Appendix A

REGIONAL BROADBAND PLANNING TEAMS PROJECT

BROADBAND/HIGH-SPEED INTERNET SURVEY

MARKING INSTRUCTIONS

- Use a No. 2 pencil or blue or black ink pen only.
- Do not use pens with ink that soaks through the paper.
- Make solid marks that fill the oval completely.
- Make no stray marks on this form.
- Do not fold, tear, or mutilate this form.

CORRECT ● INCORRECT ⊘ ⊗ ⊖ ⊙

004744

To the Resident/Business of:
223 MAPLE AVE
PINEVILLE WV 24874

Dear West Virginia Resident/Business:

The West Virginia Office of GIS Coordination, a division of the office of the West Virginia Geologic and Economic Survey, has partnered with the state's 11 regional planning & development councils to analyze and map West Virginia's broadband infrastructure. As a result, our regional planning and development council is working to better understand your high-speed Internet needs and create a strategic plan to meet these needs. As part of this process, we are gathering vital information from residents and businesses about their Internet access that can help us improve service. Broadband is typically defined as a service that enables high-speed Internet access as opposed to low speed services such as dial-up.Please have a person in your household who is 18 years or older (or the employee responsible for technology decisions if this location is a business) complete this survey. Please complete and return this survey by May 17, 2013. Your responses will remain anonymous and will only be reported as part of a larger statistical analysis to determine where the state could use federal grant funding to enhance Internet speed and availability. **We particularty urge you to TAKE THE INTERNET SPEED TEST (instructions in Question #19).**

If you have any questions, please feel free to contact the Region I Planning and Development Council by e-mail at regionone@regiononepdc.org or by phone at (304) 431-7225.

Thank you for your assistance!

If this location is a residence, please complete questions 1–8, and then questions 14–23. If this location is a business, please complete questions 9–23 only.

Residential Questions

1. **How old were you on your last birthday?** ☐☐ ⓪①②③④⑤⑥⑦⑧⑨ ⓪①②③④⑤⑥⑦⑧⑨
2. **Male** ○ **Female** ○
3. **Number of household occupants:** ☐☐ ⓪①②③④⑤⑥⑦⑧⑨ ⓪①②③④⑤⑥⑦⑧⑨
4. **What is your annual household income?**

$ ☐☐☐.☐☐ ⓪①②③④⑤⑥⑦⑧⑨ ⓪①②③④⑤⑥⑦⑧⑨ ⓪①②③④⑤⑥⑦⑧⑨ ⓪①②③④⑤⑥⑦⑧⑨ ⓪①②③④⑤⑥⑦⑧⑨ ⓪①②③④⑤⑥⑦⑧⑨

DO NOT WRITE IN THIS AREA

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5. **Who uses the Internet at your home? (Mark all that apply.)**

○ I do ○ Spouse/Partner ○ Children ○ Friend ○ Grandparent ○ Parent

○ Housemate or Roommate ○ Other (please specify):

6. **Does your employer allow employees to telecommute (work from home)?** ○ Yes ○ No ○ N/A

Do you telecommute? ○ Yes ○ No

7. **Are you self-employed?** ○ Yes ○ No **If so, do you work from home?** ○ Yes ○ No

8. **If you do use the Internet anywhere else other than your home, please indicate other places where you use the Internet. (Mark all that apply.)**

○ Work? ○ School? ○ Public Library? ○ A relative or friend's house?

○ A retail shop with wireless Internet service? ○ Cell phone?

○ Other (please specify):

Business Questions

9. **How many employees work at your location?**

○ 1–4 ○ 5–25 ○ 26–100 ○ 101–250 ○ 251–500 ○ 501 or more

10. **Indicate what national business classification best describes your business:**

○ Accommodation and Food Services
○ Agriculture, Forestry, Fishing/Hunting
○ Construction
○ Finance and Insurance
○ Information
○ Manufacturing
○ Professional, Scientific, and Technical
○ Real Estate and Rental and Leasing
○ Transportation and Warehousing
○ Waste Management and Remediation
○ Administrative and Support Services
○ Arts, Entertainment, and Recreation
○ Educational Services
○ Healthcare and Social Assistance
○ Management of Companies and Enterprises
○ Mining, Quarrying, and Oil and Gas Extraction
○ Public Administration
○ Retail Trade
○ Utilities
○ Wholesale Trade
○ Other (please specify):

11. **Does your business allow employees to telecommute (work from home)?** ○ Yes ○ No

If yes, what percentage?: ⓪①②③④⑤⑥⑦⑧⑨ ⓪①②③④⑤⑥⑦⑧⑨ ⓪①②③④⑤⑥⑦⑧⑨

12. **How important is a robust Broadband (high-speed Internet access) connection to the day-to-day operations of your business? (Mark one.)**

○ Very important ○ Important ○ Somewhat important ○ Not at all important

13. **Would it be beneficial to your customers/clients if the Broadband environment in your area was enhanced?**

○ Yes ○ No

Please explain:

Both Residential and Business Questions

14. Does this location have internet access? ○ Yes ○ No *(If "No," please go to question 21 of this survey.)*

15. Who is your Internet Service Provider?

- ○ Access High Speed
- ○ AT&T Mobility LLC
- ○ Comcast
- ○ Earthlink
- ○ Frontier Communications Corporation
- ○ HughesNet
- ○ NTELOS
- ○ NETSCOPE
- ○ Shentel
- ○ Suddenlink Communications
- ○ Sunlit Surf
- ○ Verizon Wireless
- ○ WildBlue Communications, Inc.
- ○ Other (please specify):

16. What type of connection does this location use to access the Internet? (Mark all that apply.)

○ Cable ○ DSL ○ Fiber ○ Satellite ○ Dial-Up ○ Cellular/Air Card

○ Other (please specify):

17. Why did you choose this connection type? (Mark all that apply.)

○ Cost ○ Speed ○ Only available service ○ Best reliability

18. How much do you pay per month for Internet service? (If you have indicated several services, indicate your total expense for these services.)

$ ☐☐☐.☐☐

19. For all the types of connections you have, indicate the speed of your connection(s). Please check your speed at this website http://regiononepdc.org. The speed test link is located on the "Other" page and takes approximately 30 seconds.

TYPE OF CONNECTION	SPEED	
	Download	*Upload*

20. The following is a list of characteristics about your Internet service. Please indicate whether you are "very satisfied," "satisfied," "dissatisfied," or "very dissatisfied" with that aspect of your Internet service.

SERVICE ISSUE	VERY SATISFIED	SATISFIED	DISSATISFIED	VERY DISSATISFIED	DON'T KNOW/NA
Speed of connection	○	○	○	○	○
Cost of Internet	○	○	○	○	○
Technical support	○	○	○	○	○
Reliability of access	○	○	○	○	○
Customer service	○	○	○	○	○
Number of providers	○	○	○	○	○

21. **If you indicated you DO NOT have Broadband (high-speed) Internet service (e.g., none or dial-up), please mark all reasons for not having Internet service. (Mark all that apply.)**

- ○ I don't own a computer
- ○ Cost/Too expensive
- ○ Broadband service not available
- ○ Do not Need Broadband services
- ○ Security reasons
- ○ Do not know how to use Internet
- ○ Other (please specify): _____

22. **If concerns in question 21 were addressed, would you utilize Broadband (high-speed) Internet service?**

○ Yes ○ No

23. **How much would you be willing to pay monthly for this service?**

$ _____.__

Thank you for responding to this survey.

We know your time is valuable. Your response will remain anonymous. If you have any questions, please contact the Region I Planning & Development Council at regionone@regiononepdc.org or by phone at (304) 431-7225.

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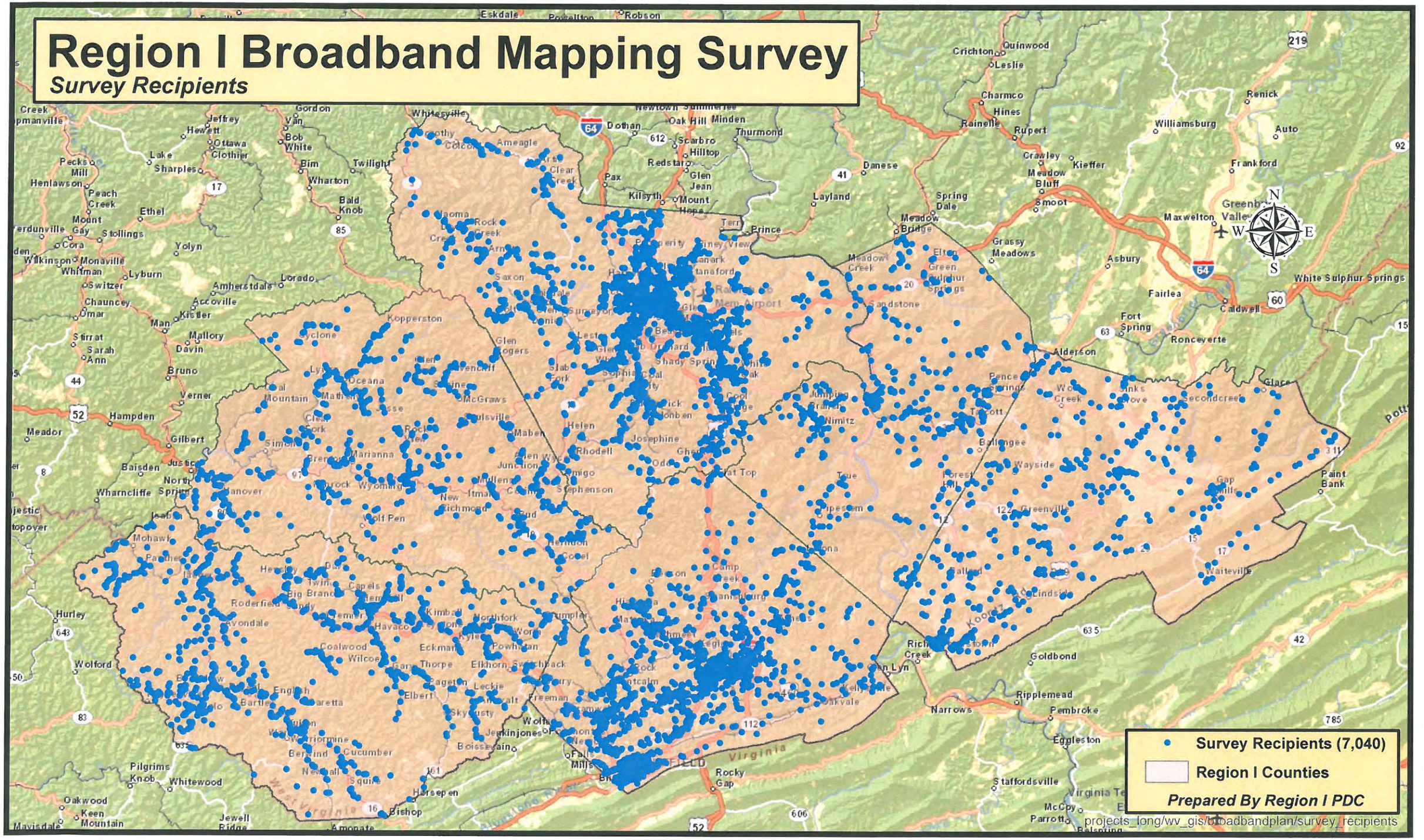
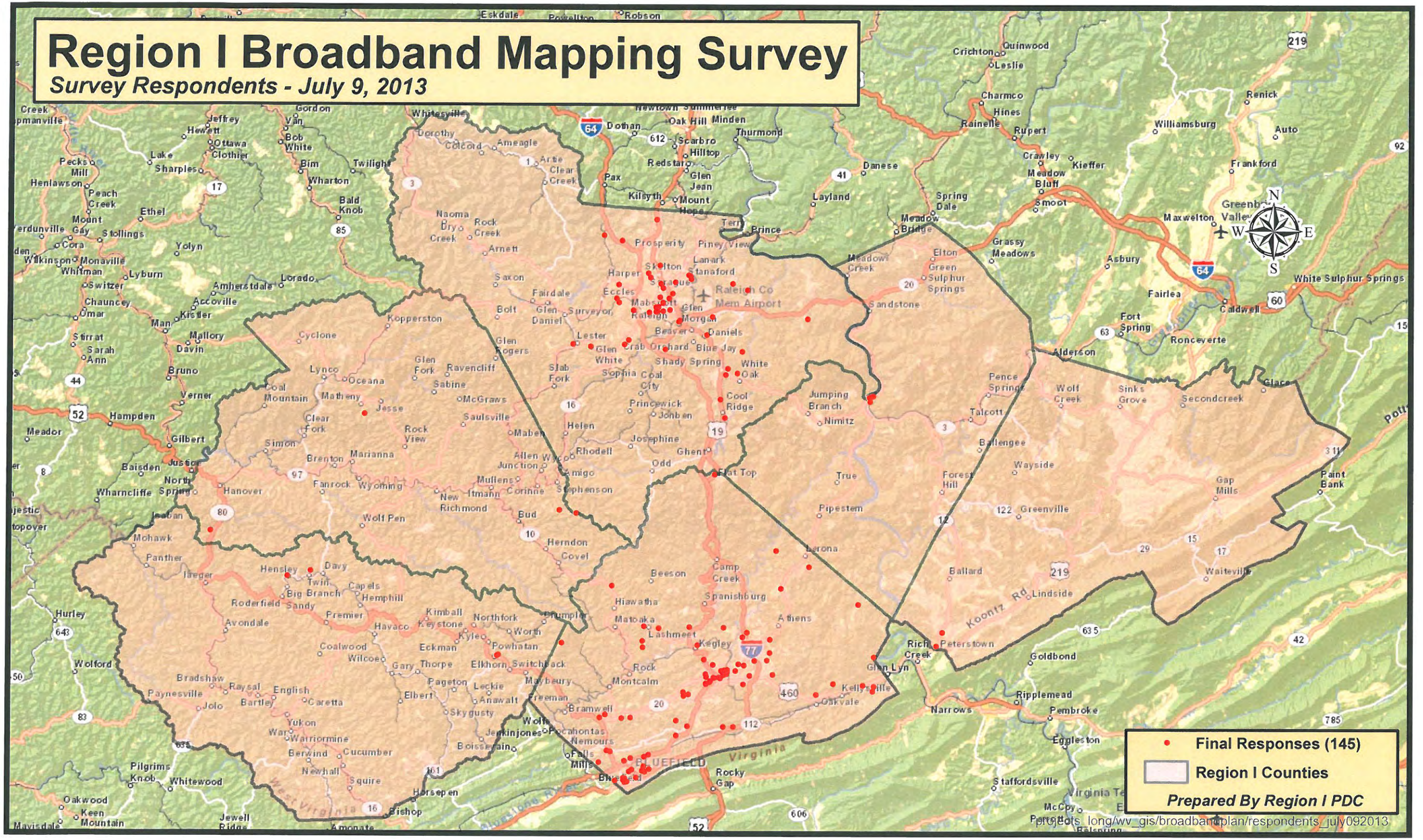
Region I Broadband Mapping Survey

