



Wythe County Broadband Study

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Survey Results

- ▶ Residential Survey: 1,831 responses— 15% response rate where 3% considered good
- ▶ Business Survey: 96 responses— very good for size of the county

93% of respondents want better Internet service.

44% of residents are “dissatisfied” or “very dissatisfied” with current Internet service.

93% of business respondents want better Internet access.

98% of businesses indicated that local government should help improve broadband

36% indicate that availability of broadband Internet is affecting where they choose to live.

98% of respondents believe that local Government should help facilitate better Internet access

98% indicated that the Internet is important to the success of their business over the next five years.

Only 21% of businesses are “satisfied” or “very satisfied” with their current Internet service.

75% of respondents report they have trouble using common Internet services

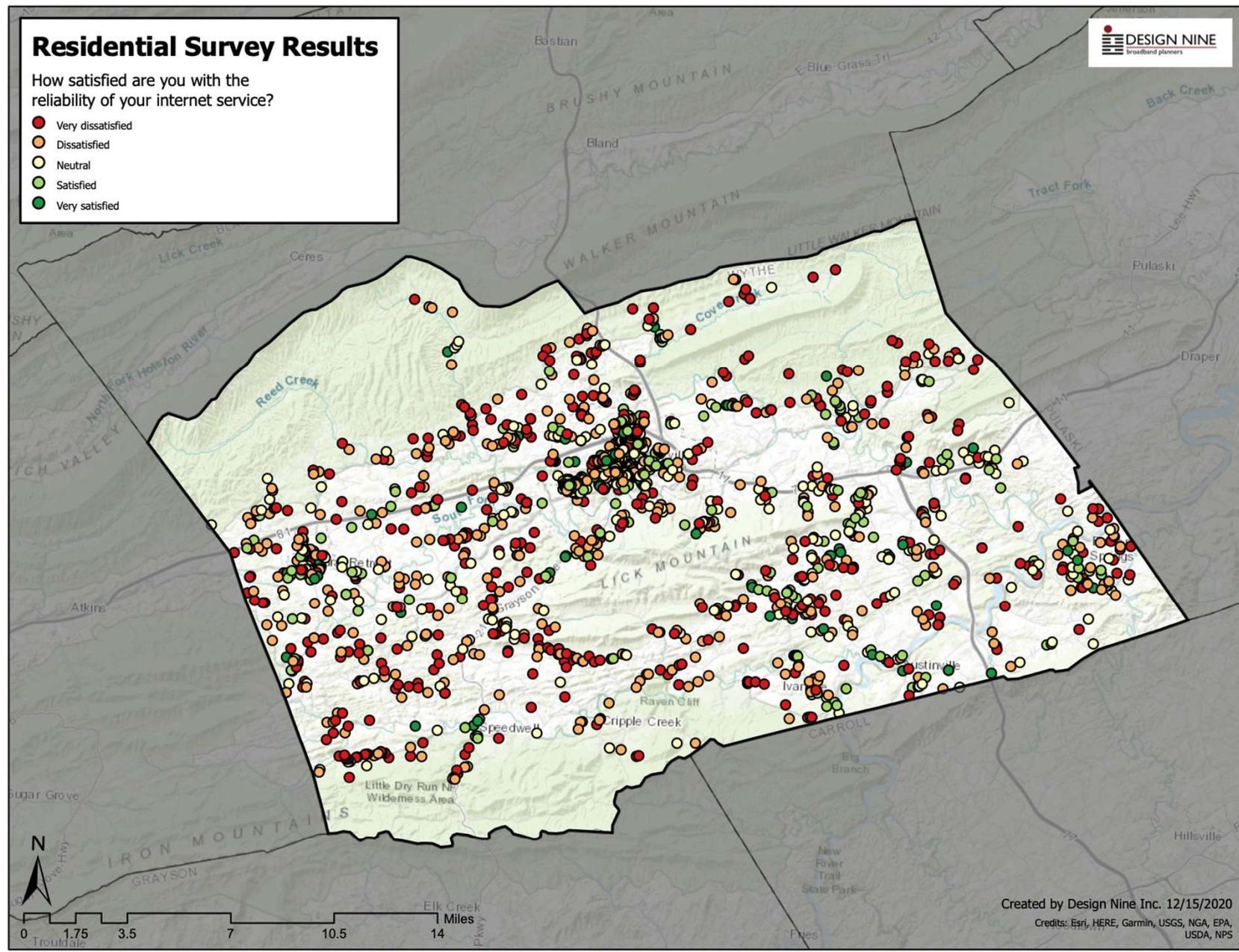
22% of the Wythe County businesses that responded are home-based

68% of businesses that responded need employees to be able to work from home

Residential Survey Results

How satisfied are you with the reliability of your internet service?

