

Report to the General Assembly on Broadband and Wireless Deployment December 15, 2014

Introduction

Vermont statute directs the Secretary of Administration or his designee to report to the General Assembly on broadband and wireless deployment. Specifically, 30 VSA § 2222c(b)(1) indicates that on or before December 15, 2014, the Secretary shall report to the General assembly to include the following:

- A. The areas served and the areas not served by broadband that has a download speed of at least 0.768 Mbps and an upload speed of at least 0.2 Mbps.
- B. The areas served and the areas not served by broadband that has a combined download and upload speed of at least five Mbps.
- C. The areas served and the areas not served by wireless communications service.

In addition, 30 VSA § 2222c(b)(2) prompts estimates as can reasonably be identified of the cost to:

- A. Provide broadband that has a download speed of at least 0.768 Mbps and an upload speed of at least 0.2 Mbps to areas not served by such broadband.
- B. Provide broadband that has a combined download and upload speed of at least five Mbps to areas not served by such broadband.
- C. Provide wireless communications service to the areas identified under subdivision (1)(C) of this subsection as not receiving such service.

This report contains the specified information.

Methodology

The State of Vermont was the recipient of a \$3.5 million grant from the National Telecommunications and Information Administration (NTIA) to gather broadband availability information for the National Broadband Map. This grant was provided by the NTIA to the Vermont Broadband Mapping Initiative (BMI), which includes the Vermont Center for Geographic Information (VCGI), the Vermont Department of Public Service (PSD), and the Vermont Telecommunications Authority (VTA). The PSD contracted with Stone Environmental for certain data processing support under the grant.

The BMI has collected broadband availability information from broadband service providers twice annually, as of June 30, and December 31. Once the information is received, the team prepares a matrix that lists, for each service provider, whether service is available at each business and residential location identified by the Vermont E-911 Board.

Areas served at 768/200 kbps

The BMI analyzed the data showing service as of 6/30/14. **This data indicates that of the 295,065 business and residential locations in the state, broadband service is presently available at all but 601 locations.** Information showing the number of locations that are served and projected to be served on a county basis is included in Appendix 1.

The BMI analyzed the locations on a census block basis, and sorted these into two groups. One group contains census blocks where all locations in the census block are served. The second group contains census blocks with locations that are not presently served. This map is included in Appendix 2.

No attempt has been made to identify the cost to deploy networks that can provide broadband with speeds of 768/200 to these locations for the simple reason that projects in process are in place to reach all of these locations.

Areas served at 5 mpbs

Analysis of availability of service at certain speeds is considerably more difficult. This is because in many instances, service providers, specifically DSL providers, cannot tell what services are available at a specific location at the broad scale of analysis required for this sort of project. **The BMI developed an approach to estimate availability of services at 4 Mbps down and 1 Mbps up in the Vermont 2014 Telecommunications Plan (the Plan) ; and the resulting information is adopted in this report.** In this approach, locations served (or to be served) at 4/1 include those that are: served by cable or fiber, served by a rural telephone company, or subject to an FCC CAF Phase I award. **Of the 295,065 business and residential locations in the state, 229,249 locations have access at 4/1 or better while 65,816 lack access at 4/1.** A breakdown of this information by county is listed in Appendix 7. In the analysis performed for the Plan, the areas that lack 4/1 fall into the 768/200 speed tiers: Areas that are

completely unserved at 4/1 are eligible for federal support under the FCC CAF Phase II program, areas that are partially served are not.

The *Plan* also includes information about the costs of deploying broadband. Specifically the *Plan* describes three methodologies to estimate the costs of deploying fiber to the premises (FTTP) networks. These include estimates based on the experience of a.) over 200 projects as described in a report prepared by a group of Nebraska telephone companies (Nebraska), b.) the Vermont Telephone Company (VTel), and c.) the FTTP project of ECFiber (ECFiber). Each of these methodologies addresses only the cost of deployment and is not based on a business model analysis. For more information about these cost estimation methodologies refer to Chapter 4 of the *Plan*.

The table below depicts the number of Vermont business and residential locations that fall into various speed tiers. It also indicates the cost to build FTTP networks to serve these areas based on each of the three cost methods.

Cost Estimates

Speed Tier	Locations	Miles	Nebraska	VTel	ECFiber
100/100	27,574	1,719			
100/10	178,767	6,599	\$878M	\$347M	\$337M
4/1	22,908	1,814	\$125M	\$95M	\$66M
768/200 CAF II	37,570	4,727	\$228M	\$249M	\$151M
768/200 No CAF II	28,246	3,314	\$168M	\$174M	\$108M
Total	295,065	18,173	\$1,399M	\$866M	\$662M

The BMI analyzed the census blocks in which these locations lie, and grouped them into three categories. The map depicting the resulting information is in Appendix 3. Census blocks that are completely served at 4/1 are depicted in green. Census blocks that are partially served at 4/1 are depicted in yellow. Census blocks that are completely unserved at 4/1 are depicted in red. Census blocks eligible for CAF Phase II are depicted with cross hatching.