Survey Recipients



Region I Broadband Mapping Survey

Survey Respondents - July 9, 2013

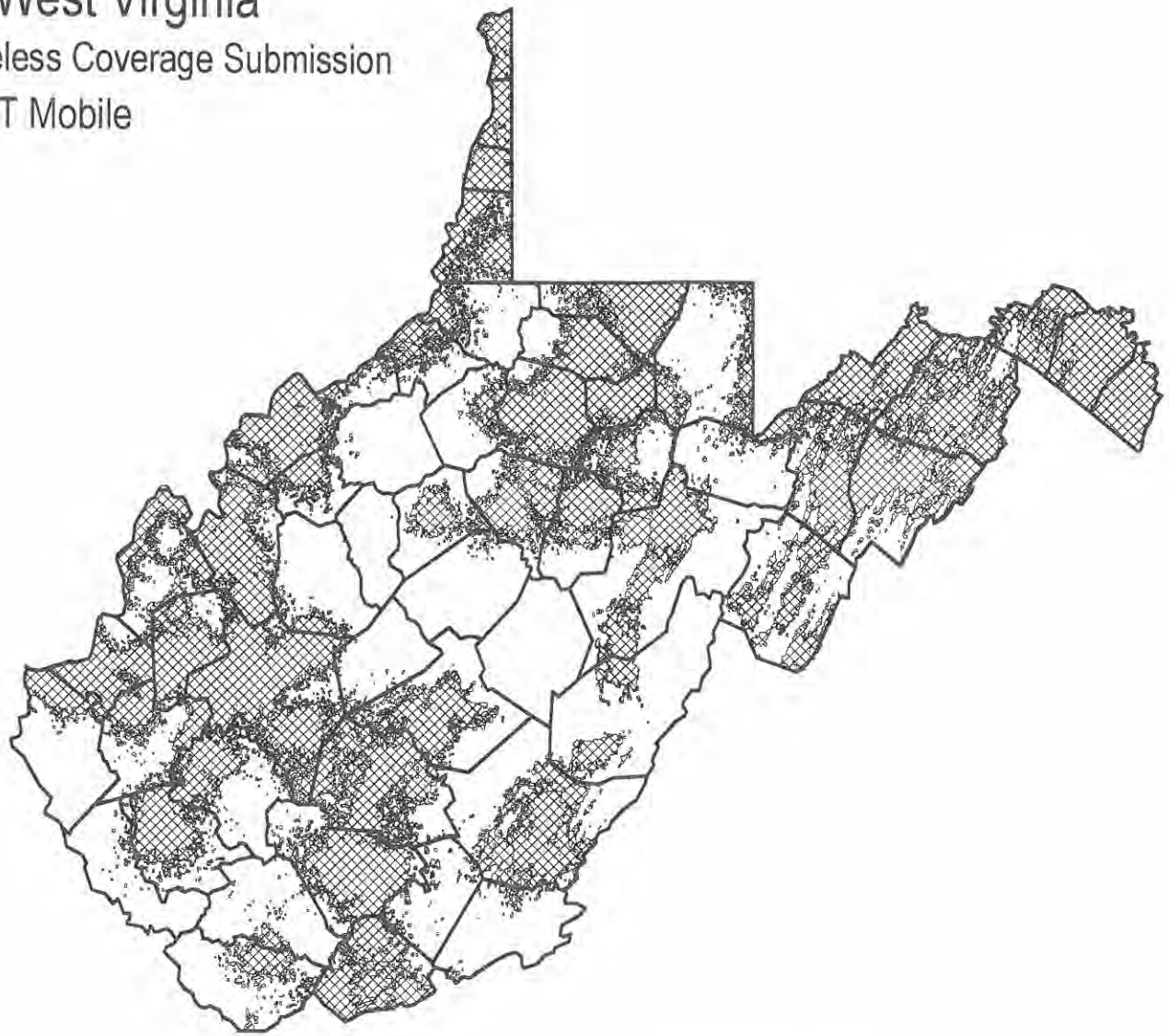


Appendix B

State of West Virginia

Round 7 NTIA Wireless Coverage Submission

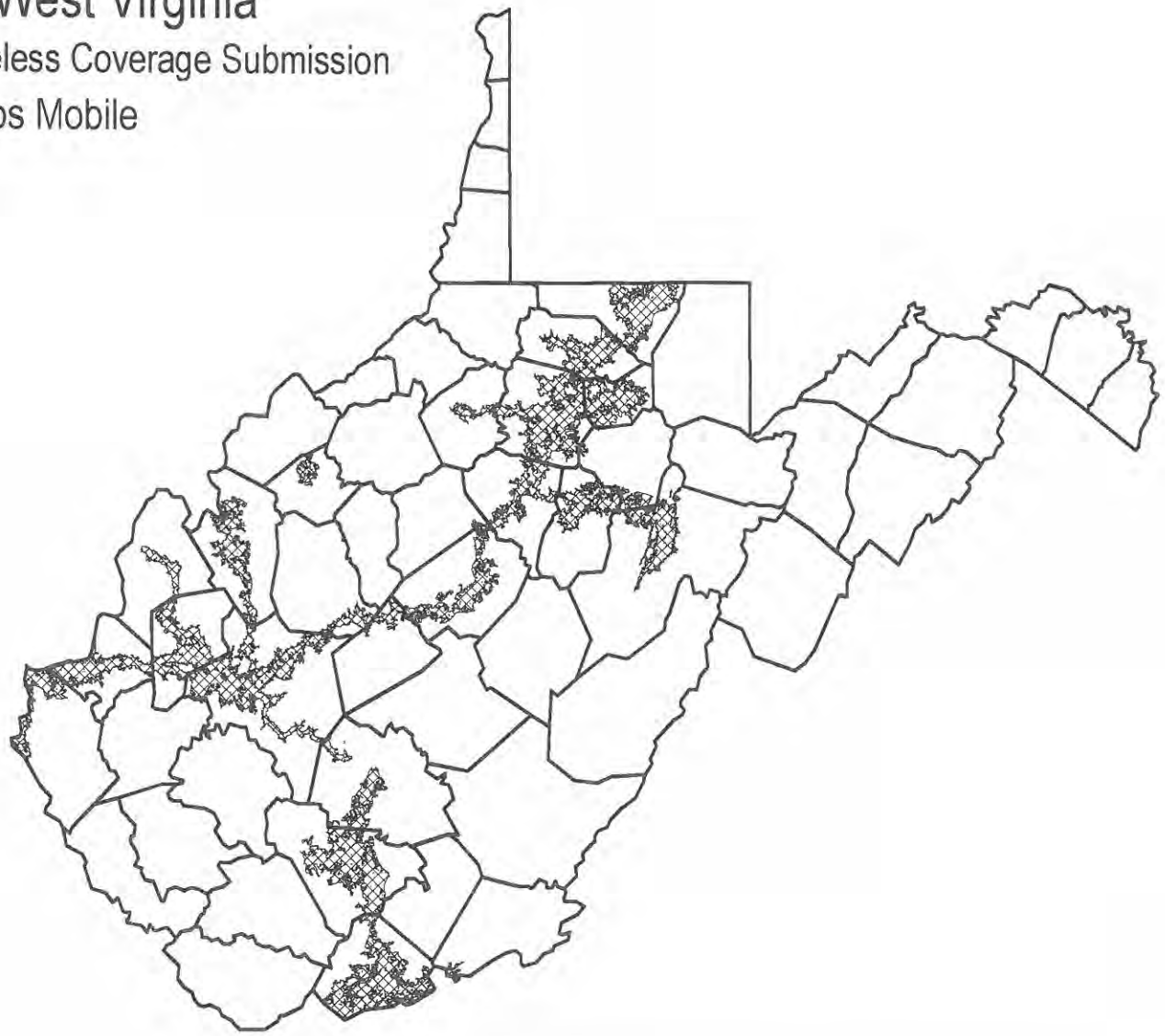
AT&T Mobile



State of West Virginia

Round 7 NTIA Wireless Coverage Submission

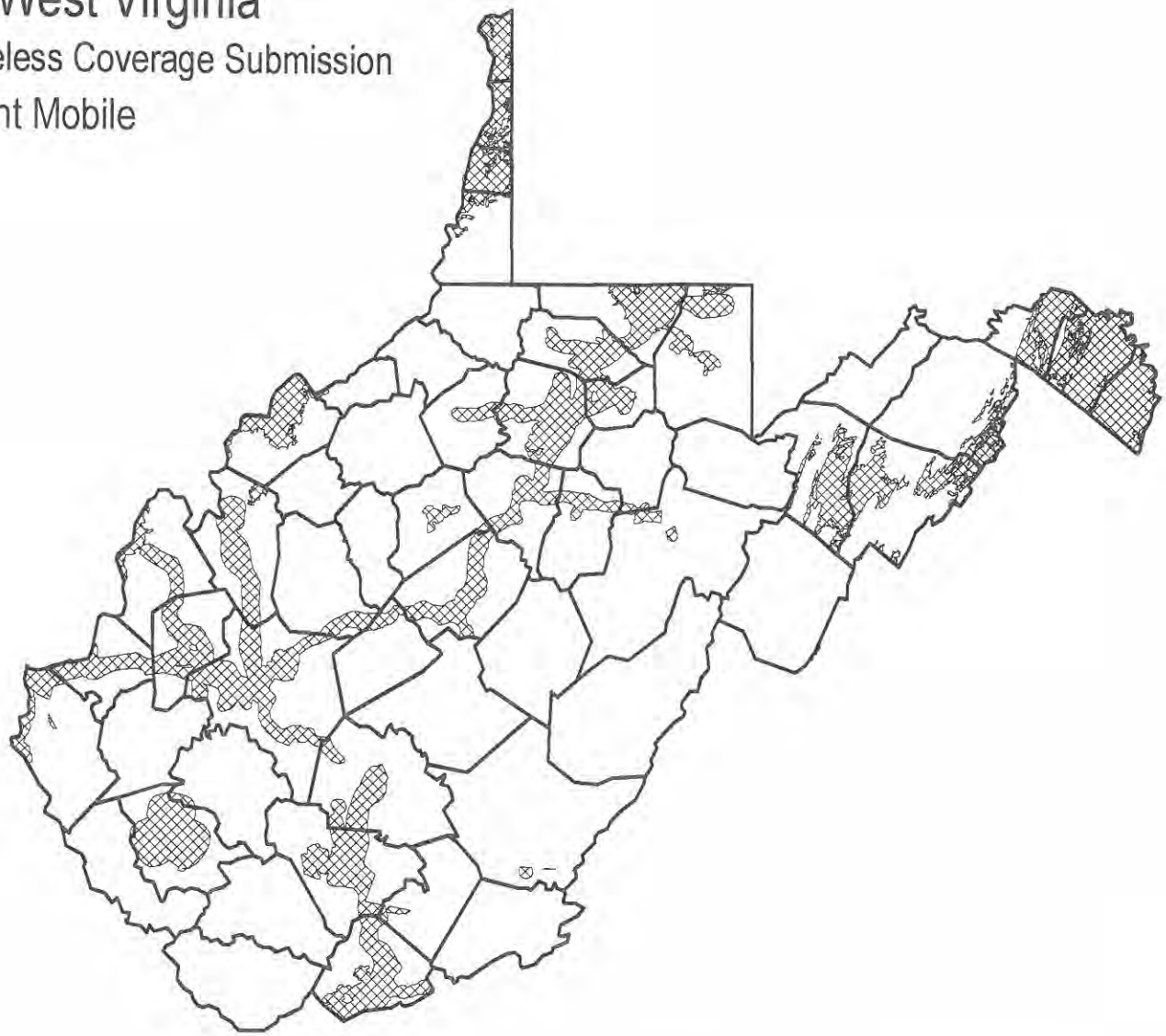
nTelos Mobile



State of West Virginia

Round 7 NTIA Wireless Coverage Submission

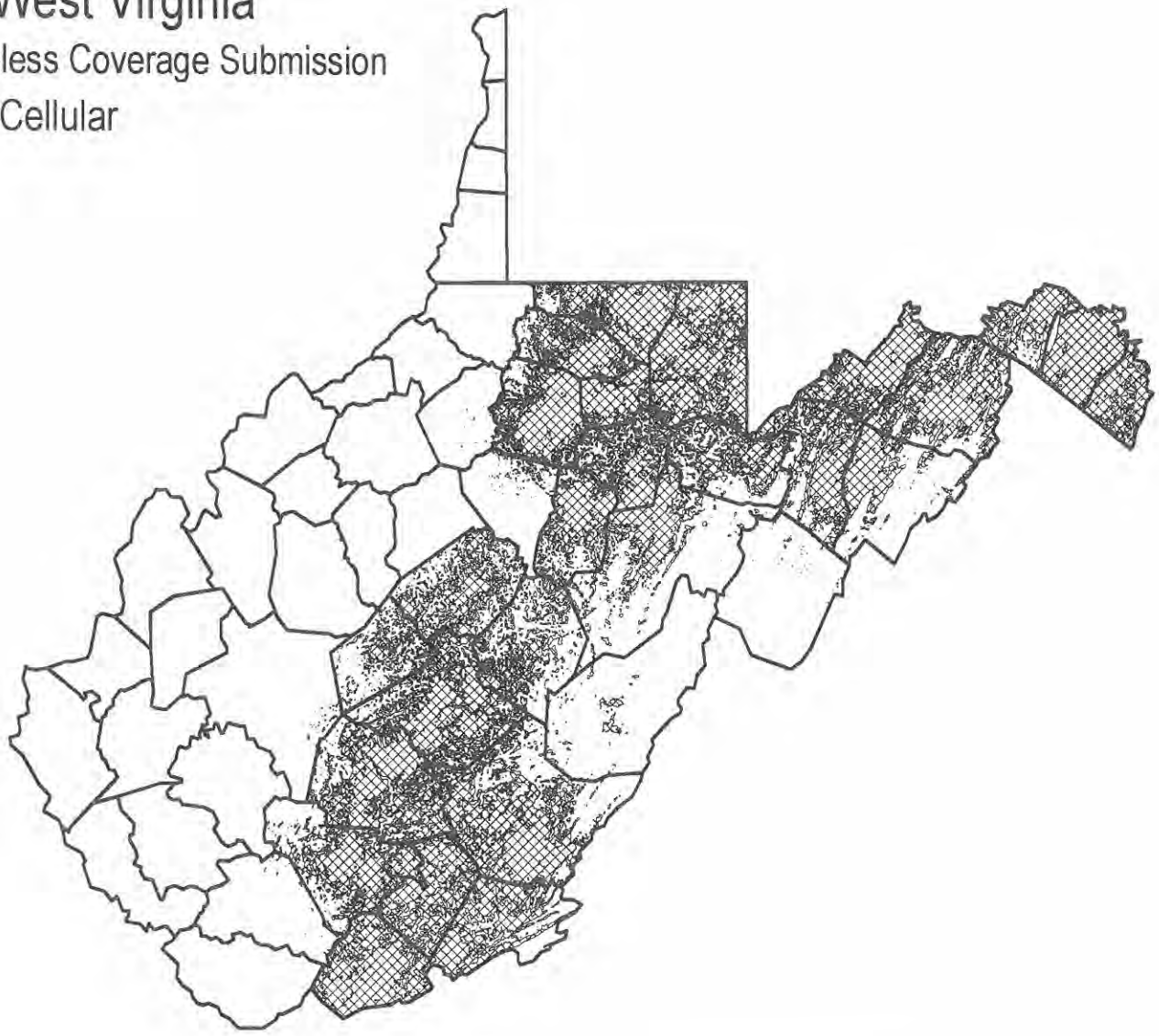
Sprint Mobile



State of West Virginia

Round 7 NTIA Wireless Coverage Submission

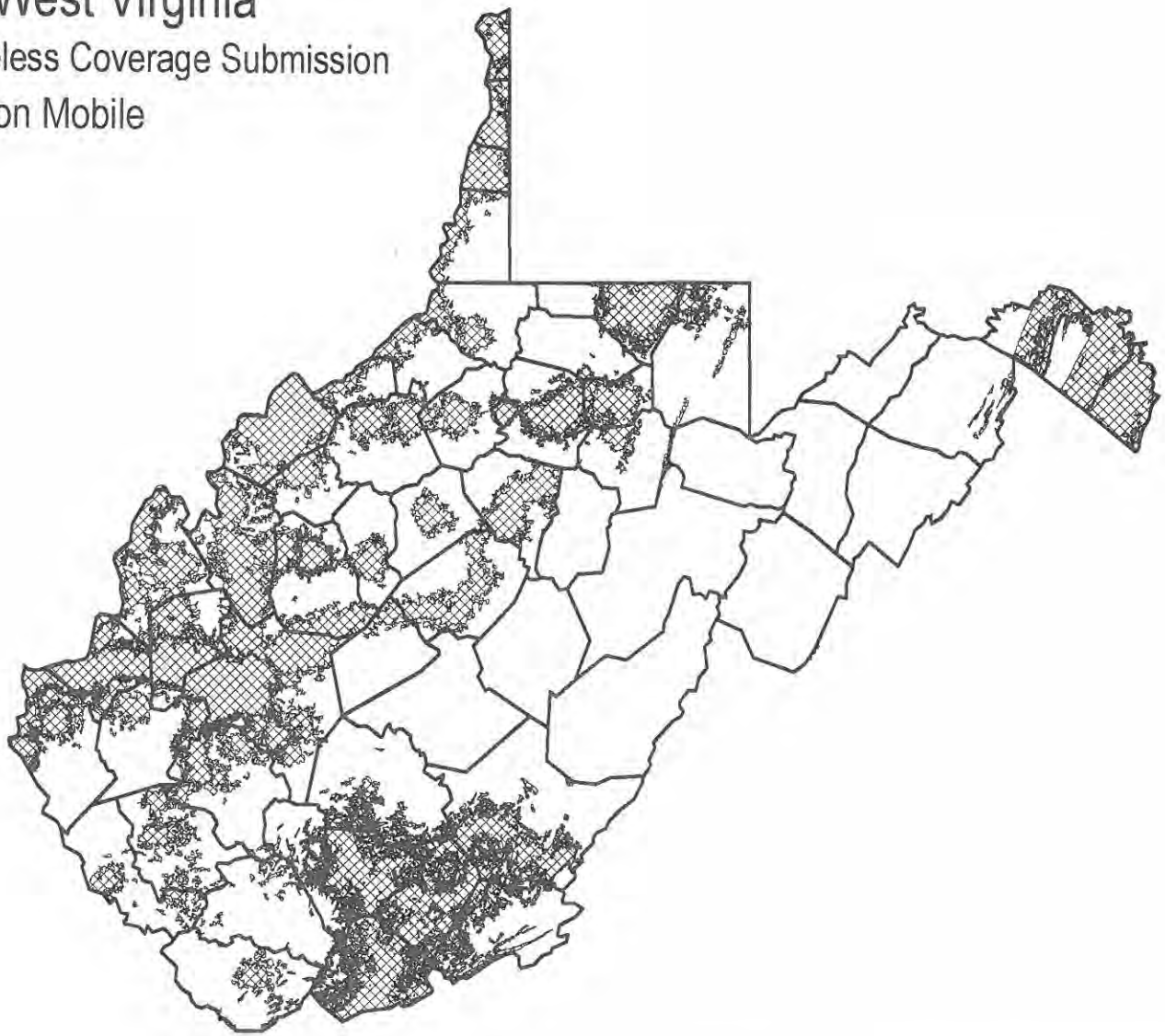
US Cellular



State of West Virginia

Round 7 NTIA Wireless Coverage Submission

Verizon Mobile



Appendix C

Report for

State of West Virginia Broadband Field Testing Region 1

Prepared for

State of West Virginia Geological and Economic Survey And Office of GIS Coordination

September 2013 ©

L.R. Kimball®

TARGETED RESULTS. EXPERTLY MANAGED.
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EXECUTIVE SUMMARY

L.R. Kimball respectfully submits this Findings Report for Broadband Field Testing (Findings Report) to the State of West Virginia Geological and Economic Survey and the Office of GIS Coordination (State). The State contracted with L.R. Kimball to provide broadband data verification tasks including statewide wireless broadband field testing. In May 2013, L.R. Kimball performed testing in the Region 1 Planning and Development Council area consisting of McDowell, Mercer, Monroe, Raleigh, Summers and Wyoming Counties, West Virginia.