- Very dissatisfied
- Dissatisfied
- Neutral
- Satisfied
- Very satisfied



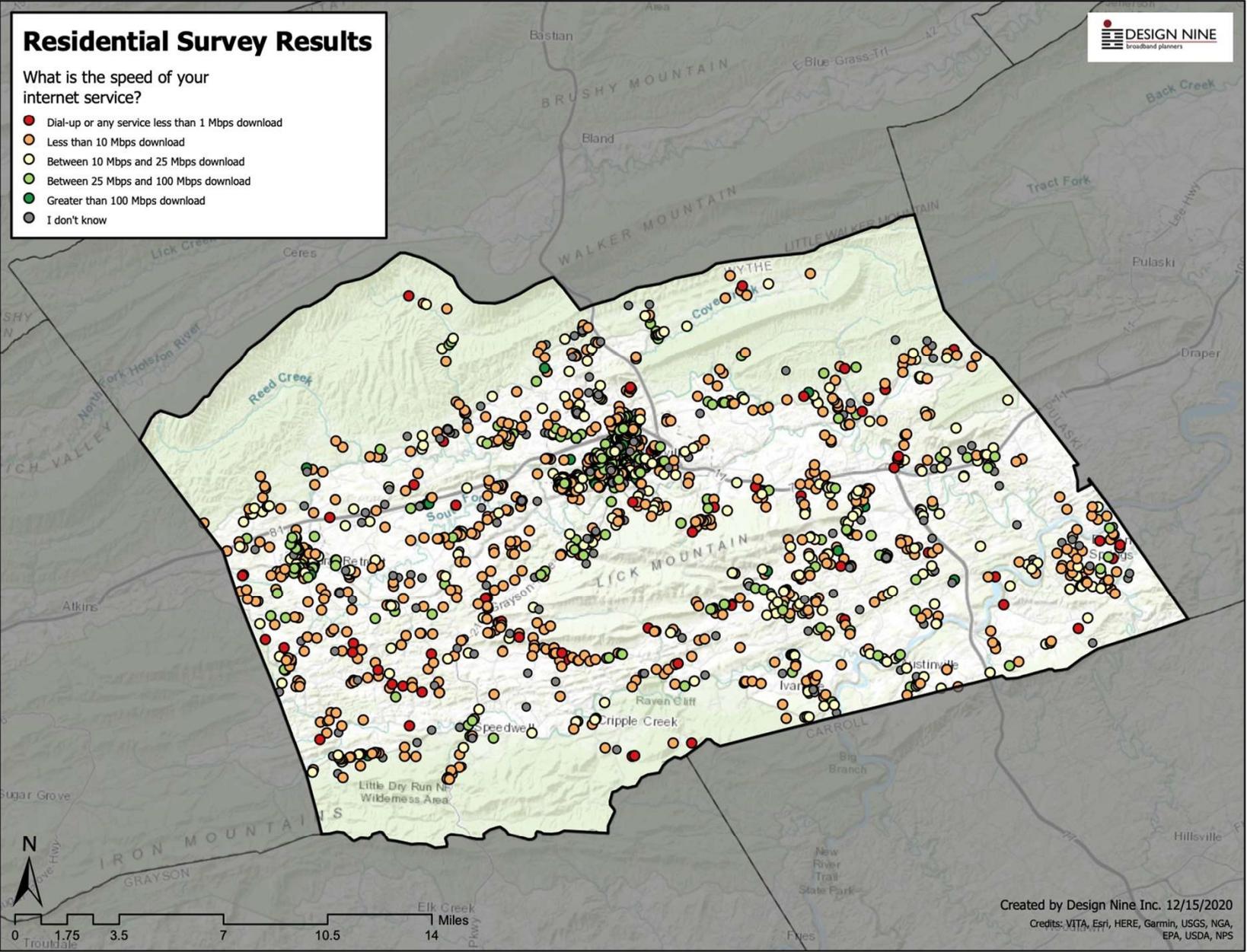
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Credits: Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS

Residential Survey Results

What is the speed of your internet service?

