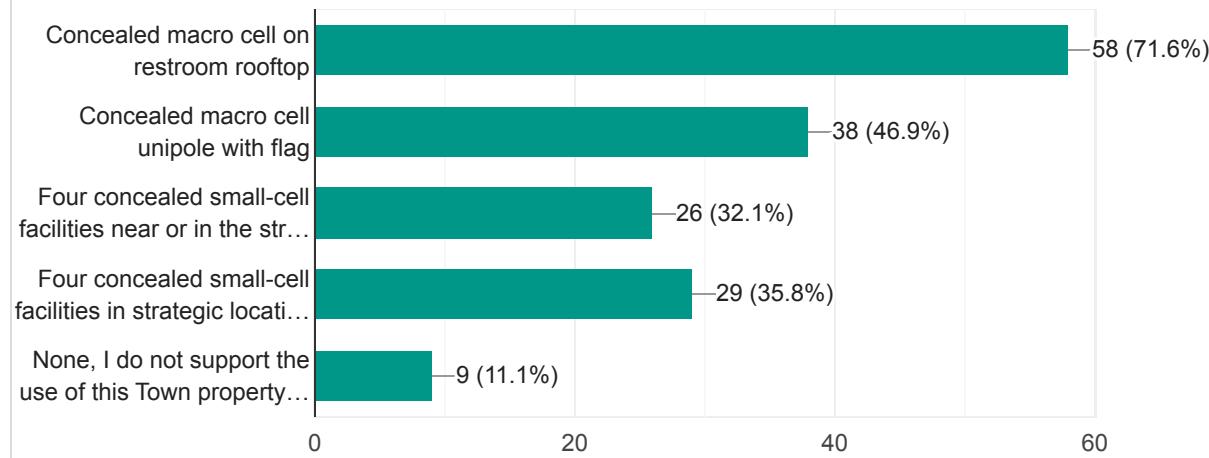
83 responses



**29) If you support using Town-owned property please choose the type of infrastructure you would support at the George A. Barker Springdale River Park? Check all that apply.**

[Copy](#)

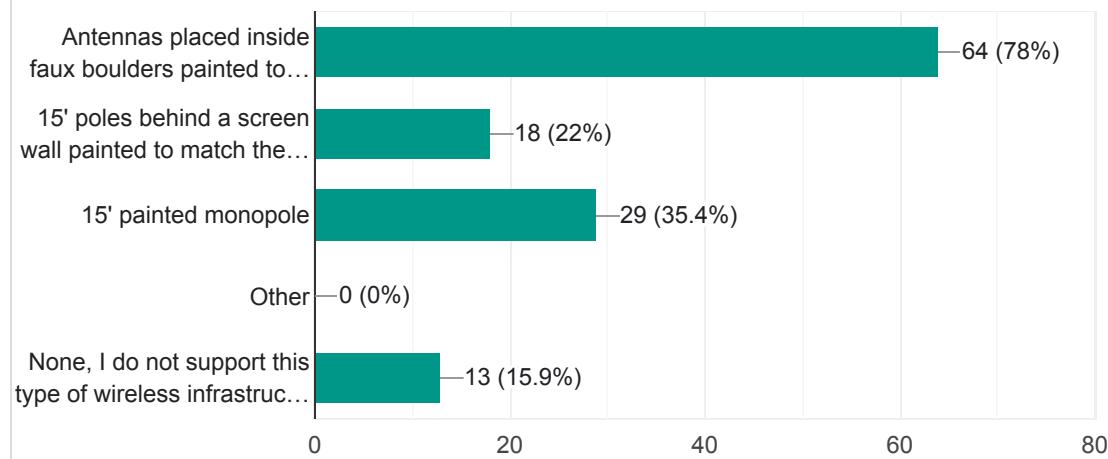
81 responses



**30) Regarding the Foothill Residential zone, please indicate what you can support. Check all that apply.**

[Copy](#)

82 responses



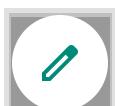
**31) Please provide commentary if you answered "Other" to the item above regarding the Foothill Residential zone.**

3 responses

This survey is biased. The questions would have me indicate an option I would not want or not answer the question. There are more options out there then this.

I believe that public funds need to be used for this project at all simple as that !Leave the town of Springdale alone .