The broadband field testing consisted of drive-testing the six county area while using specific app-enabled smartphones provided by the State. The purpose of this testing was to assess the spatial and attribute accuracy of the service area polygons that four providers, AT&T, nTelos, US Cellular and Verizon, submitted to West Virginia in March 2013 as part of the National Telecommunications Information Agency (NTIA) State Broadband Data and Development Program (SBDD). Comparisons between the field data collected and the provider-supplied service area polygons facilitated the identification of possible coverage and speed inaccuracies reported to the State by the providers. This findings report will discuss the methodology associated with the field collection and the results of said field collection.

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1. METHODOLOGY

The drive-testing phase of this project was initiated May 20, 2013 in Princeton, West Virginia. It continued through May 31, 2013, with 6 days of field data collection, where L.R. Kimball field specialists spent a minimum of 10 hours each day driving through McDowell, Mercer, Monroe, Raleigh, Summers and Wyoming Counties. L.R. Kimball field specialists consisted of one two-person team, where one member served as the driver and the other as the navigator and data collector.

1.1 Initial Data Collection

Prior to drive-testing, L.R. Kimball prepared geographic information system (GIS) data layers to make the drive-testing more efficient and improve the quality of the data collected. These layers include the following:

- West Virginia Statewide Addressing and Mapping Board (WVSAMB) 2011 Centerlines, with pre-determined "Drive Centerlines" chosen prior to field work
- West Virginia Statewide Addressing and Mapping Board 2011 Structures
- West Virginia Statewide Addressing and Mapping Board 2011 Imagery
- NTIA Round 7 Wireless Data Coverage Submission
- Speed Test Point Locations

In addition, the State provided four smartphones for use during the drive-testing:

- AT&T Samsung Galaxy S III
- West Virginia PCS Alliance (nTelos) Samsung Galaxy S
- US Cellular Samsung Galaxy S III
- Verizon Samsung Galaxy S III

All of these phones were updated with the QoS Solutions Android Applications that measure carrier connectivity, also provided by the State.

The State asked L.R. Kimball to visit each planning and development council regional office during the initial stages of the fieldwork collection to discuss the objectives of the project and gain feedback from the region regarding specific areas of broadband concern within the region. L.R. Kimball field team met with Mr. Jason Roberts, Region 1 GIS Director, on May 21, 2013. Mr. Roberts did not have any additional areas of concern for the field crew to focus on, but expressed interest in learning the results of the West Virginia Broadband Mapping "Broadband Survey" program for his region.

1.1.1 West Virginia Statewide Addressing and Mapping Board 2011 Centerlines

The WVSAMB 2011 Centerlines were downloaded from the West Virginia GIS Technical Center Website. The centerlines were then evaluated for potential use. Removed from the dataset were named driveways and dead-end streets. The centerlines were further reviewed and potential "Drive Centerlines" for the region were chosen. These potential "Drive Centerlines" were chosen based on several factors. They are a good representation within the submitted coverage areas. Also, they have residents living on them and did not appear to be "fade-away" roads (dirt roads that ultimately lead to nothing). In general, interstates were not included in the potential "Drive Centerlines"

coverage because it is anticipated that they will be traveled/measured during normal travel to various locations and did not need to be formally routed.

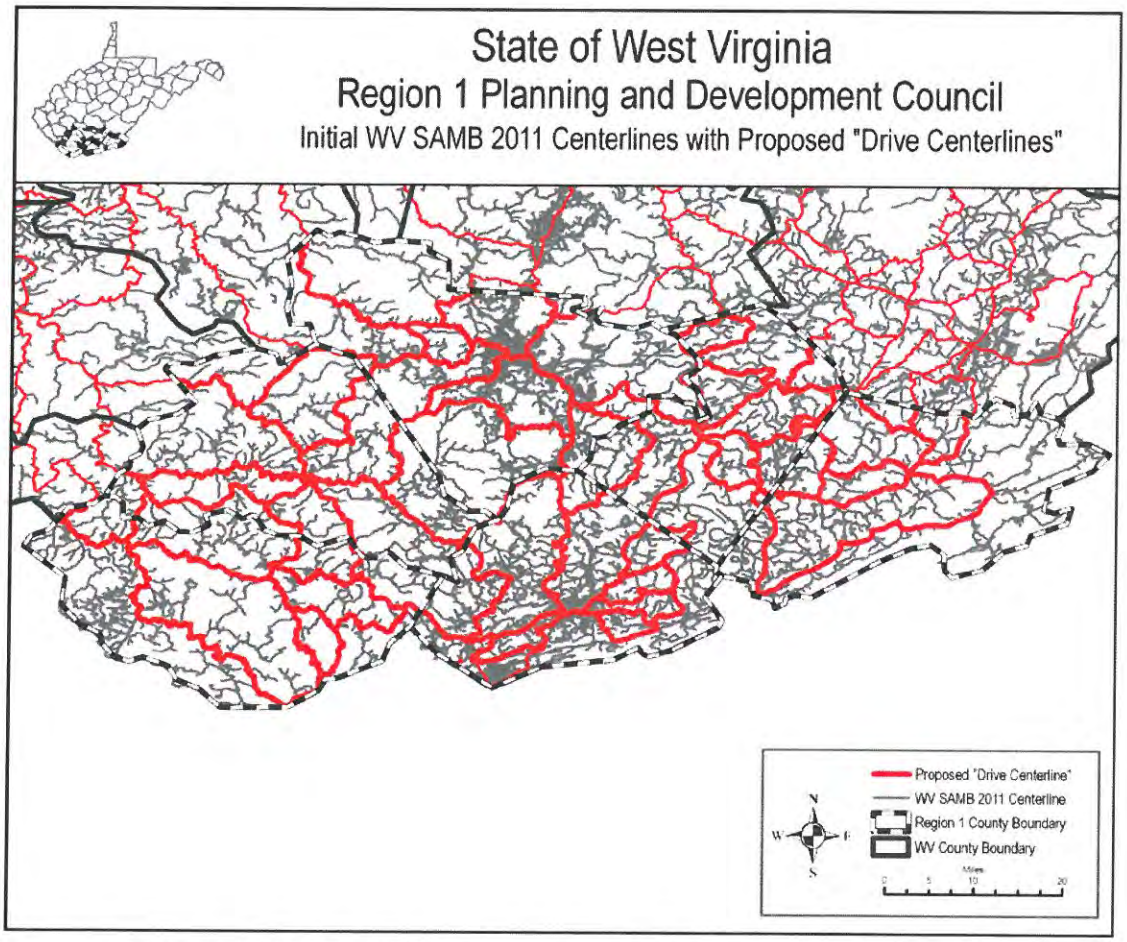

Figure 1—Initial WV SAMB 2011 Centerlines with Proposed "Drive Centerlines"

1.1.2 West Virginia Statewide Addressing and Mapping Board 2011 Structures

The WVSAMB 2011 Structures were downloaded from the West Virginia GIS Technical Center Website to use as reference only. There were no changes made to this layer prior to or during drive-testing.

1.1.3 Speed Test Points

The QoS applications allow for a carrier broadband speed test to occur every five minutes, or at user-selected points. As the application requires remaining in the same location until the test completes, and does not produce accurate results if traveling above 25 mph, QoS recommended selecting random test point locations to run the application throughout the region. L.R. Kimball chose random points in populated areas as a test of the broadband speeds in submitted coverage areas. The initial speed test point layer contained 36 speed test locations in Region 1.

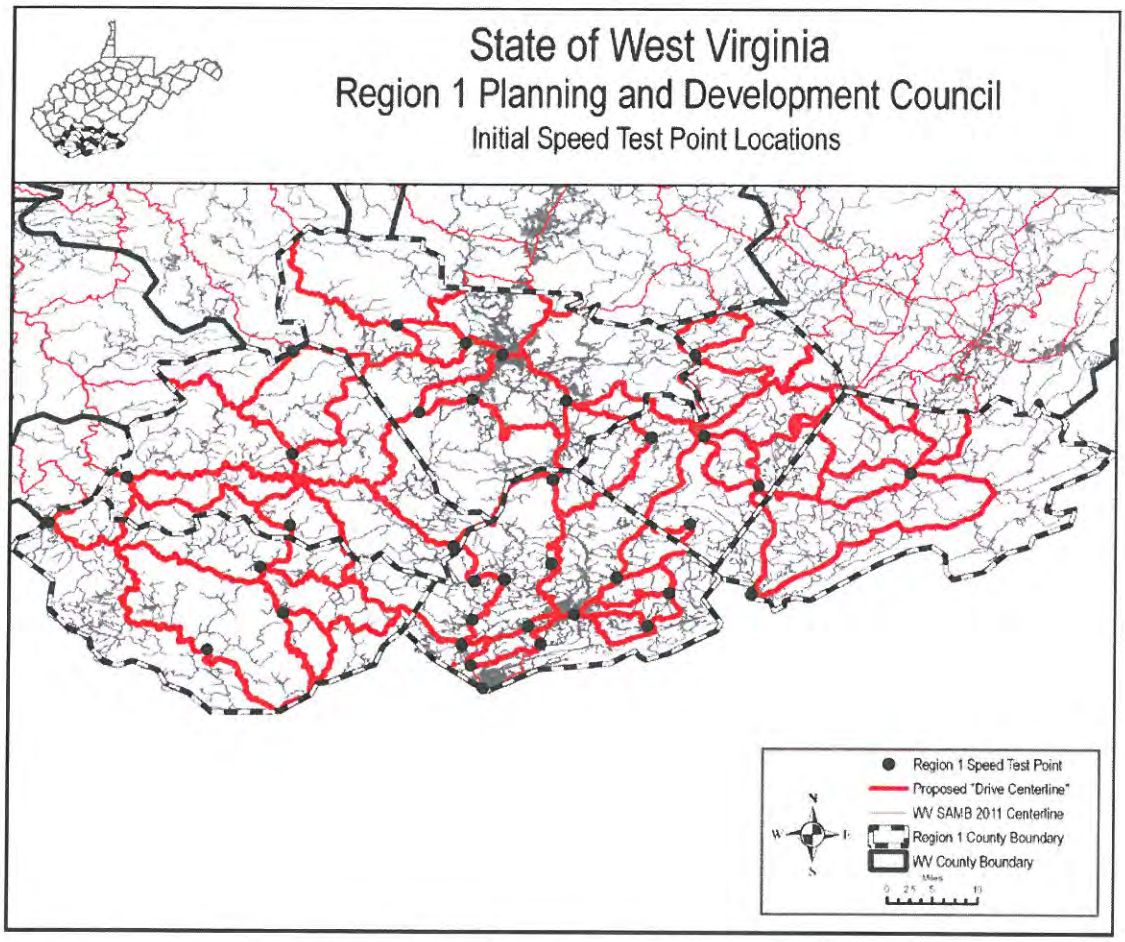

Figure 2—Initial Speed Test Point Locations

1.1.4 West Virginia Statewide Addressing and Mapping Board 2011 Imagery

The WVSAMB 2011 Imagery was downloaded from the West Virginia GIS Technical Center Website for Region 1 counties to use as reference only. There were no changes made to these layers prior to or during drive-testing.

1.1.5 QoS Solutions Android Applications

The QoS Solutions software that was provided by the State consisted of four Android Applications for use with smartphones. QCarrier measures carrier signal strength while driving with collected data stored directly on the phone. Rate of vehicle speed is not a factor in measuring signal strength. QWiFi locates and records Wi-Fi services with collected data stored directly on the phone. Rate of vehicle speed is not a factor in measuring Wi-Fi services. QPerf measures carrier connectivity at specific locations or during specific intervals with collected data stored on the QoS Website. Rate of vehicle speed is a factor in measuring signal strength. QMapper is a mapping device used in urban areas where you want a more accurate reading of your location. It does not store any data, and is to be used as a physical location reference tool. Please see Appendix A; QoS Applications.

1.1.6 AT&T Samsung Galaxy S III Phone

The State provided a Samsung Galaxy S III smartphone for L.R. Kimball field technicians to use with the AT&T network.

1.1.7 nTelos Samsung Galaxy S Phone

The State provided a Samsung Galaxy S smartphone for L.R. Kimball field technicians to use with the West Virginia PCS Alliance (nTelos) network.

1.1.8 US Cellular Samsung Galaxy S III Phone

The State provided a Samsung Galaxy S III smartphone for L.R. Kimball field technicians to use with the US Cellular network.

1.1.9 Verizon Samsung Galaxy S III Phone

The State provided a Samsung Galaxy S III smartphone for L.R. Kimball field technicians to use with the Verizon network.

1.2 Field Data Collection

L.R. Kimball field technicians spent six days drive-testing in McDowell, Mercer, Monroe, Raleigh, Summers and Wyoming Counties for the State. Equipment included a laptop computer pre-loaded with Environmental System Research Institute's (ESRI) ArcMap 10.1 software and the WV SAMB 2011 centerline, drive centerline, speed test point, and orthophotography layers, a GPS to use for reference and four smartphones provided by the State. In addition, a power inverter was used in the vehicle to keep all of the equipment charged while testing.

The L.R. Kimball field technician team consisted of a driver and a navigator. The navigator was responsible for mapping the route taken, as well as keeping track of the roads that were traveled and the points where speed tests were taken.

1.2.1 Roads Traveled

Approximately 953 miles of roads were tested in Region 1 for carrier connectivity. The goal was to drive-test the carrier submitted NTIA wireless polygons using a good representation of roads without "back-tracking" a great deal. The terrain was what was expected for this section of Appalachia, with numerous mountainous and valley areas. In some instances, anticipated road and/or weather conditions prevented the driver from traveling certain roadways and the initial drive centerlines and speed test locations in those areas were adjusted accordingly.

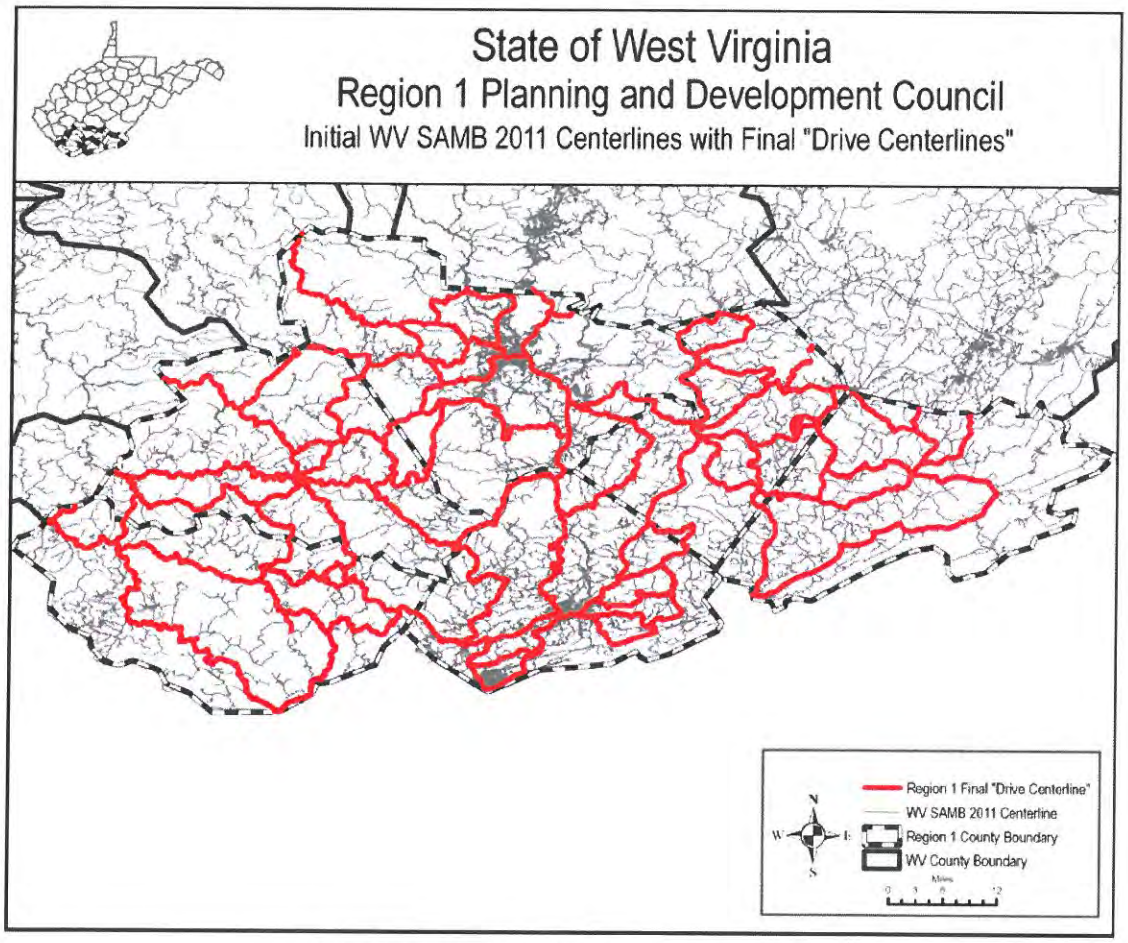

Figure 3—Roads Traveled During Drive-Testing

1.2.2 Speed Test Point Validation

There were a total of 36 speed test locations verified within Region 1.