- Dial-up or any service less than 1 Mbps download
- Less than 10 Mbps download
- Between 10 Mbps and 25 Mbps download
- Between 25 Mbps and 100 Mbps download
- Greater than 100 Mbps download
- I don't know



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Credits: VITA, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS

Do the math for Wythe County

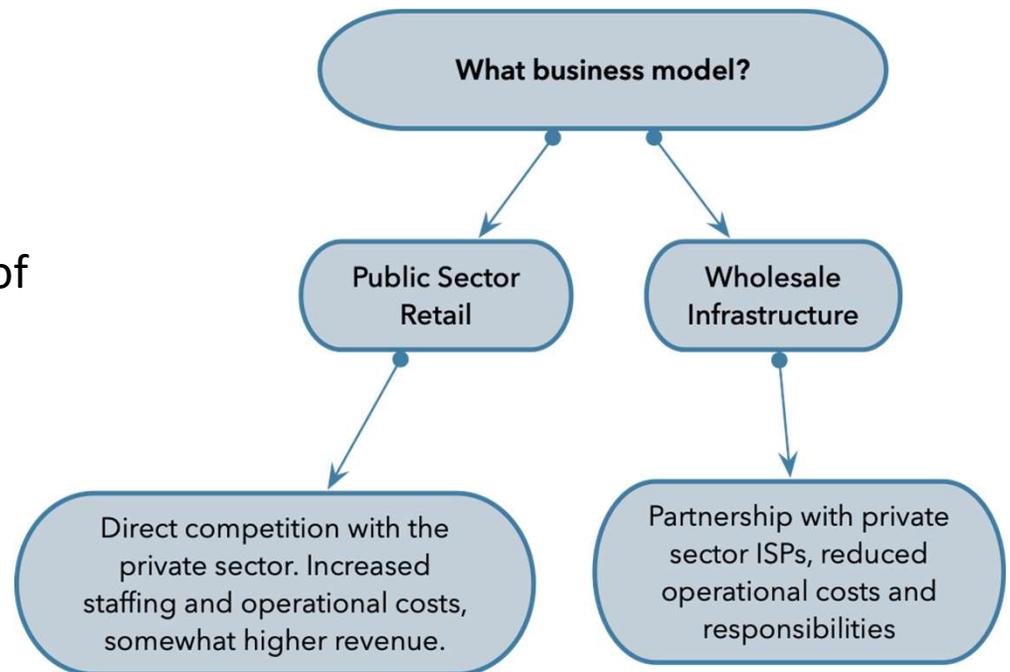
Wythe County 30 Year Estimated Telecom Expenditures				
Total Households	11983			
Businesses	680			
Estimated Internet Access Type	Households using Cell Phone for Internet	Households with "little" broadband DSL or wireless	Households with Cable Modems	Households with no Internet or "don't know"
Household Percentage	9%	42%	32%	17%
Number of households	1,078	5,033	3,835	2,037
Average monthly telecom expenditures	Cell Phone for Voice/Internet \$90 Cable/satellite TV: \$65 bundle	Cell Phone \$70 Phone: \$13 Satellite TV: \$60 Broadband Internet: \$45	Cell Phone \$70 Phone \$15 TV \$43 Broadband Internet \$45	Cell Phone, no Internet, \$70 Cable/satellite TV: \$65
Monthly Cost of Services	\$155	\$188	\$173	\$135
Annual household cost	\$1,860	\$2,256	\$2,076	\$1,620
Annual cost all households	\$2,005,954	\$11,354,132	\$7,960,547	\$3,300,118
30 year expenditure	\$60,178,626	\$340,623,965	\$238,816,397	\$99,003,546
Total residential expenditures	\$738,622,534			
Total Estimated Cost of Hidden Fees	\$108,888,371			
Total Business Costs	\$42,228,000			
Total expenditures	\$889,738,904			