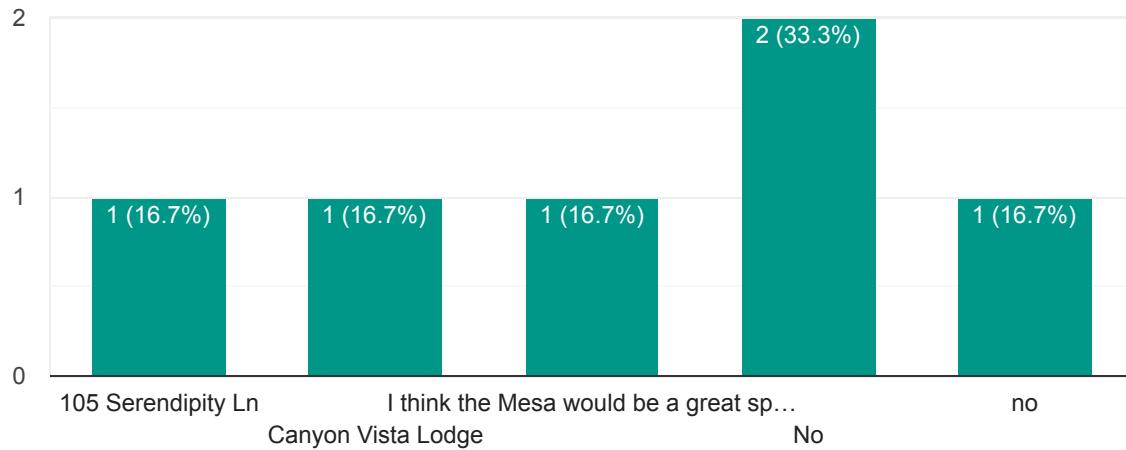
I only support the faux boulders if the stain actually matches the canyon wall color unlike the bad brown stain color on the faux rock walls the city recently built across from the Driftwood hotel.



**32) Are you aware of private property that could be available for new wireless infrastructure? If yes, please provide an address.**

 Copy

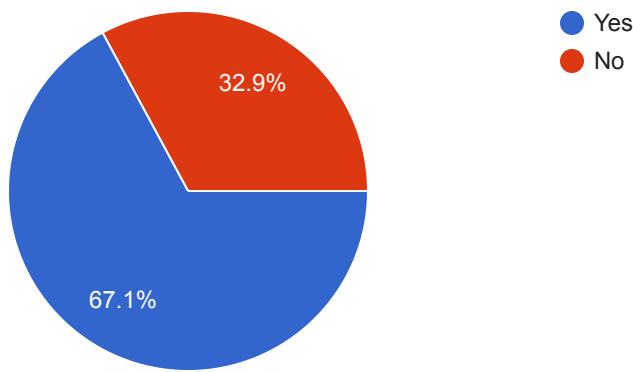
6 responses



**33) Do you want to receive further e-mail about this project?**

 Copy

73 responses



## 35) Comments or suggestions

16 responses

Why do the proposed remedies stop before Canyon View Rd in the Watchman neighborhood?

I don't think the service is that bad though inconsistent. I can live with it as it currently exists.

We look forward to great service, however it happens!

With fiber in town, I do not actually see a reason to extend cell coverage but would prefer the town help get fiber to residences. I have it at both my businesses and it is amazing and we use VOIP instead of cell coverage and it is an easy way to get the best coverage

Love this conversation

Design infrastructure for the best service while doing all possible to conceal it

Springdale was not meant to be a modern business city if tourists passing through town are so concerned about wifi , cellphones , iPads and internet access tell them to stay home .

You have a solution that is in search of a problem. Cell coverage at every point of the town is not essential. As technology changes the solutions will change but we will still have to use the infrastructure that we deploy now. We don't need another unsightly piece of tech that will grow outdated like the Century Link Drum in the middle of the town. The residents are covered fine between the existing cell coverage and wifi access. Please don't blight the town.

Thank you for doing this!

Use the boulder idea anything else is going to ruin our views

I support getting better wireless cell phone connection to our community. However, the proposal seems like way to many towers whether Macro or smaller. 9 Macro or up to 40 smaller sites or even the Hybrid seems a little overwhelming and too much for our little town. Can we scale it down? I'm concerned we are all going to be fried in our little town with too much wireless towers. I also am somewhat concerned having a cell tower go near our water source or water tower - not sure this is healthy. Thank you for listening to my concerns. But, also thank you for wanting to better our cell phone service which we need better service for emergencies and all the visitors who are using up our service.

Thank you for prioritizing this. While I love our small town feel, I think that with the number of visitors, cell connectivity is an important convenience.

The town should not try meet the needs of visitors during high season but rather what the needs are for "residents" - recognizing there may be times of the year when coverage isn't optimum. A higher level of coverage means a greater need for more infrastructure with a higher impact to viewsheds.



Perhaps a public meeting to explain the ramifications and show details would be more appropriate than a questionnaire. I need further explanation to fill this out properly.

This kind of survey should be presented to the public with the experts giving a presentation. There are many more questions to be answered and considering the health risks of 5 g etc so this survey was inadequate for the proposed infrastructure.

Maps confusing. Won't the promised full distribution of fiber optic service to all residences be helpful in improving cell phone service?

This content is neither created nor endorsed by Google. [Report Abuse](#) - [Terms of Service](#) - [Privacy Policy](#)

Google Forms