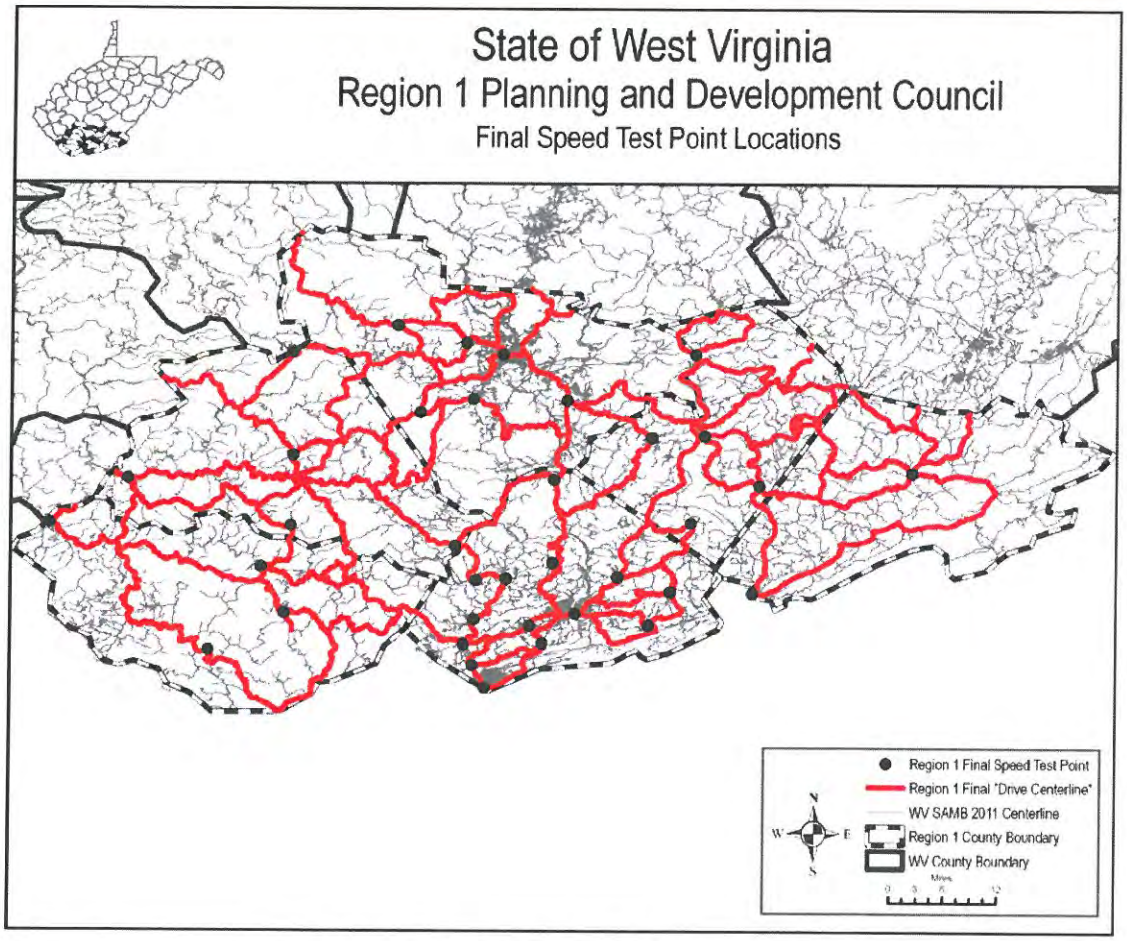

Figure 4—Final Speed Test Point Locations

2. TEST RESULTS

The drive-testing in Region 1 using smartphones was expected to show that good service exists in the urban areas and poor service in the rural areas of the region. In addition, it was expected that each of the providers being tested would have the service advertised in their NTIA submitted round 7 wireless coverage boundaries within the region. The QoS Software applications were user-friendly. It was easy to install the apps on the smartphones, and touching their icons on the screen opened them as expected. Analysis of the QoS Software application results involved the converting of .xml and .csv files into geodatabases and then making the appropriate comparisons.

2.1 QPerf Test Results

The QPerf application is a measure of carrier connectivity at specific locations, or speed test points. Data was uploaded to the QoS Website during the test. The data from the Website was downloaded as .csv files and converted into a geodatabase. The downstream and upstream speeds were then converted to the appropriate NTIA tier to match the Round 7 Wireless Coverage Polygons submitted by wireless providers as part of NTIA's Round 7 data collection effort. Analysis consisted of a location comparison, whereby the plotted locations of the test points were compared against their respective R7 coverage layer, as well as a comparison of the downstream and upstream speeds of the test points against the maximum speeds reported to the NTIA.

Reference Chart #2: Speed Tiers	
Code	Speed Tiers
1	Less than or equal to 200kbps
2	Greater than 200kbps and less than 768 kbps
3	Greater than or equal to 768kbps and less than 1.5 mbps
4	Greater than or equal to 1.5 mbps and less than 3 mbps
5	Greater than or equal to 3 mbps and less than 6 mbps
6	Greater than or equal to 6 mbps and less than 10 mbps
7	Greater than or equal to 10 mbps and less than 25 mbps
8	Greater than or equal to 25 mbps and less than 50 mbps
9	Greater than or equal to 50 mbps and less than 100 mbps
10	Greater than or equal to 100 mbps and less than 1 gbps
11	Greater than or equal to 1 gbps

Figure 5—NTIA Speed Tiers

2.1.1 AT&T QPerf Results

Of the 36 speed test point locations within Region 1, 24 were located within the Round 7 wireless coverage polygon submitted by AT&T and should have obtained QPerf speed test results. However, only two test points obtained results using the AT&T mobile network within Region 1, and both were within the AT&T submitted coverage polygon. Maximum advertised downstream and upstream values for the entire area are a value of five on the NTIA Speed

Tier. Only one of the two test points obtaining results met or exceeded the maximum advertised values for downstream and upstream coverage.

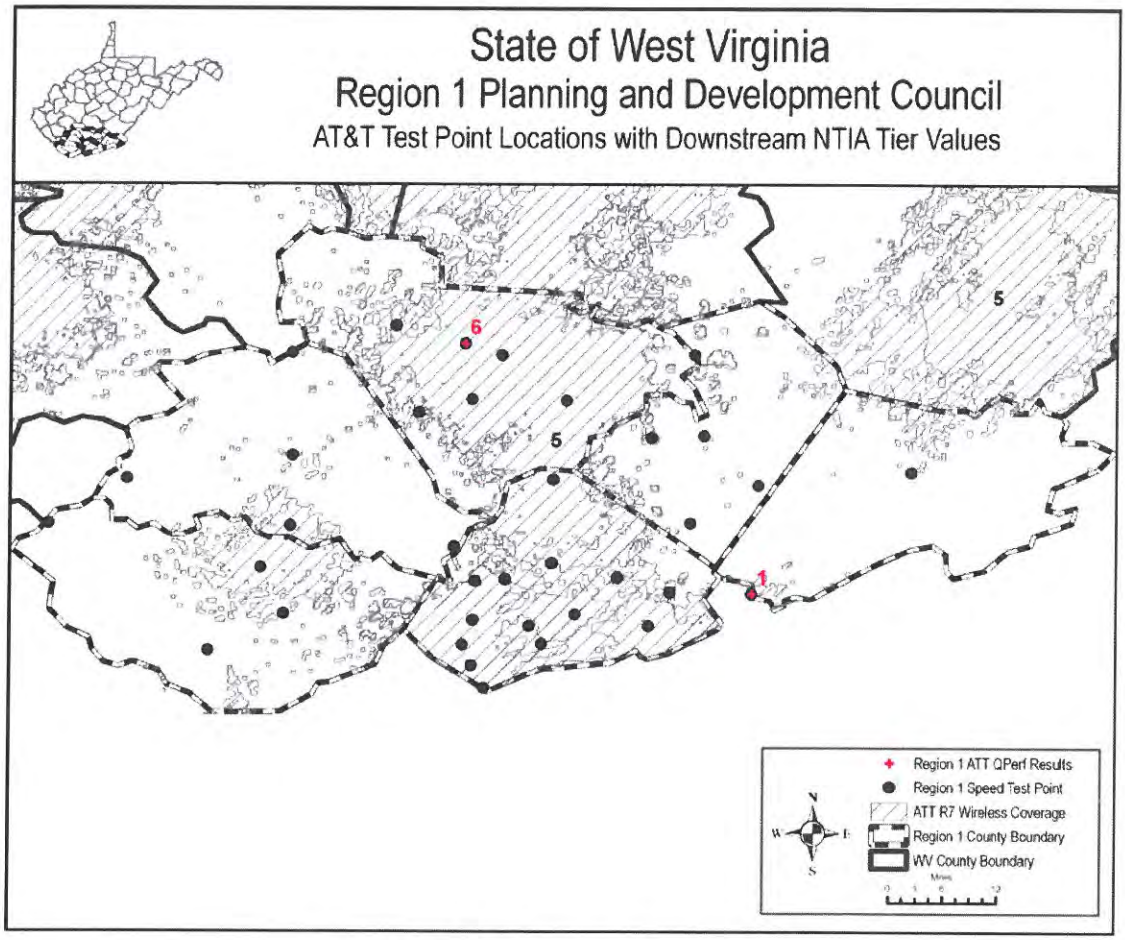

Figure 6—AT&T Downstream Speed Values

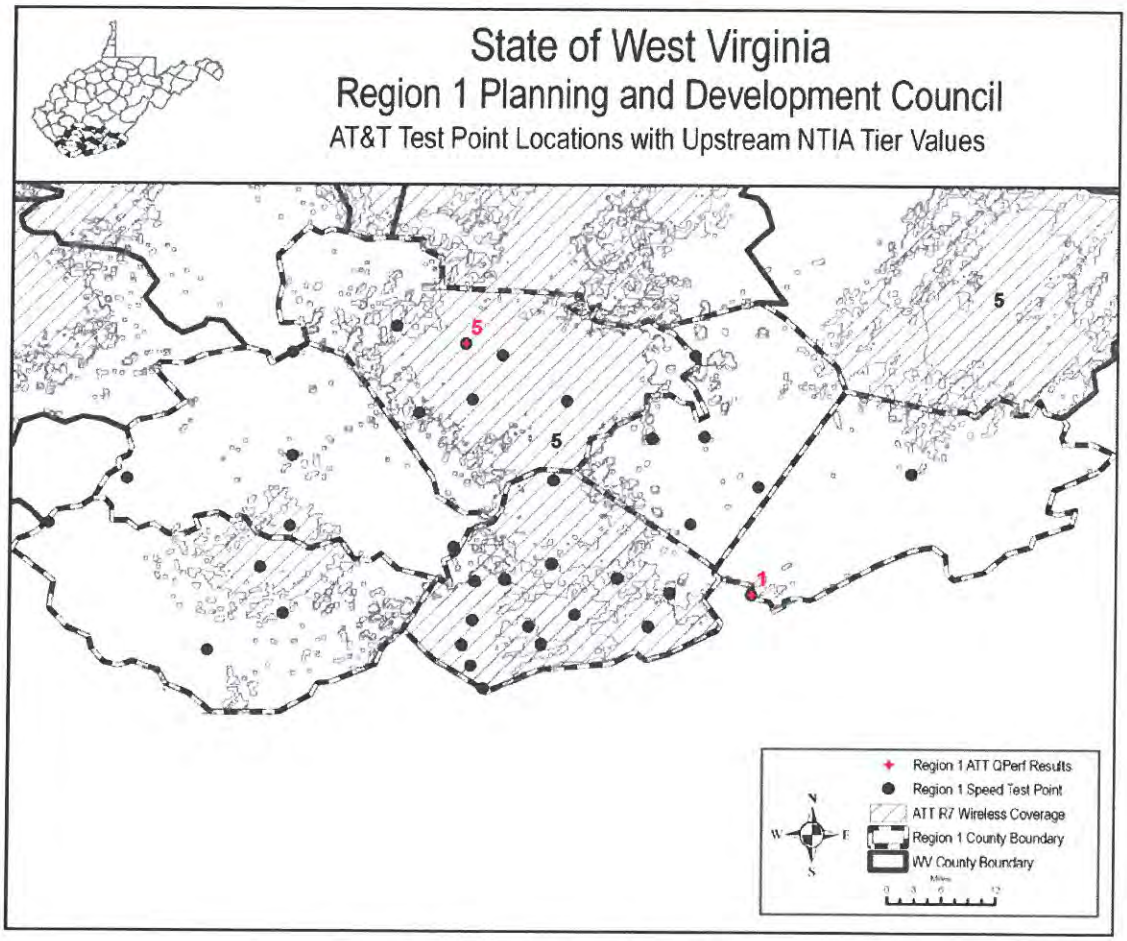

Figure 7—AT&T Upstream Speed Values

2.1.2 nTelos QPerf Results

Of the 36 speed test point locations within Region 1, 17 were located within the Round 7 wireless coverage polygon submitted by nTelos and should have obtained QPerf speed test results. However, only five test points obtained results using the nTelos mobile network within Region 1. Of these five points, two were within the nTelos submitted coverage polygon and three were not within the nTelos submitted coverage polygon. Maximum advertised downstream values for the entire area are a value of three on the NTIA Speed Tier and maximum advertised upstream values for the entire area are a value of two on the NTIA Speed Tier. Both of the test points obtaining results within the submitted coverage polygon met or exceeded the maximum advertised values for downstream and upstream coverage.