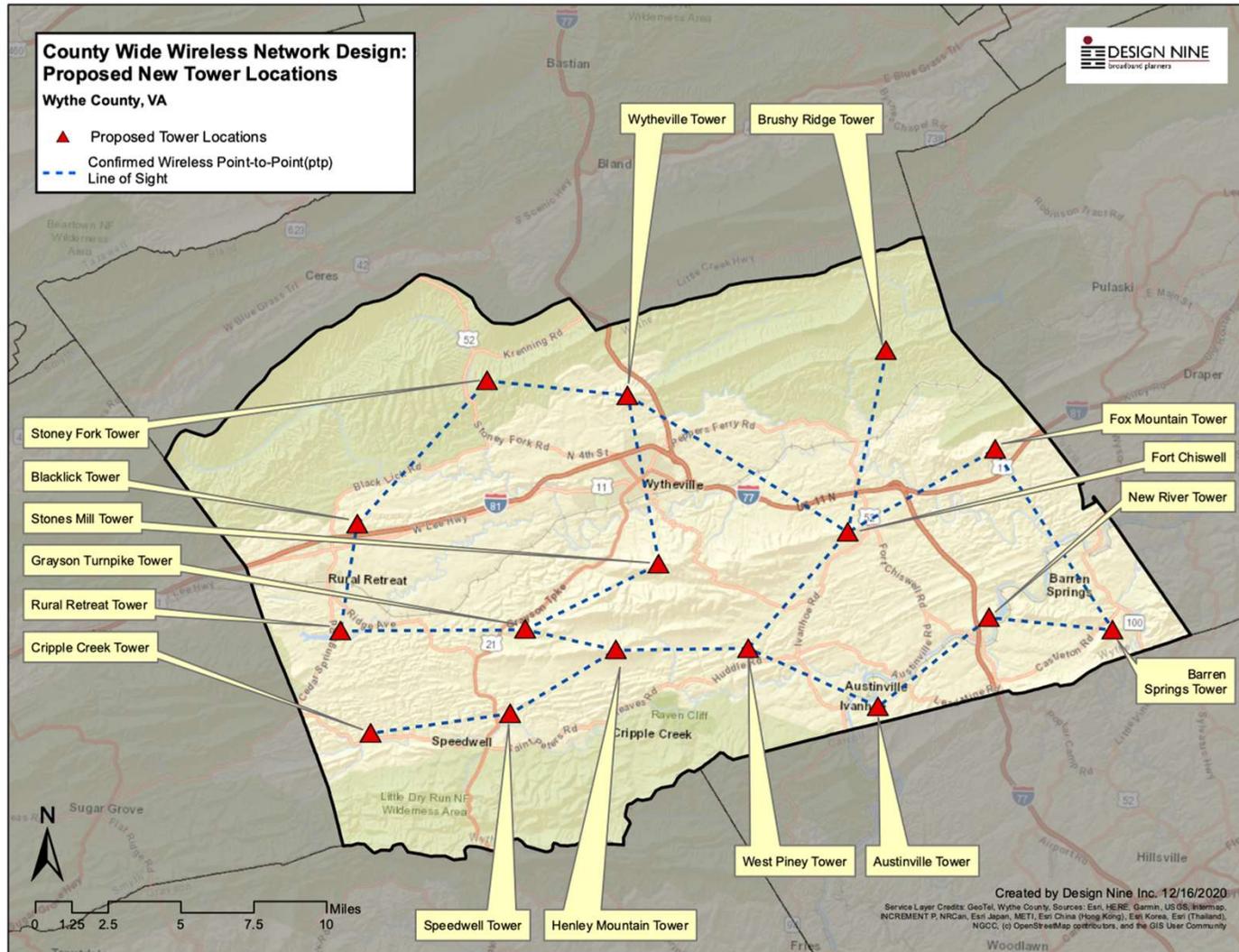
Findings

- ▶ Many residents and businesses lack even minimally adequate broadband
- ▶ Fixed point wireless broadband important to improving access, creating competition
- ▶ County should not be in the Internet business, should not compete with the private sector
- ▶ County role should be limited to providing basic infrastructure for private sector providers
- ▶ Look for opportunities for public/private partnerships
- ▶ Grant funds may be available to meet some of the needs

How to Improve Access and Affordability

- ▶ Make existing tower space improvements to attract more WISPs
- ▶ Adjust price structure for access to towers
- ▶ Evaluate need for new towers in areas of high need and no existing towers
- ▶ Evaluate creating shared backhaul network between towers
 - ▶ Lower WISP capital costs
 - ▶ Create redundant ring for more redundancy and reliability
 - ▶ Could support improved K12 school reliability
 - ▶ Could support public safety voice/data uses