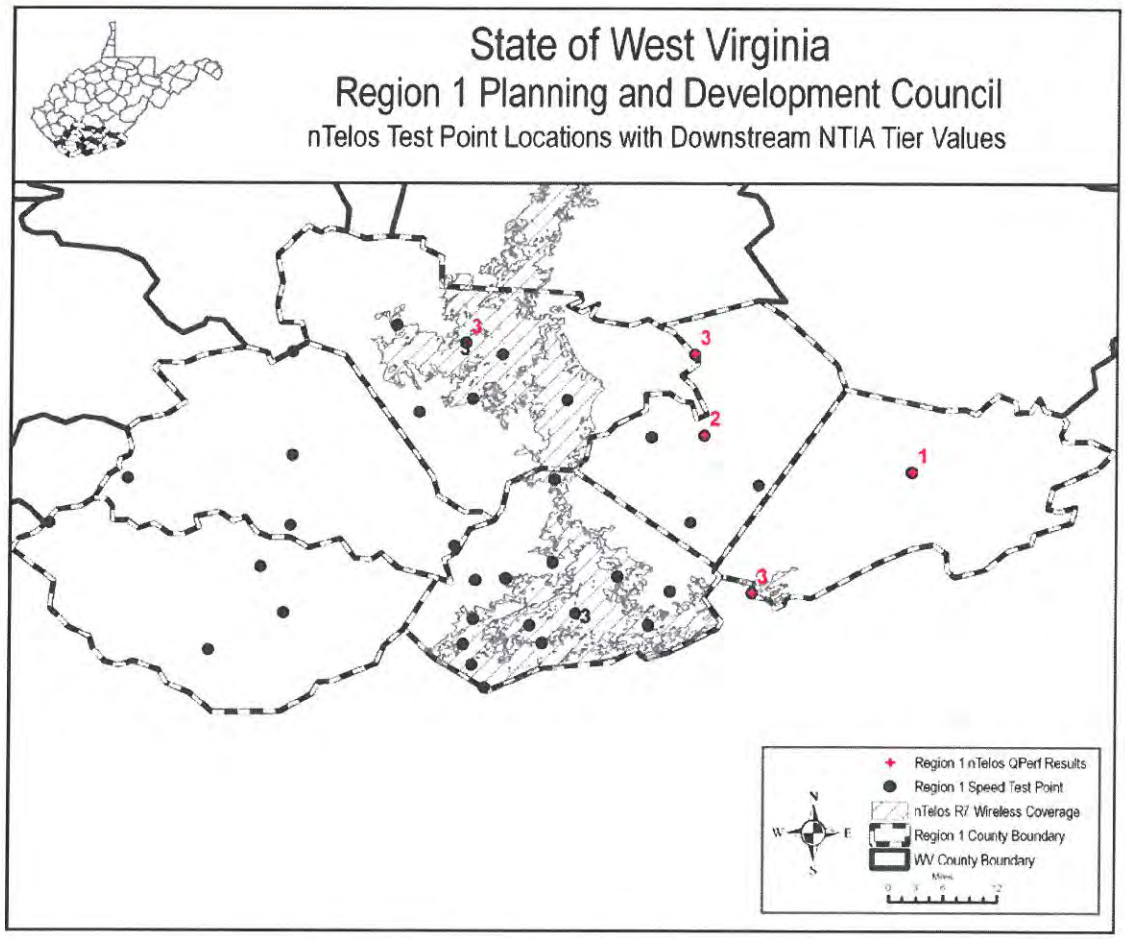

Figure 8—nTelos Downstream Speed Values

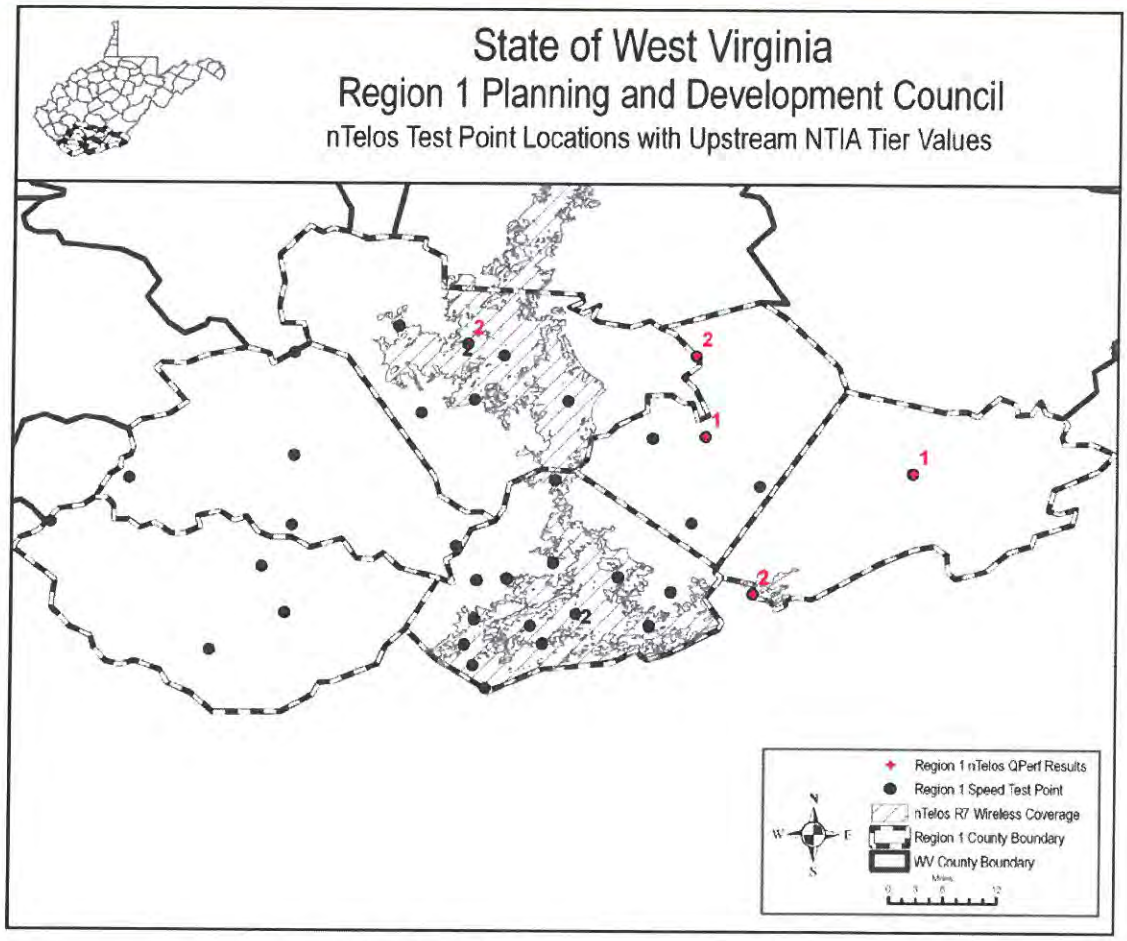

Figure 9—nTelos Upstream Speed Values

2.1.3 US Cellular QPerf Results

Of the 36 speed test point locations within Region 1, 24 were located within the Round 7 wireless coverage polygon submitted by US Cellular and should have obtained QPerf speed test results. However, only two test points obtained results using the US Cellular mobile network within Region 1, and all were within the US Cellular submitted coverage polygon. Maximum advertised downstream values for the entire area are a value of five on the NTIA Speed Tier and maximum advertised upstream values for the entire area are a value of four on the NTIA Speed Tier. Of the five test points obtaining results within the submitted coverage polygon, four met or exceeded the maximum advertised value for downstream coverage and three met or exceeded the maximum advertised value for upstream coverage.

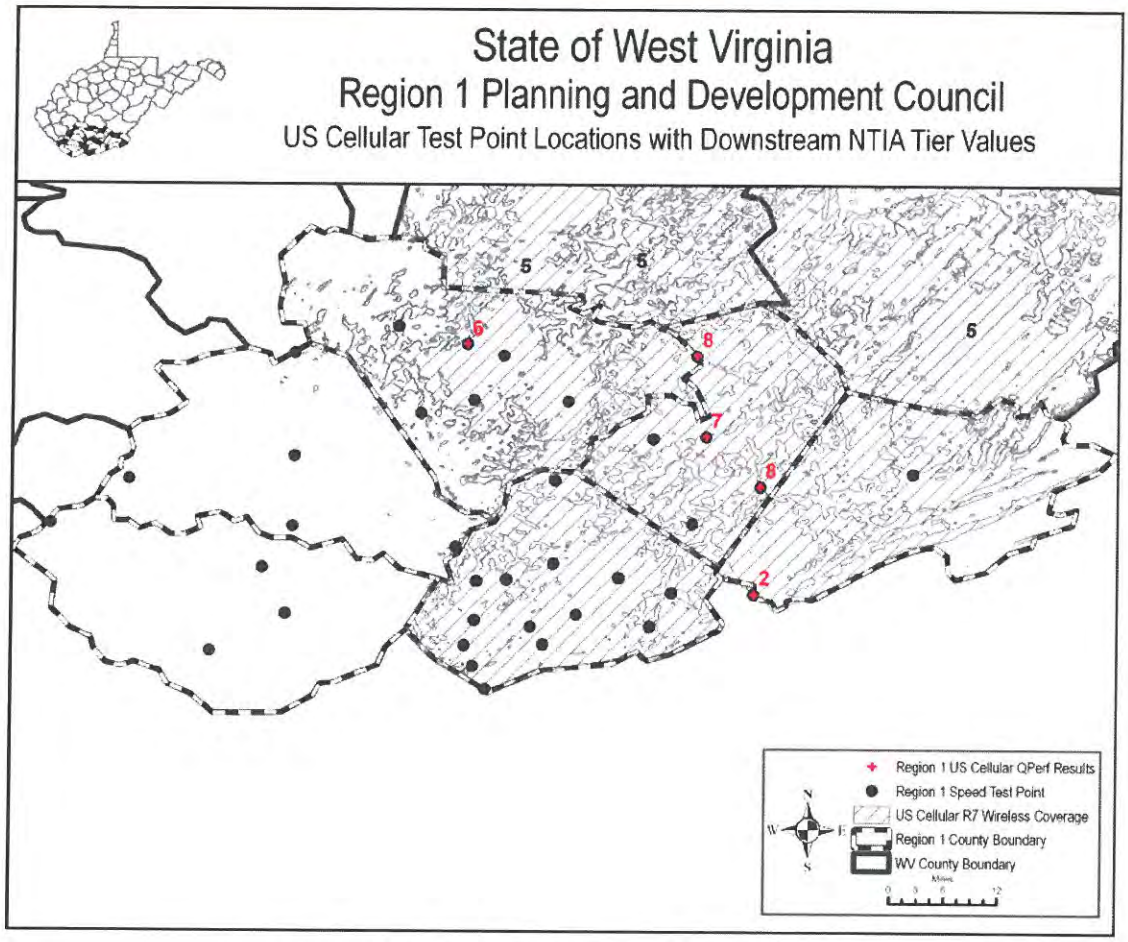

Figure 10—US Cellular Downstream Speed Values

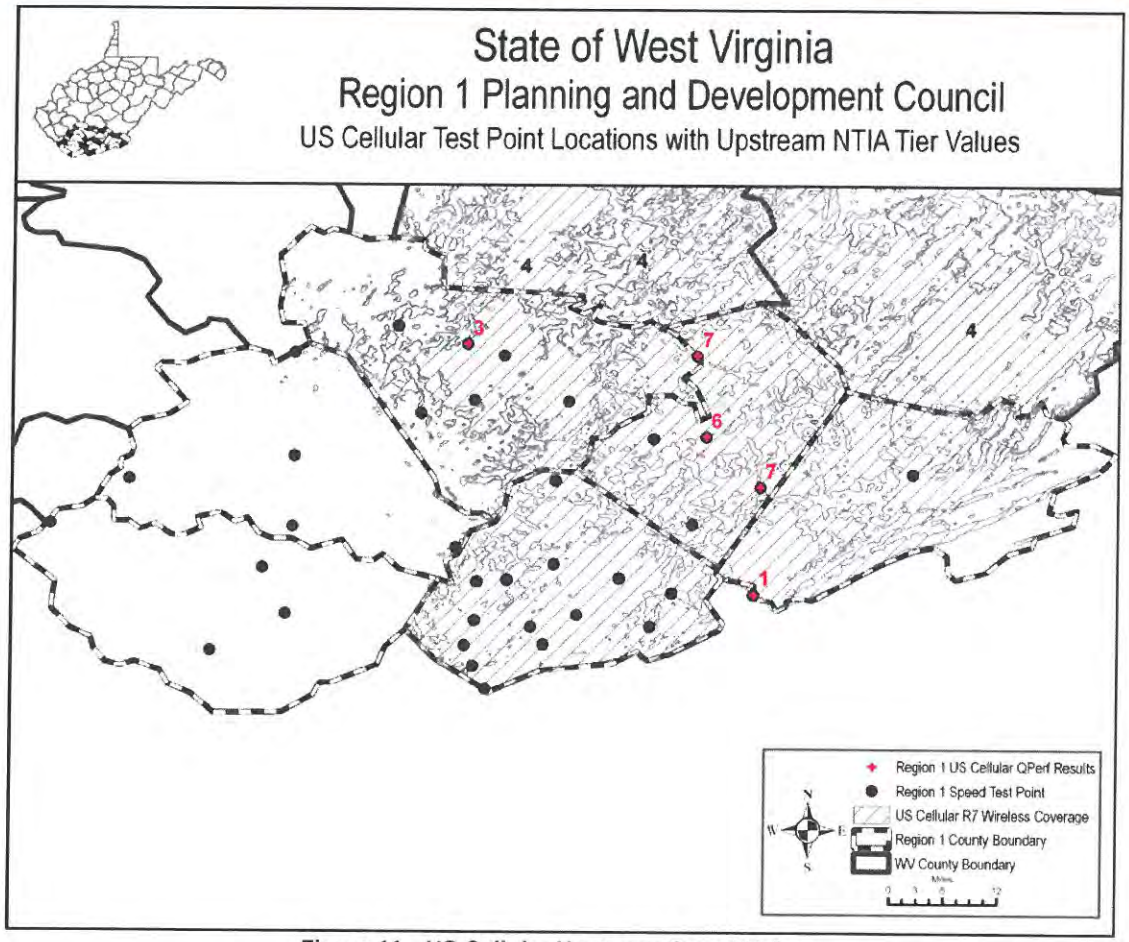

Figure 11—US Cellular Upstream Speed Values

2.1.4 Verizon QPerf Results

Of the 36 speed test point locations within Region 1, 22 were located within the Round 7 wireless coverage polygon submitted by Verizon and should have obtained QPerf speed test results. However, only five test points obtained results using the Verizon mobile network within Region 1. Of these five points, four were within the Verizon submitted coverage polygon and one was not within the Verizon submitted coverage polygon. Maximum advertised downstream values for the entire area are a value of three on the NTIA Speed Tier and maximum advertised upstream values for the entire area are a value of two on the NTIA Speed Tier. Of the four test points obtaining results within the submitted coverage polygon, one met or exceeded the maximum advertised value for downstream coverage and two met or exceeded the maximum advertised value for upstream coverage.

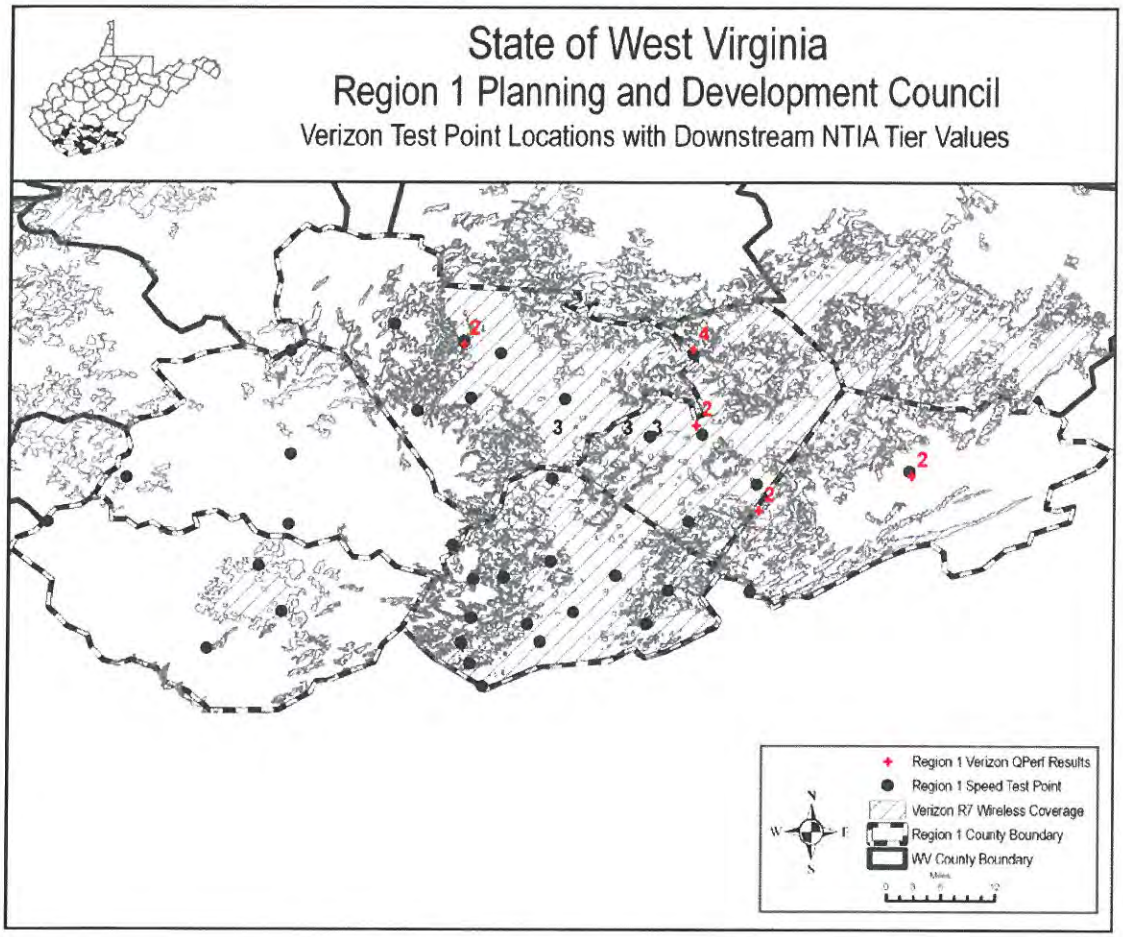

Figure 12—Verizon Downstream Speed Values

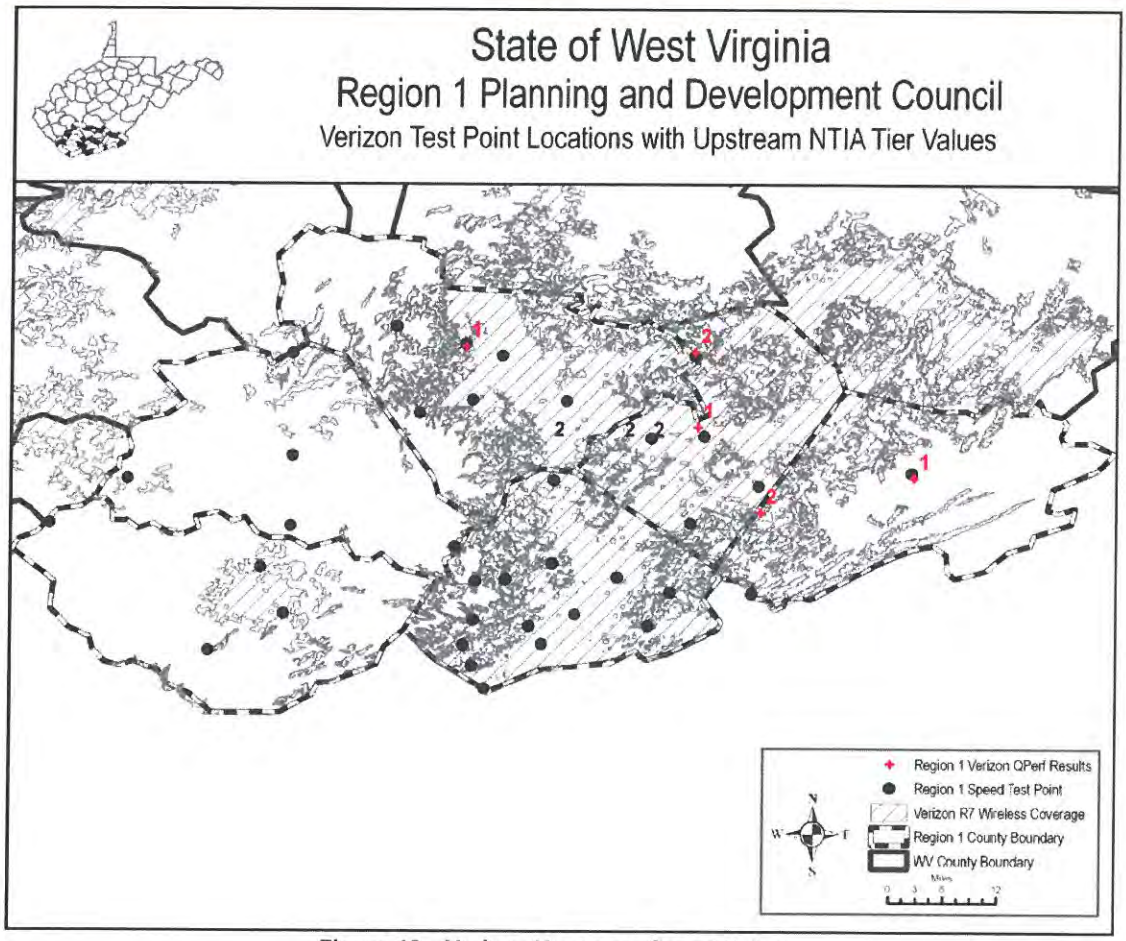

Figure 13—Verizon Upstream Speed Values

2.2 QCarrier Test Results

The QCarrier application is a measure of signal strength along the roads that were traveled during drive-testing. A record is created every 10 seconds or whenever the signal strength changes, and is stored in an .xml file directly on each phone. In general, it was found that there is acceptable coverage within the urban areas of the region and very limited coverage in the rural parts of the region for all carriers. Attributes used for analysis include the RSSI_DM field which is Received Signal Strength Indication, measured in DBm, and the EC/IO field, which is the signal strength relative to interference, measured in dB*10.

2.2.1 AT&T QCarrier Results

There were 16,483 points plotted within the AT&T network in Region 1. There were 3036 points that obtained no data, indicating no signal strength. The signal strength ranged from -51 to -113 DBm. There was no EC/IO data

collected for these points, as AT&T uses a Global System for Mobile Communication (GSM), which does not measure this value. The final drive centerlines shown with no phone data overlaid indicate areas where the phone was not able to connect to a GPS satellite, had no cellular service, and was not able to track the location of the phone.

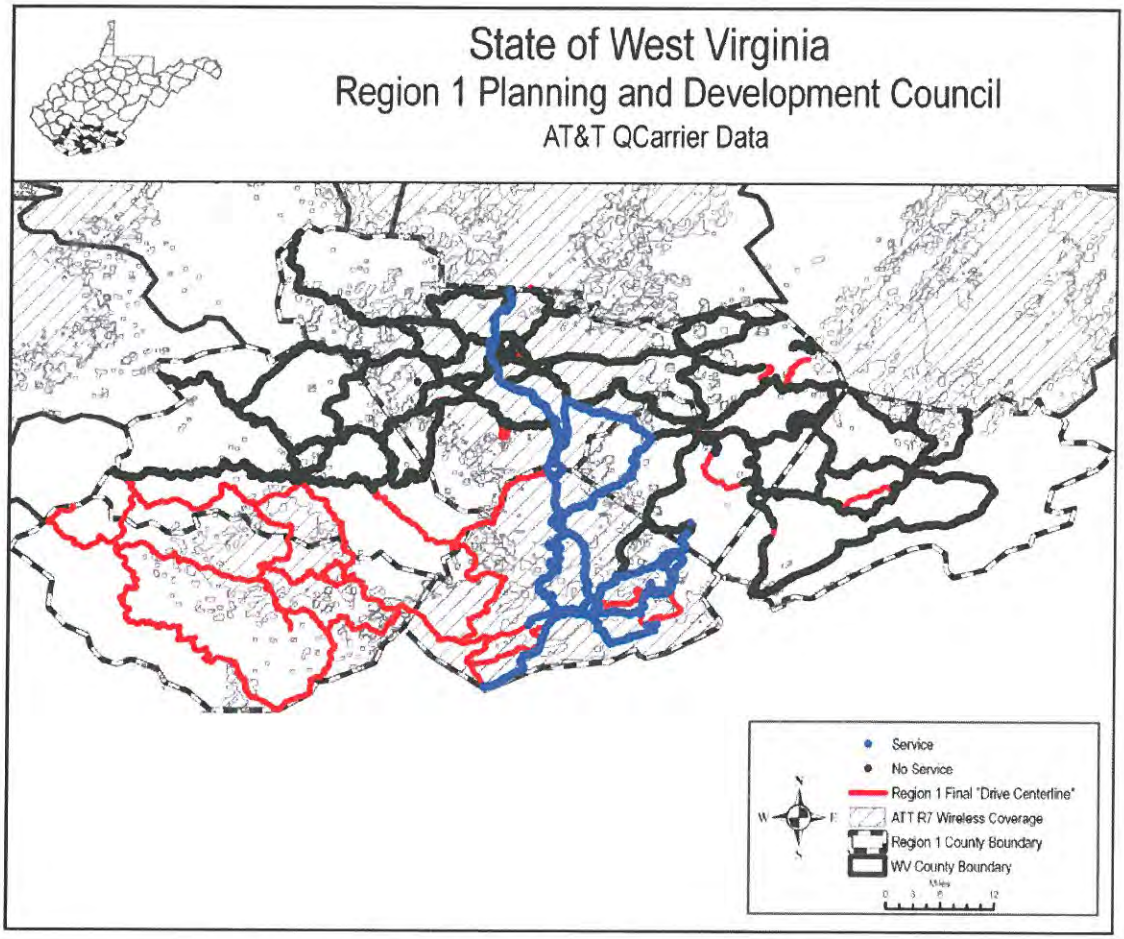

Figure 14—AT&T QCarrier Results, Based on RSSI_DM

2.2.2 nTelos QCarrier Results

There were 21,207 points plotted within the nTelos network in Region 1. The signal strength ranged from -52 to -105 DBm. The EC/IO data ranged from -90 to -160, with the majority of points falling at -160. This indicates areas where calls cannot connect, or calls are dropped constantly.[1] The final drive centerlines shown with no phone data overlaid

[1] http://www.telecomhall.com/what-is-ecio-and-ebno.aspx

indicate areas where the phone was not able to connect to a GPS satellite, had no cellular service, and was not able to track the location of the phone.

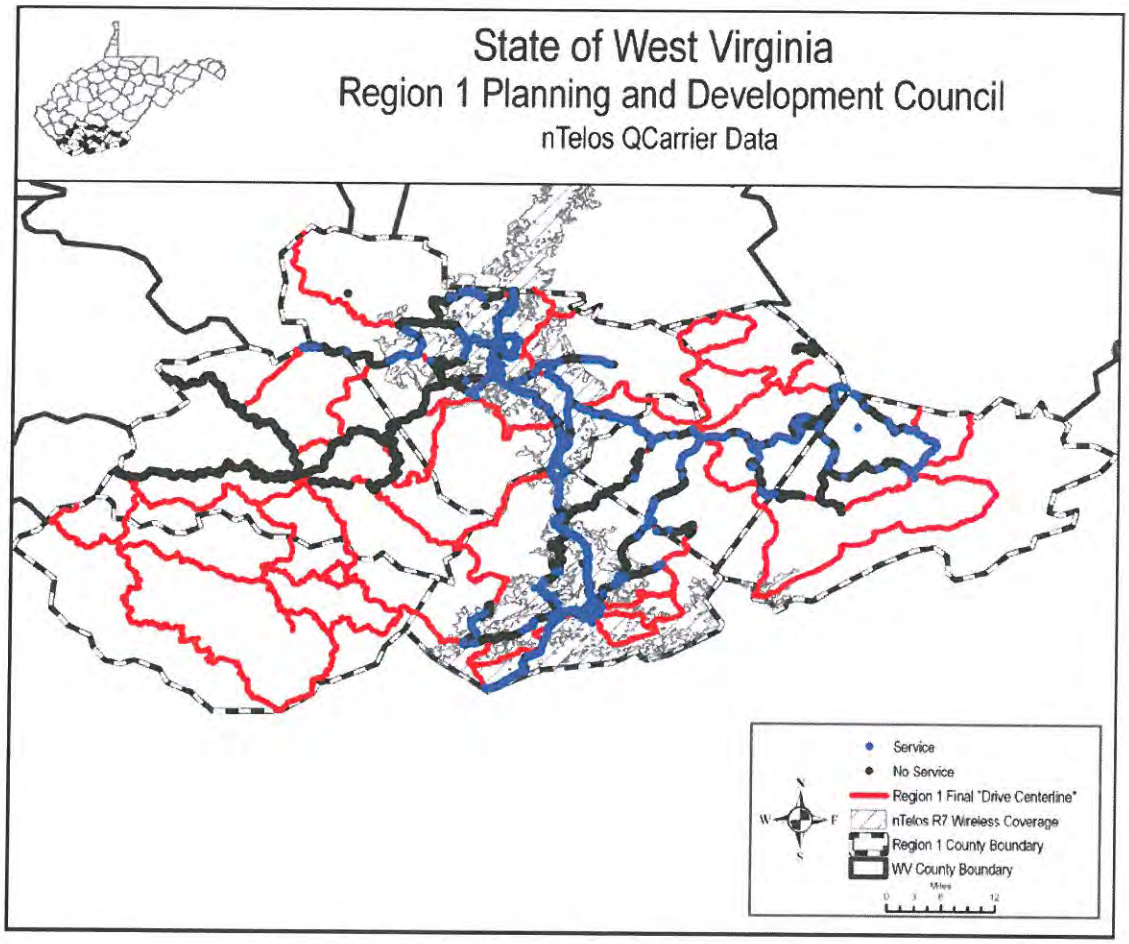

Figure 15—nTelos QCarrier Results, Based on EC/IO

2.2.3 US Cellular QCarrier Results

There were 6180 points plotted within the US Cellular network in Region 1. The signal strength ranged from -54 to -125 DBm. The EC/IO data ranged from -10 to -160. EC/IO data of -160 indicates areas where calls cannot connect, or calls are dropped constantly.[2] The final drive centerlines shown with no phone data overlaid indicate areas where

[2] http://www.telecomhall.com/what-is-ecio-and-ebno.aspx

the phone was not able to connect to a GPS satellite, had no cellular service, and was not able to track the location of the phone.

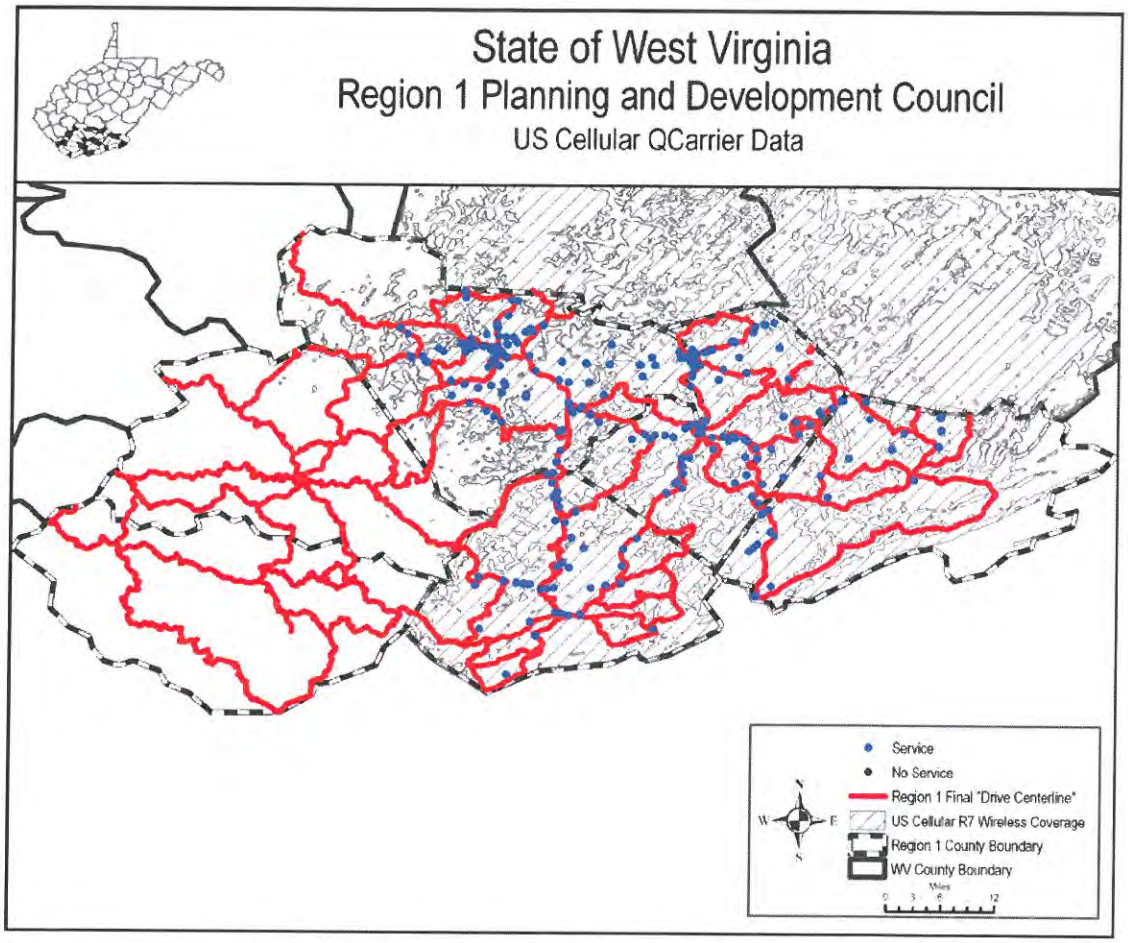

Figure 16—US Cellular QCarrier Results, Based on EC/IO

2.2.4 Verizon QCarrier Results

There were 27,859 points plotted within the Verizon network in Region 1. The signal strength ranged from -55 to -125 DBm. The EC/IO data ranged from -10 to -160. EC/IO data of -160 indicates areas where calls cannot connect, or calls are dropped constantly.[3] The final drive centerlines shown with no phone data overlaid indicate areas where the phone was not able to connect to a GPS satellite, had no cellular service, and was not able to track the location of the phone.

[3] http://www.telecomhall.com/what-is-ecio-and-ebno.aspx

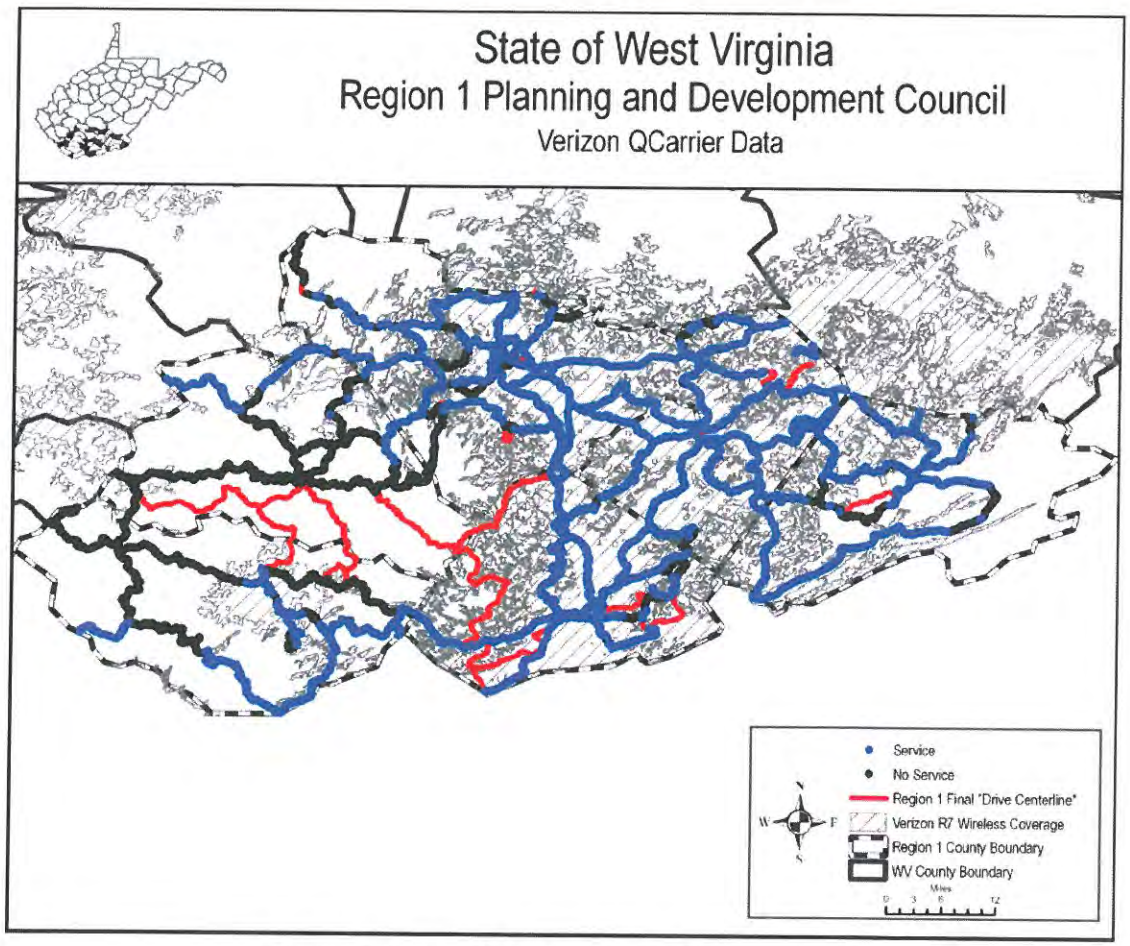

Figure 17—Verizon QCarrier Results, Based on EC/IO

2.3 West Virginia Broadband Mapping Survey Results

As requested by the Region, LR Kimball is providing a summary of participation results for the West Virginia Broadband Mapping Program's Broadband Survey program. Residents of West Virginia have been asked to provide feedback to the State regarding their broadband access. There are two surveys available. One is for broadband feedback, and one is to measure broadband speed at a specific location. The surveys are located at http://gis2.kimballdata.com/westvirginiaonline/WVBroadbandSurvey and http://gis2.kimballdata.com/westvirginiaonline/wvspeedtest. As of June 1, 2013, 272 residents participated in the survey by taking the broadband survey, 283 residents participated by taking the speed test and 142 residents provided user feedback through the broadband survey website. These results are on a statewide basis.

Region 1 had a total of 31 participants: nine provided user feedback, 14 took the broadband survey and eight took the speed test. Of the nine residents providing user feedback, seven indicated that the map shows that broadband is available, but in reality it is not available at their residence. The remaining two participants indicated "other." Providers listed for the broadband survey and speed test include Comcast, Frontier, Hughsnet, Lumos, Shentel, Suddenlink, USCC and Wild Blue. The majority of residents indicated that they had poor broadband service at their residence/business. Comments include the following:

- Tried Frontier DSL, but I'm at the 'end of their line' and barely got 2mb. Now have Wild Blue satellite. VERY spotty performance, MANY scheduled and unscheduled outages. VERY undependable.
- It's never as fast as it should be.
- My internet service provider stinks. My connection speed goes up and down like a yoyo. We have had numerous service calls. All of my neighbors have the same problem.
- Trying to watch videos or movies frustrate me. The constant buffering when I am on fullscreen is very aggravating. Especially for the price I pay every month.
- We would like very much to have broadband.
- Although suddenlinks fiber optic cable runs about 60 feet from my house, I am told that I would have to pay $2,000 for them to connect me and my neighbors (about 15 houses).
- I do have slow, frequently interrupted internet service at my home. I teach and I am often doing research for my classes rather than stay at school where I have the same problem.
- Although broadband is provided to both ends of my road, about 30 houses in the middle have no access. I was told that they (Suddenlink) would have to put a node in this area but won't.
- Its time for frontier to add broadband to our house.
- Had DSL from Frontier, but I'm at the 'end of the line' and barely got 2mb. Now I have Exede/Wild Blue. Service is expensive, very spotty and undependable. I have to re-boot all my equipment almost daily. They have constant unannounced 'scheduled outages'
- Frontier is awesome!