- ▶ Estimated 88% of county covered with fixed point wireless
- ▶ Some towers are in or could be located in HUD-eligible grant areas
- ▶ Sixteen towers provide excellent coverage
- ▶ Some existing towers may be available

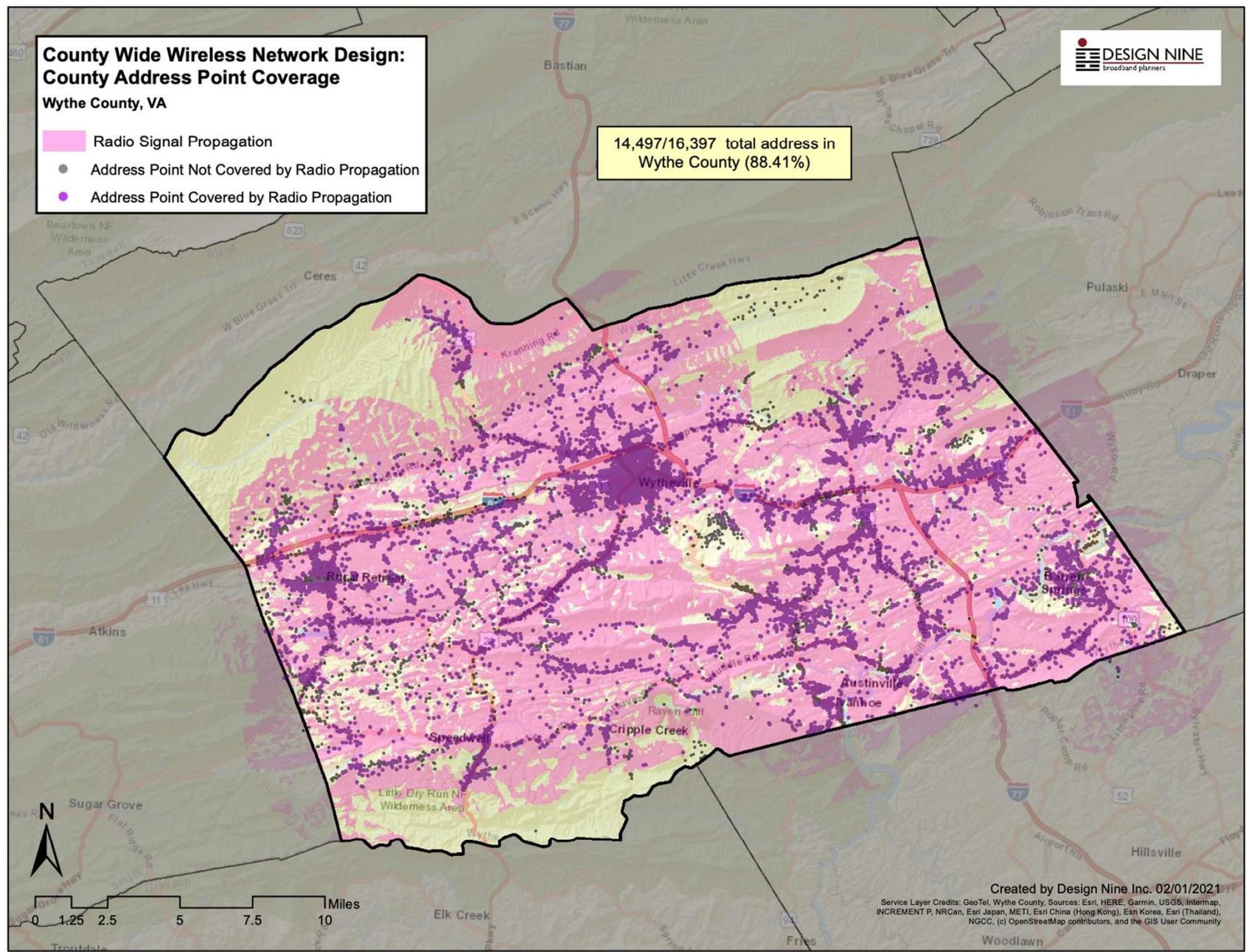
County Wide Wireless Network Design: County Address Point Coverage

Wythe County, VA

- Radio Signal Propagation
- Address Point Not Covered by Radio Propagation
- Address Point Covered by Radio Propagation