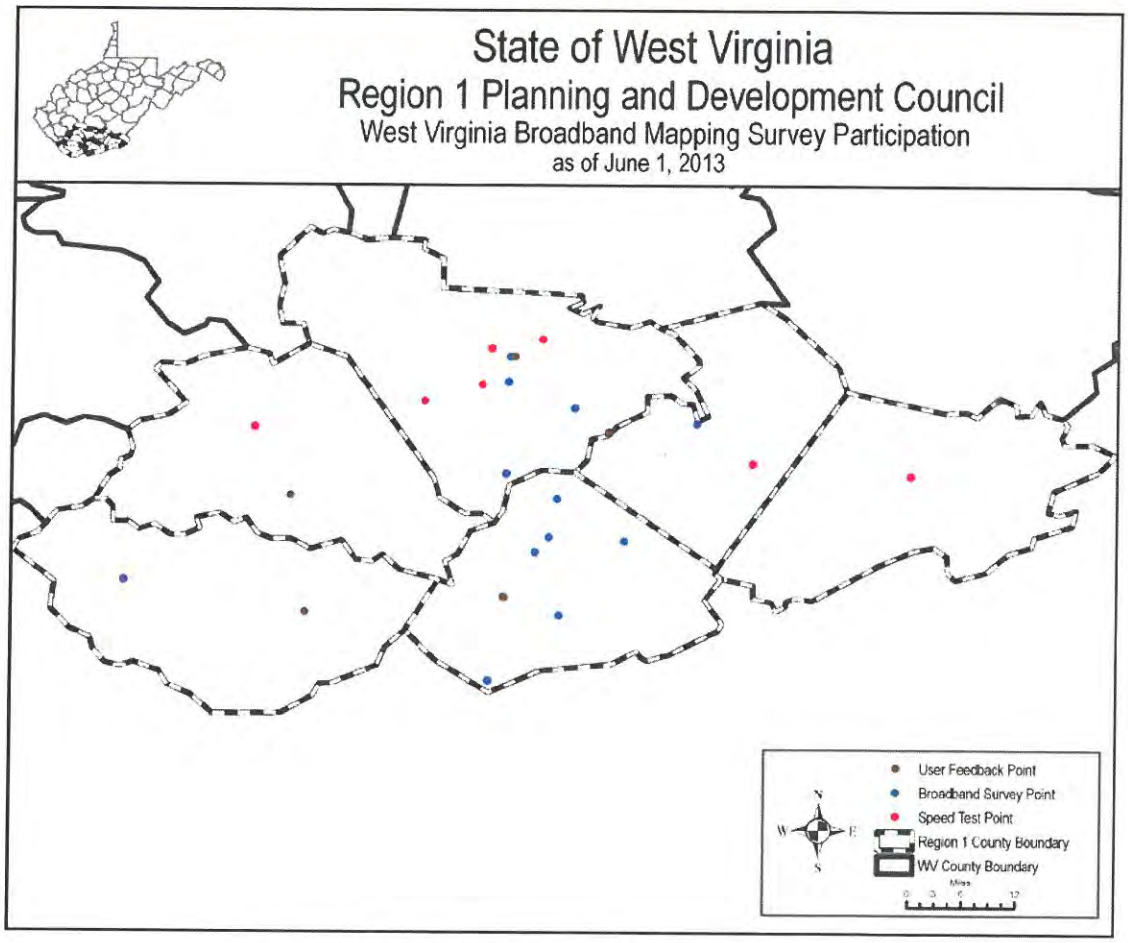

Figure 18—Broadband Survey Participant Locations

3. CONCLUSION

3.1 Carrier Connectivity

Carrier connectivity for the nTelos and Verizon networks proved to exist as anticipated with good coverage in the urban areas and poor to non-existent coverage in the rural areas of Region 1. Both carriers submitted acceptable designations of their coverage areas to the NTIA. Carrier connectivity for the AT&T and US Cellular networks proved to be poor in general, and showed discrepancies in reported coverage boundaries for both the urban and rural areas of Region 1.

3.2 Recommendations

There are several areas within Region 1 having very limited cell carrier connectivity. Unfortunately, the topography and demographics of this area of West Virginia is not conducive to the efficient construction of additional cell towers, as it would be difficult to reach a large number of potential customers with one tower. However, it is recommended that the region continue to look at other possible broadband technologies to build out last mile capabilities for residents within the region. Broadband technologies are described in more detail in the following section.

One of the most noted comments by L.R. Kimball field technicians throughout their drive-testing within the State is the lack of appropriate road name signage. It is highly recommended that the regional councils encourage their participating counties to erect street signs at each intersection according to addressing standards once county SAMB addressing data has been verified and approved by the United States Postal Service. The "West Virginia E9-1-1 Addressing Reference Guide, Version 2.1" contains guidelines regarding road signage, and should be used for reference.[4]

It should also be noted that several of the roads traveled during the drive-testing were found to not be suitable for non-four-wheel-drive vehicle use. Some SAMB road classification may need to be reviewed in some areas over time to assure road classifications meet the road types for dispatching vehicles as it may be difficult for emergency vehicles to travel some of these rural roads. Travelers unfamiliar with some of these areas following GPS-given directions could find themselves in a challenging, potentially dangerous road situation if assuming a road is a certain road classification.

3.3 Broadband Technologies

This section will give a high level overview of the different types of bandwidth transport mediums and types of service providers available in the industry today.

3.3.1 Cable

The Cable TV providers throughout the country have migrated and grown to be much more than simply video programming providers. The cable providers are now providing cable internet speeds much faster than DSL, satellite

[4] http://www.dhsem.wv.gov/gis/Documents/reference%20guide.pdf

and dial-up. Another advantage is in discounts that can be realized by the end user through bundled service offerings. These bundled services usually offer TV, high speed internet access and phone services.

The transport method to the end user is typically using fiber optic cables from the head end office at the cable company to a common fiber node in the field which is then converted to coaxial cable to the end user's location. This technology, in conjunction with other elements in the network, allows for high speed internet access to be a reality. With this technology the bandwidth speeds realized can be up to 50 Mbps.

The cable providers are improving as time goes by but consumers are more likely to lose cable service before traditional telephone service. One reason for this may be due to the standards followed by cable providers when installing the outside plant facilities. Poor weather conditions can cause outages.

In areas such as West Virginia, high amounts of rock and granite tend to make the installation of such outside plant facilities expensive to construct, making the offering non cost-effective for the provider.

3.3.2 Fiber Optics

Fiber Optic technology is used by nearly all providers to deliver the voice, video, and data included with high speed internet access. A very high level description of fiber optic technology is an electronic signal (traditional) that is converted to an optical signal through an optical transmitter. This optical signal will transmit through the optical fiber to an end point. In some areas of the country, a few of the local exchange carriers such as Verizon and AT&T have optical service to their residents. Optical gear is expensive to purchase for large networks and the cost of construction, like all outside plants, tends to be expensive to deploy.

The following table and scenario is provided by http://www.lageman.com/bandwidth.htm.[5] Using a file size of **1,000,000,000.00** bytes (1,000.00 Megabytes) the following download speeds are projected using standard calculations and demonstrating bandwidth use with a T1 (1.5Mbps) as the standard. Notice the faster OC speeds are ideal for voice, video, applications mirroring, and disaster recovery hot sites because the speeds of mirroring systems are relatively instantaneous.

128 K	128,000 bps	17:21:40	91% slower
256 K	256,000 bps	8:40:50	83% slower
512K	512,000 bps	4:20:25	66% slower
768 K	768,000 bps	2:53:37	50% slower
T1, DS-1	1.544 Mbps	1:26:21	BASELINE
T3, DS-3	44.736 Mbps	2:59	2,748% faster
OC-3	115.520 Mbps	51	9,973% faster
OC-12	622.080 Mbps	13	40,191% faster
OC-48	2.488 Gbps	3	161,040% faster
OC-192	10 Gbps	1	647,569% faster

Figure 19—Typical Download Speeds Using Standard Mediums

[5] http://www.lageman.com/bandwidth.htm

3.3.3 Digital Subscriber Line

Where typically delivered by the Local Exchange Carriers (LEC), which provide very reliable services, there is normally very little downtime using Digital Subscriber Line (DSL). The DSL services provided by the LECs are competitive in price to other service providers in the same market segment. DSL can be purchased at different speeds up to a maximum speed. DSL can use a medium transport for data over the existing twisted pair cabling.

Advertised bandwidth speeds for DSL are good and much better than dial-up services. DSL is typically delivered by the LECs over twisted pair facilities which may limit the through-put speeds desired. Extremely fast speed may require other types of services such as Asymmetrical Digital Subscriber Line (ADSL) and Symmetrical Digital Subscriber Line (SDSL), T-1, T-3 etc.

3.3.4 Wireless

Wireless technology uses radio waves as a medium of communication.

With consideration to the remote locations attempting to be serviced http://www.broadband.gov describes wireless broadband in the following five bullets:[6]

- Wireless broadband connects a home or business to the Internet using a radio link between the customer's location and the service provider's facility. Wireless broadband can be mobile or fixed.
- Wireless technologies using longer-range directional equipment provide broadband service in remote or sparsely populated areas where DSL or cable modem service would be costly to provide. Speeds are generally comparable to DSL and cable modem. An external antenna is usually required.
- Wireless broadband Internet access services offered over fixed networks allow consumers to access the Internet from a fixed point while stationary and often require a direct line-of-sight between the wireless transmitter and receiver. These services have been offered using both licensed spectrum and unlicensed devices. For example, thousands of small Wireless Internet Services Providers (WISPs) provide such wireless broadband at speeds of around one Mbps using unlicensed devices, often in rural areas not served by cable or wireline broadband networks.
- Wireless Local Area Networks (WLANs) provide wireless broadband access over shorter distances and are often used to extend the reach of a "last-mile" wireline or fixed wireless broadband connection within a home, building, or campus environment. Wi-Fi networks use unlicensed devices and can be designed for private access within a home or business, or be used for public Internet access at "hot spots" such as restaurants, coffee shops, hotels, airports, convention centers, and city parks.
- Mobile wireless broadband services are also becoming available from mobile telephone service providers and others. These services are generally appropriate for highly-mobile customers and require a special PC

[6] http://www.broadband.gov/broadband_types.html#wireless

card with a built in antenna that plugs into a user's laptop computer. Generally, they provide lower speeds, in the range of several hundred Kbps.

3.3.4.1 Cellular

Cellular Internet service is based on a cellular architecture that consists of a backbone network with fixed base stations interconnected through the wired public switched telephone network (PSTN).

3.3.4.2 Satellite

Satellite access is another type of wireless transport.

One should consider that satellite communications can be highly affected by atmospheric conditions as well as severe weather. Intermittent and sporadic interruptions are very possible.

Lower orbiting satellites are used today to provide many services to our population such as (but not limited to) communications and video transmission. Satellite broadband is also a key element in providing necessary links for delivering access to the end user. Although faster than dial-up one could realize speeds of 500 Kbps downstream and 80 to 100 Kbps upstream.

3.3.4.3 WiMAX

The network WiMAX is known as Worldwide Interoperability for Microwave Access and known to the technical community as IEEE, 802.16 (WiMAX). WiMAX is thought by many to be the technology that will deliver access to the majority of the population in the near future. WiMAX is an option when considering the last mile connection to the end user.

The data rates are 30 to 70 Mbps. A 30 mile radius for access is possible. WiMAX provides qua broadband access and has a very high penetrability, in that the microwaves it emits can be accessed by nearly every point in its coverage area. Access is from fixed or mobile devices, desktops at home or work, smart phones etc. VoIP is possible as well.

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APPENDIX A—QOS SOLUTIONS ANDROID APPLICATIONS

The QoS Solutions Android Applications can be found on the following pages.

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Instructions for Running QoS Solutions Android Applications

The applications will be sent to you as attachments in an email from qos-solutions.com or from your account administrator.

Please review the Download and Installations Document for further information.

QCarrier

QCarrier will automatically create a file each time it starts on the SD Card of your phone. The app will automatically create records every 10 seconds or whenever the signal changes. The file size will not show up until the file exceeds 1MB.

QWiFi

QWiFi is designed for locating and recording WiFi services. It also creates a file on the SD card each time it starts.

QPerf

QPerf is designed to measure the carriers connectivity. It is recommended that you hit the Menu Button and turn off WiFi so that you measure the carrier's performance and not WiFi. You should remain in the same location until it completes.

QPerf will run every 5 minutes until you stop or exit the program. QPerf does not record any data locally. All data is sent to the QoS website for downloading.

QMapper

QMapper is designed for those locations such as downtown locations where GPS is unreliable. The application will download a map so that you can pinpoint your exact location and run any or all of the tests such as QCarrier, QWiFi and QPerf.

Q Carrier	
Field	Description
accuracy	accuracy of the fix in meters
carrier_cid	cell id in GSM, UNKNOWN_CID if in UMTS or CDMA
carrier_lac	Location Area Code in GSM, UNKNOWN_CID if in UMTS or CMDA
date_stamp_date	They calendar day of the measurement..
date_stamp_hours	The hour of the measurement.
date_stamp_minutes	The minutes into the hour of the measurement.
date_stamp_month	The numeric month of the measurement.
date_stamp_seconds	The seconds into the minute of the measurement.
date_stamp_time_zone	The time zone (hours +/- GMT) of the measurement.
date_stamp_year	The year of the measurement.
latitude	Phone latitude
longitude	Phone longitude
newtwork_type	The carrier type of network
phone_type	CDMA or GSM
remote_id	The IMEI of the phone
signal_level	The strength of the signal, measured in either RSSI (for GSM phones) or dbm (for CDMA and EVDO) phones
sim_operator_name	Provider name
Phone_Name	MBI Calculated field

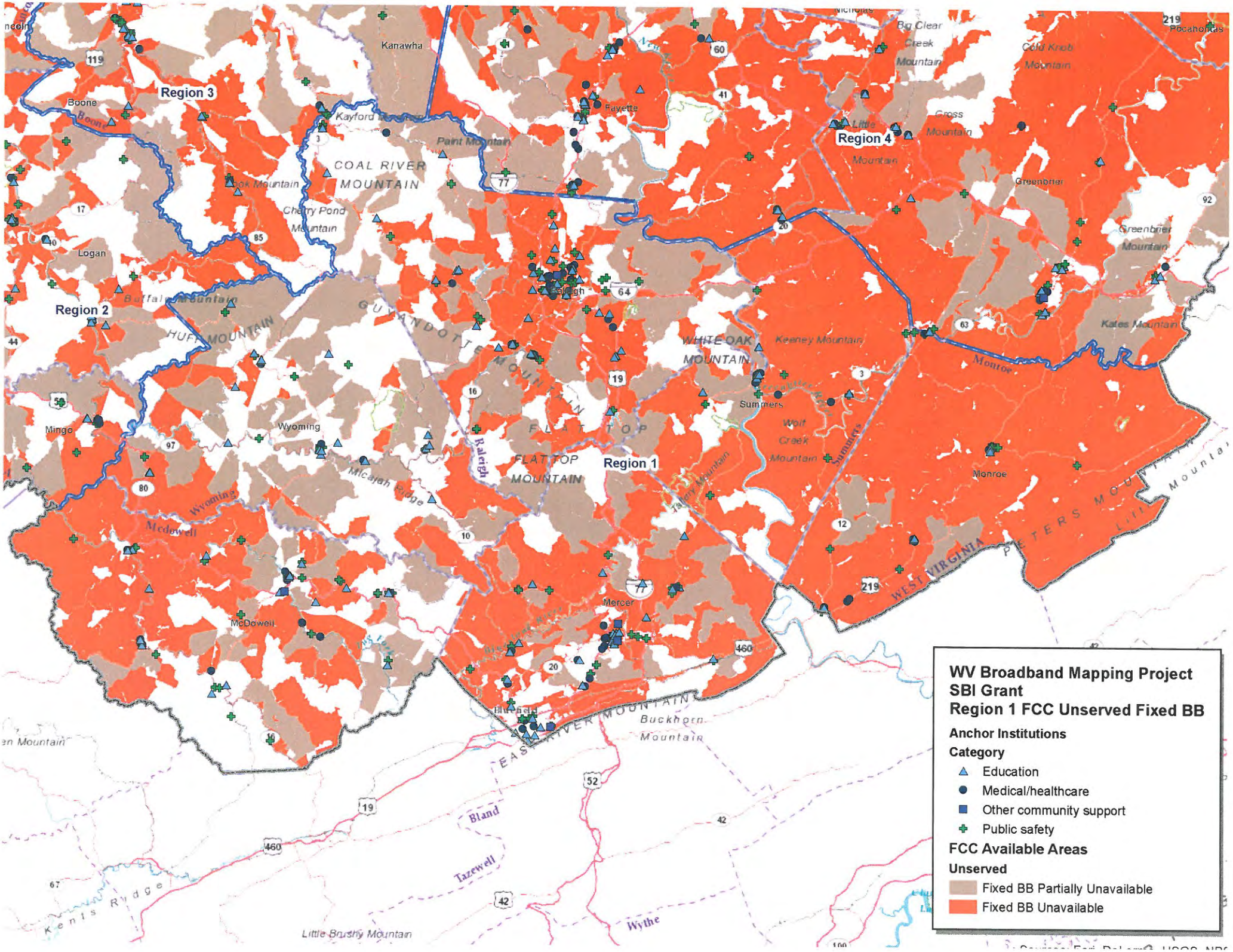
Route	MBI Calculated field

Q Perf	
Field	Description
Timestamp	Date and Time from QPerf.
_Location	The phone that data was gathered from.
_Internal_IP	In a NAT environment, this is the IP address of the device which would be different from the External IP
_External_IP	This is the IP address of the device as seen from the internet
_Latitude	Phone Latitude
_Longitude	Phone Longitude
_Inbound_Jitter__msecs	This is a measure of the variance in interarrival packet delays calculated according to RFC 1889
_Inbound_Dropped___	Packets dropped from server to phone.
_Inbound_Out_of_Order___	Packets which arrived at phone not in the order sent from server
_Outbound_Latency__msecs	This is calculated as the average round trip time of a set of UDP packets sent to the server and returned to the device.
_Outbound_Jitter_msecs	This is a measure of the variance in interarrival packet delays calculated according to RFC 1889
_Outbound_Dropped___	Packets dropped from phone to server.
_Outbound_Out_of_Order___	Packets which arrived at server in not in the order sent from phone
_Inbound_Bandwidth_kbps_	This is calculated using the total number of data bytes received * 8 / time to completion
_Outbound_Bandwidth_kbps_	See above
_Target	Qperf.net
_UDP_TOS_	These settings are available in the NetQualtiy Analyzer to enable testing based on TOS Values typically used in carrier MPLS networks for prioritizing traffic
_TCP_TOS	See above
Provider	MBI Calculated field

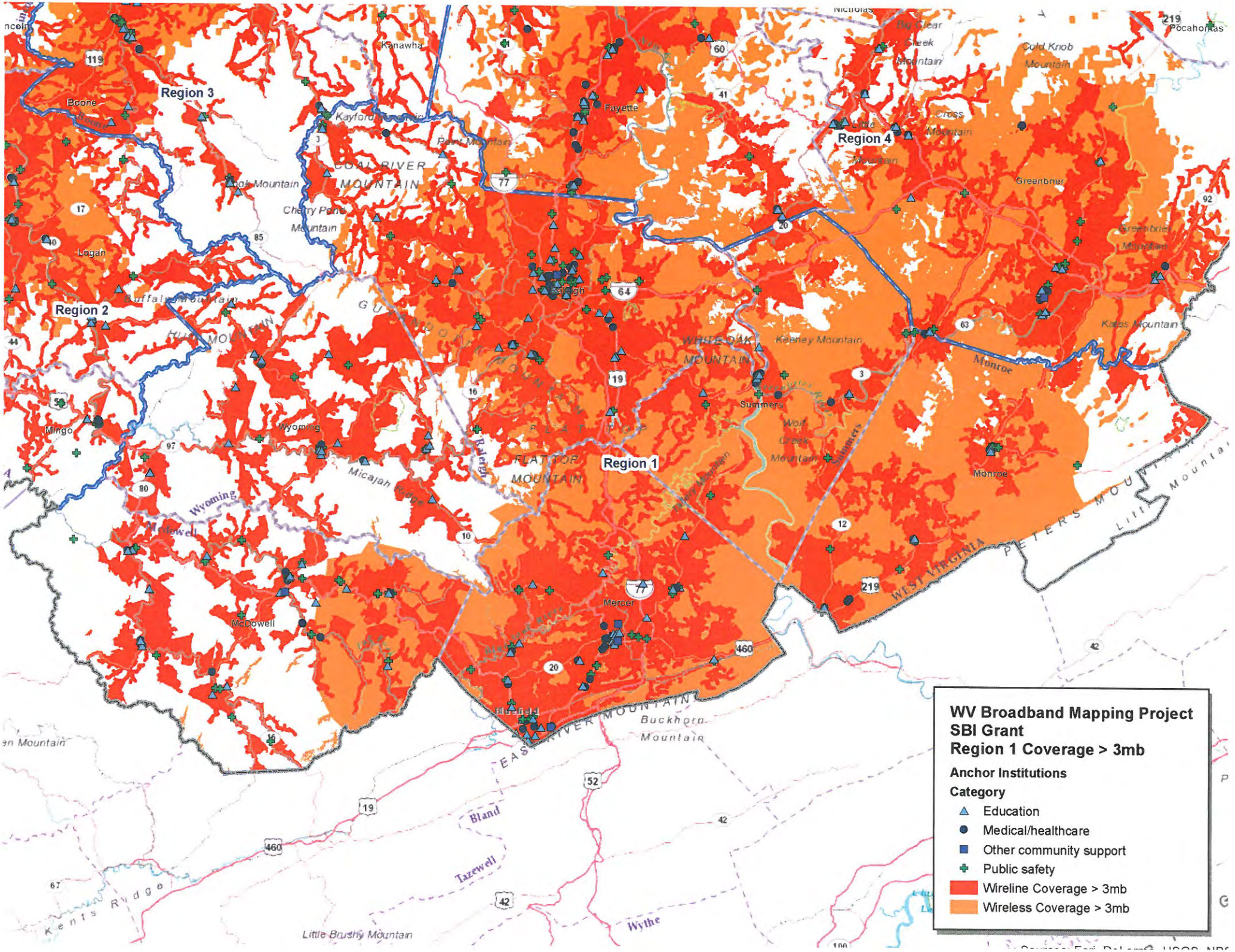
Route	MBI Calculated field
YEAR	MBI Calculated field
MONTH	MBI Calculated field
DAY	MBI Calculated field
MINUTES	MBI Calculated field
HOUR	MBI Calculated field
Upstream_Req_Met	MBI Calculated field. Value is 1 if the [_Outbound_Bandwidth_kbps_] value greater than 200
Downstream_Req_Met	MBI Calculated field. Value is 1 if the [_Inbound_Bandwidth_kbps_] value greater than 786

Q Wifi	
Field	Description
hours	Timestamp Hours
minutes	Timestamp Minutes
Seconds	Timestamp Seconds
time_zone	Time Zone of Phone
Remote_iD	Phone IMEI
latitude	Latitude in Degrees
longitude	Lontitude in Degrees
accuracy	Accuracy of GPS fix in meters
ssid_name	SSID Name
ssid_id	Numeric ID of SSID
ssid_capabilities	SSID Capabilities
ssid_frequency	SSID Frequency
ssid_level	The detected signal level in dBm

Appendix D


Region 1
Region 2
Region 3
Region 4
Kanawha
Boone
Logan
Wyoming
Mingo
McDowell
Mercer
Fayette
Summers
Monroe
Greenbrier
Pocahontas
COAL RIVER MOUNTAIN
Paint Mountain
Cherry Pond Mountain
Buffalo Mountain
HUFF MOUNTAIN
GUYANDOTTE MOUNTAIN
FLAT TOP MOUNTAIN
WHITE OAK MOUNTAIN
Keeney Mountain
Wolf Creek Mountain
Big Clear Creek Mountain
Cold Knob Mountain
Cross Mountain
Greenbrier Mountain
Kates Mountain
PETERS MOUNTAIN
EAST RIVER MOUNTAIN
Buckhorn Mountain
Little Brushy Mountain
Kents Ridge
Bland
Tazewell
Wythe
Raleigh
Summers
Monroe
WEST VIRGINIA
WV Broadband Mapping Project
SBI Grant
Region 1 FCC Unserved Fixed BB
Anchor Institutions
Category
Education
Medical/healthcare
Other community support
Public safety
FCC Available Areas
Unserved
Fixed BB Partially Unavailable
Fixed BB Unavailable

Appendix E


Region 1
Region 2
Region 3
Region 4
WV Broadband Mapping Project
SBI Grant
Region 1 Coverage > 3mb
Anchor Institutions
Category
Education
Medical/healthcare
Other community support
Public safety
Wireline Coverage > 3mb
Wireless Coverage > 3mb
Kanawha
Fayette
Boone
Logan
Mingo
Wyoming
McDowell
Mercer
Summers
Monroe
Greenbrier
Pocahontas
Bland
Tazewell
Wythe
Buckhorn Mountain
Little Brushy Mountain
COAL RIVER MOUNTAIN
FLAT TOP MOUNTAIN
WHITE OAK MOUNTAIN
EAST RIVER MOUNTAIN
PETERS MOUNTAIN
WEST VIRGINIA

Appendix F

Dear Editor,

Satellite is not Broadband! In "Broadband Expansion in Monroe County", July 25 Watchman, it is stated that "satellite-delivered service – Frontier Broadband – that is ideal for many …". While satellite may be OK for social needs, (facebook, etc.), it is not adequate for a serious business that needs VPN (Virtual Private Network) to function. The problem with satellite is not the upload or download speeds. The problem is the "ping", which is the time for the signal to cycle through the network (handshaking, etc.). While the "ping" signal typically travels a few miles for land-based, in satellite it has to travel an "extra" 45,000 miles in a round trip to outer space and back, significantly increasing the "ping", eliminating serious business VPN applications and applications requiring rapid interactions. If it rains or snows, you are out of luck. I do hope the intent of Connect America will be honored. Rural businesses need REAL broadband, not satellite!

Dana Olson

One mile from a DSL service.

Notice of Public Meeting

Gap Mills Community Center will have a public meeting and open house on Thursday, August 1st at 7:00pm. All interested persons are urged to attend.

Family Movie Night

Family movie night at Alderson Alumni Park, Friday, July 26th at 8:00pm. Free admission, bring blankets or chairs, popcorn and drinks will be provided.

Gospel Convention

The 63rd Annual West Virginia Mountain State Gospel Singers Convention will be held July 21-28.

The Convention grounds are located 5 Miles South of Summersville, Nicholas county, off Rt 19, follow Rt 129 East

For more information or a schedule of events, visit the web site at www.wvgospelsing.com or call 304-872-1977.

Broadband Expansion in Monroe County

Frontier Communications has extended broadband service to residents and businesses in the Gap Mills and Sinks Grove areas of Monroe County, according to General Manager Mike Swatts, who added the project was made possible through subsidies from the federal Connect America Fund (CAF).

The Federal Communications Commission (FCC) has said broadband service is necessary for citizens to seek full participation in the nation's economy and society. To expand broadband service, the FCC transformed the telephone-focused Universal Service Fund (USF) into the CAF.

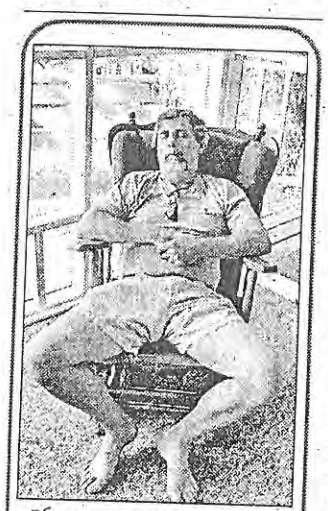
"Frontier has invested its own resources in developing broadband service in West Virginia and also is taking advantage of CAF to accelerate broadband build-out in rural areas that need access to robust broadband infrastructure," Swatts said. "These new broadband connections give more West Virginia families and businesses access to the myriad services available online."

Monroe County Clerk Donald J. Evans said he and the County Commission appreciate Frontier's continued commitment to invest the necessary funds to bring broadband to the unserved areas of Monroe County. Evans went on to say that the County Commission has experienced a very positive relationship with Frontier and looks forward to continue to work with the company in bringing this vital service to the residents of Monroe County.

Swatts encouraged residents to call 1-800-921-8101 toll-free for information about their service options. Customers have an opportunity to bundle broadband service with telephone and television services and realize substantial savings. Swatts said residential customers ordering Frontier broadband for the first time can start at just $19.99 per month with a qualifying phone service. The no-contract offer provides a three-year price guarantee for broadband service.

Since acquiring Verizon properties in 14 states in July 2010, Frontier has invested more than $300 million to improve, strengthen and expand its communications network in West Virginia. Frontier has increased broadband access since July 2010 to 162,000 additional West Virginia households – from 62 percent of households in the acquired markets to 87 percent today.

Swatts said Frontier also offers a satellite-delivered service – Frontier Broadband – that is ideal for many households that do not have access to land-based broadband service. He added that Frontier Broadband residential service delivers an impressive array of speeds that allow customers to stream video and use other high bandwidth applications – up to 5 Mbps download/1 Mbps upload to 15 Mbps download/2 Mbps upload.



If you see Seven at Zenith, don't wake him up. He is on vacation.

Make a Difference RECYCLE

A Special Thanks

We would like to sincerely thank all our family and friends for the prayers, visits, calls, food, cards and support during the sudden loss of our loved one. A special thank you to Pastor Mark Shafer and his family for the beautiful service. Union Memorial Baptist Church for the food, Ann, Carol, Frances, Martha, Danny, Richard and Groves Funeral Home for their special help. Your continued prayers are appreciated.

The Family of Janie Martin

Card Of Thanks

My eternal gratitude to everyone for the prayers, visits, cards, food and money during the illness and death of my daughter, Darlene C. Bailey. To Debbie Boggs for her shoulder to cry on and arms to lean on during this time, and before, during and after the service. To Gary Winebrimmer, Kathy Helvey, Mark and Marva Smearman for the special music and words that brought a tear and a smile. To the ladies of Bruffey Methodist Church for the wonderful meal. To Bob and Carol Groves for their support and kindness. God bless each and everyone.

Doris C. Love

S.C. Boy Scouts build gazebo at historic McNutt House

By KATE COIL
Bluefield Daily Telegraph

PRINCETON — A troop of Boy Scouts from South Carolina received a warm welcome from local residents as they spent much of the day Monday working around downtown Princeton.

A troop from the Columbia, S.C., area found themselves working at the McNutt House in Princeton, cleaning up debris and building a new gazebo. Local residents driving by the scene honked their car horns and waved at the group as they passed by. Monday marked the fourth day of the 2013 Boys Scouts of America National Jamboree Day of Service Initiative.

Robert Farley, executive director of the Princeton-Mercer County Chamber of Commerce, said the troop had already accomplished a lot despite only being in Princeton for three hours.

"They are a good group of kids," he said. "They have been very friendly. They have great personalities and they all just jumped right in. We have 36 kids here, so when you put them to work they get a lot done quickly."

Patrick Westcott, a Scoutmaster with the group, said the Scouts took a five-hour bus drive up from South Carolina to participate in the jamboree.

"The weather is a lot similar to back home, though the temperature in the evenings is cooler," he said. "We've been staying busy the entire time we've been here. There is a lot to do at the Summit like ziplining, whitewater rafting and shooting bows and arrows. They are getting to meet kids from other states and there are some international scouts there from Canada, Puerto Rico and Korea. Trading council patches and stripes has been another big activity for the kids."

Westcott said the large scale of community service projects taking place throughout southern West Virginia is impressive.

"I think it's great and the guys were very excited to get to do a project," Westcott said. "We always try to do service projects at home and try to do as many as we can. This is probably the grandest scale these projects have been done on."

Zachary Jordan, 15, said the project had gone really smoothly for the troop.

"The project is going a lot quicker than I thought it would," he said. "The way it is set up, all the pieces fit together easily. Once we figured out how to put things together it went by very fast."

While he had fun working in Princeton, Jordan said he and his fellow Scouts have also been partaking in a lot of the activities offered at the Summit.

"I think my favorite thing we've done so far is climbing up to the actual Summit," he said. "You have to take one of four trails up to the top and the one we did was about 5 or 6 miles. There was a lot of stuff to do up there. I thought it was just going to be an observation deck, but they had highland games, an Indian Village and a pioneer village. They let people make their own hammers and tomahawks. That was a lot of fun."

Jacob Newiswonger, 14, said the jamboree more than met his expectations.

"This is my first jamboree and its even more than what I was expecting," he said. "It's making history. We've had fun doing the projects and I'm grateful we get to do them. There is a lot to do at the Summit, too. There are a lot of people doing ziplining and rock climbing. There is also Brown Sea Island, which shows what one of the first big Boy Scout campouts was like. I've met guys from Missouri, New Mexico, New York and Chicago. It's been a great meeting a lot of people from all over."

Scouts were also at work at the New River Community and Technical College in Princeton and other locations throughout Mercer County. Scout troops were also working at in Landgraff and Welch in McDowell County.

— Contact Kate Coil at kcoil@bdtonline.com

Broadband service expanding into Monroe

Staff reports

UNION — Broadband service will be expanded for Frontier Communications customers in Monroe County.

The company announced Monday it has recently completed expansions into the Gap Mills and Sinks Grove area of Monroe County through federal subsidies provide from the Connect American Fund. The fund is made possible through a Federal Communications Commission (FCC) project with the aim of bringing broadband to all citizens so they can better participate in the nation's economy and society, according to Frontier General Manager Mike Swatts.

"Frontier has invested its own resources in developing broadband service in West Virginia and also taking advantage of CAF to accelerate broadband build-out in rural areas that need access to robust broadband infrastructure," Swatts said. "These new broadband connections give more West Virginia families and businesses access to the myriad of services available online."

Monroe County Clerk Donald J. Evans said he and the county commission appreciate bringing the new services to the county.

"We appreciate Frontier's continued commitment to invest the necessary funds to bring broadband service to the unserved areas of Monroe County," Evans said. "The county commission has experienced a very positive relationship with Frontier and looks forward to continue to work with the company in bringing this vital service to residents of Monroe County."

Residents seeking more information about newly available services can contact Frontier at 1-800-921-8101.

WVa. schools to participate in digital math study