14,497/16,397 total address in
Wythe County (88.41%)

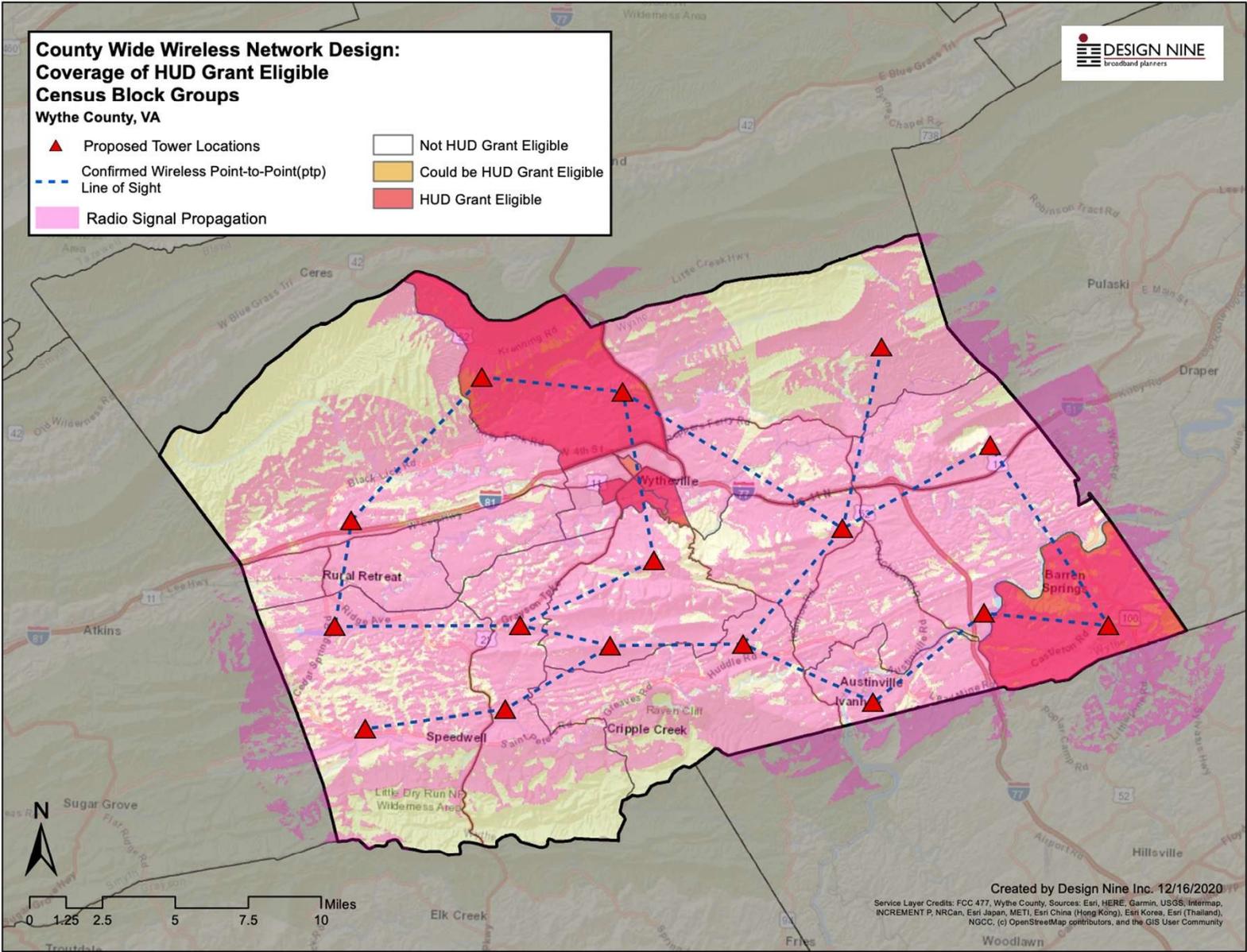


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**County Wide Wireless Network Design:
Coverage of HUD Grant Eligible
Census Block Groups**

Wythe County, VA

- ▲ Proposed Tower Locations
- Confirmed Wireless Point-to-Point(ptp) Line of Sight
- Radio Signal Propagation
- Not HUD Grant Eligible
- Could be HUD Grant Eligible
- HUD Grant Eligible



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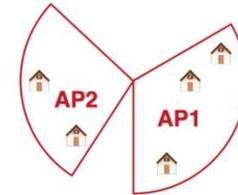


Community Poles Tall Utility Poles are one way that communities are lowering infrastructure costs, and avoiding lengthy permitting processes involved in installing a tower.

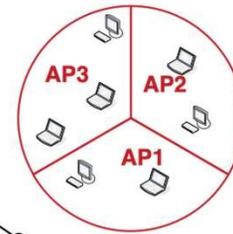


CPE - Customer Premise Equipment

A radio and antenna will be installed at each customer's home.

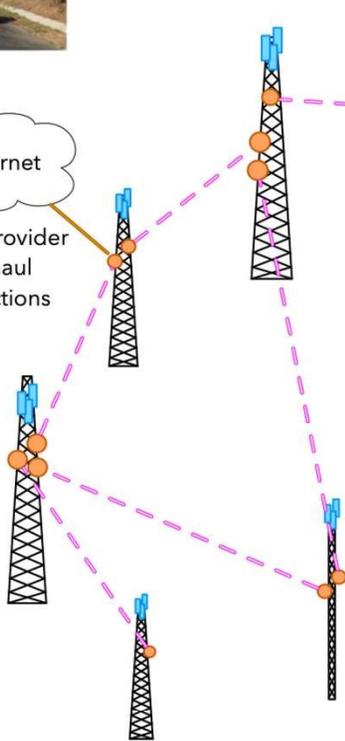


In narrow topographies, not all sites will require 3 APs.



Top view of an access point (AP)

Internet
Service Provider
Backhaul
Connections

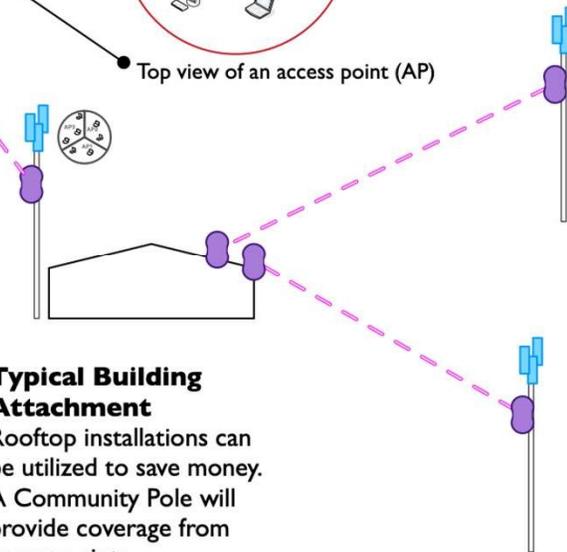


Typical Pole - A 60' wooden utility pole or small tower can be installed to extend broadband to a wider area.

Typical Building Attachment

Rooftop installations can be utilized to save money. A Community Pole will provide coverage from access points.

Typical Pole - A 60' wooden utility pole or small tower can be installed to extend broadband to a wider area.



Attracting WISPs

- ▶ **Work with wireless and wireline ISPs**
 - ▶ Modest application fee for tower access, use fixed monthly lease fee
 - ▶ Use a single tower space agreement for all providers
 - ▶ Offer a grace period of three to six months to allow WISPs to build subscriber base
 - ▶ Include performance requirements to encourage good service from WISPs
- ▶ **Keep structural analysis costs as low as possible**
 - ▶ Some localities charge high engineering analysis fees
- ▶ **Provide space at base of towers for WISP equipment**
- ▶ **Keep electric service fees as low as possible**
 - ▶ Shared generator access is desirable
- ▶ **Consider single lease agreement that includes all towers**
 - ▶ Provides more incentive to offer service throughout Wythe County

Getting Started

- ▶ County should not be in the Internet business, should not compete with the private sector
- ▶ Focus on improved wireless broadband access in the short term
- ▶ Long term goal should be some fiber to the home in some areas
 - ▶ Critical to attracting and retaining businesses, a younger workforce
- ▶ Fund for success
 - ▶ Grants could supply much of the funding needed
- ▶ Manage expectations
- ▶ Get started with what is possible now
 - ▶ Don't wait
- ▶ Develop public/private partnerships with service providers
- ▶ Look for opportunities to leverage public safety opportunities