The cost figures listed in the table offer the estimates as can reasonable by identified, of the cost to provide broadband that has a combined upload and down load speed of at least 5 Mbps to locations not served by such broadband. Additional information, including the number of miles, the number of locations, and the estimated costs, on a county basis, is offered in the 2014 Telecommunications Plan.

FCC Cost model

The FCC is in the process of developing a complex methodology to determine support for telecommunications companies offering service in high-cost areas. The FCC employs a complete business model analysis that takes into account costs and revenues over a long period. The model presently under consideration projects that there are 28,921 eligible locations in the eligible census

blocks in Vermont. The support calculated by the model for these locations amounts to \$8,320,923 per year. This amounts to \$1,726.27 per location, or \$24 per location per month.

As described above, there are 28,246 locations that lack access at 4/1 but are not eligible for support from the FCC because they are in partially served census blocks. If support were offered at the same rate of \$24 per location per month for these locations, this would cost \$8,134,848 per year.

Areas served by wireless Communications

Some wireless service providers submit coverage maps to the Department of Public Service with their cellular annual reports. Some offer coverage maps to the Broadband Mapping Initiative in response to the twice yearly availability inquiry. All of this information is subject to confidentiality claims. In addition, since the maps are created by the individual companies, the assumptions used in their creation are unknown and not necessarily consistent. In response to this situation, the BMI contracted with Pericle Communications in 2013 to analyze wireless communications in the state. Pericle created a model to predict wireless communications availability based on consistent assumptions, using publicly available information. First Pericle identified tower locations by reviewing Act 250 petitions, 248a petitions, and other data sources. Then Pericle created an initial projection of predicted coverage. Pericle performed a drive test by driving all state highways. The results of the drive tests were used to verify the results of the model, and where necessary, make adjustments to the model. Finally, Pericle offered a set of projected coverage maps for each mobile wireless communications company. These projections are in the form of a two-tone map, with pixels of approximately 2 acres (about 300 ft x 300 ft). The shaded pixels depict areas where wireless coverage is predicted to be available using a wireless handset outdoors in good weather.

The Department contracted with Stone Environmental to process the information prepared by Pericle. Stone first aggregated the coverage maps from all service providers into a single aggregated coverage map. This map is included in Appendix 4. Stone then did further analysis of the data. First, for each Vermont E-911 business and residential location, Stone identified whether it was within the projected aggregate coverage area or not. Stone then prepared summary statistics, on a town and county basis, depicting the percentage of locations with and without service. These statistics are depicted in Appendix 5. Second, Stone compared the roads in the state to the aggregate coverage map. This resulting map does not show the results of the actual Pericle road test, but instead shows the results of the Pericle model for all of the roads in the state. This road map is included in Appendix 6.

**Address Summary of 768/200 Broadband Service With Mobile by 2010 Census Block as of June 30, 2014
by County Release 8, December 13, 2014**

County Name	Census Blocks Currently Served ¹		Census Blocks Projects in Process ²				Total Addresses
	Currently Served Addresses ⁴	Percent Currently Served ⁵	Currently Served Addresses ⁴	Percent Currently Served ⁵	Projects in Process Addresses ⁶	Percent Projects in Process ⁷	
ADDISON	16,872	99.6%	59	0.3%	4	0.0%	16,935
BENNINGTON	19,265	96.6%	604	3.0%	80	0.4%	19,949
CALEDONIA	14,959	98.4%	234	1.5%	11	0.1%	15,204
CHITTENDEN	55,089	100.0%	-	0.0%	-	0.0%	55,089
ESSEX	4,025	81.5%	670	13.6%	246	5.0%	4,941
FRANKLIN	20,958	99.0%	214	1.0%	8	0.0%	21,180
GRAND ISLE	5,611	100.0%	-	0.0%	-	0.0%	5,611
LAMOILLE	11,724	97.7%	212	1.8%	59	0.5%	11,995
ORANGE	13,424	90.1%	1,383	9.3%	84	0.6%	14,891
ORLEANS	15,478	99.2%	99	0.6%	32	0.2%	15,609
RUTLAND	29,519	98.8%	358	1.2%	5	0.0%	29,882
WASHINGTON	25,891	100.0%	-	0.0%	-	0.0%	25,891
WINDHAM	26,243	97.1%	751	2.8%	44	0.2%	27,038
WINDSOR	30,552	99.0%	270	0.9%	28	0.1%	30,850
Total	289,610	98.2%	4,854	1.6%	601	0.2%	295,065

1. 'Census Blocks Currently Served' indicates census blocks with 100 percent broadband availability with mobile of 768/200 broadband service as of 6/30/2014.

2. 'Census Blocks Projects in Process' indicates census blocks with 100 percent broadband availability with mobile of 768/200 broadband service in the future according to forward looking datasets provided by service providers.

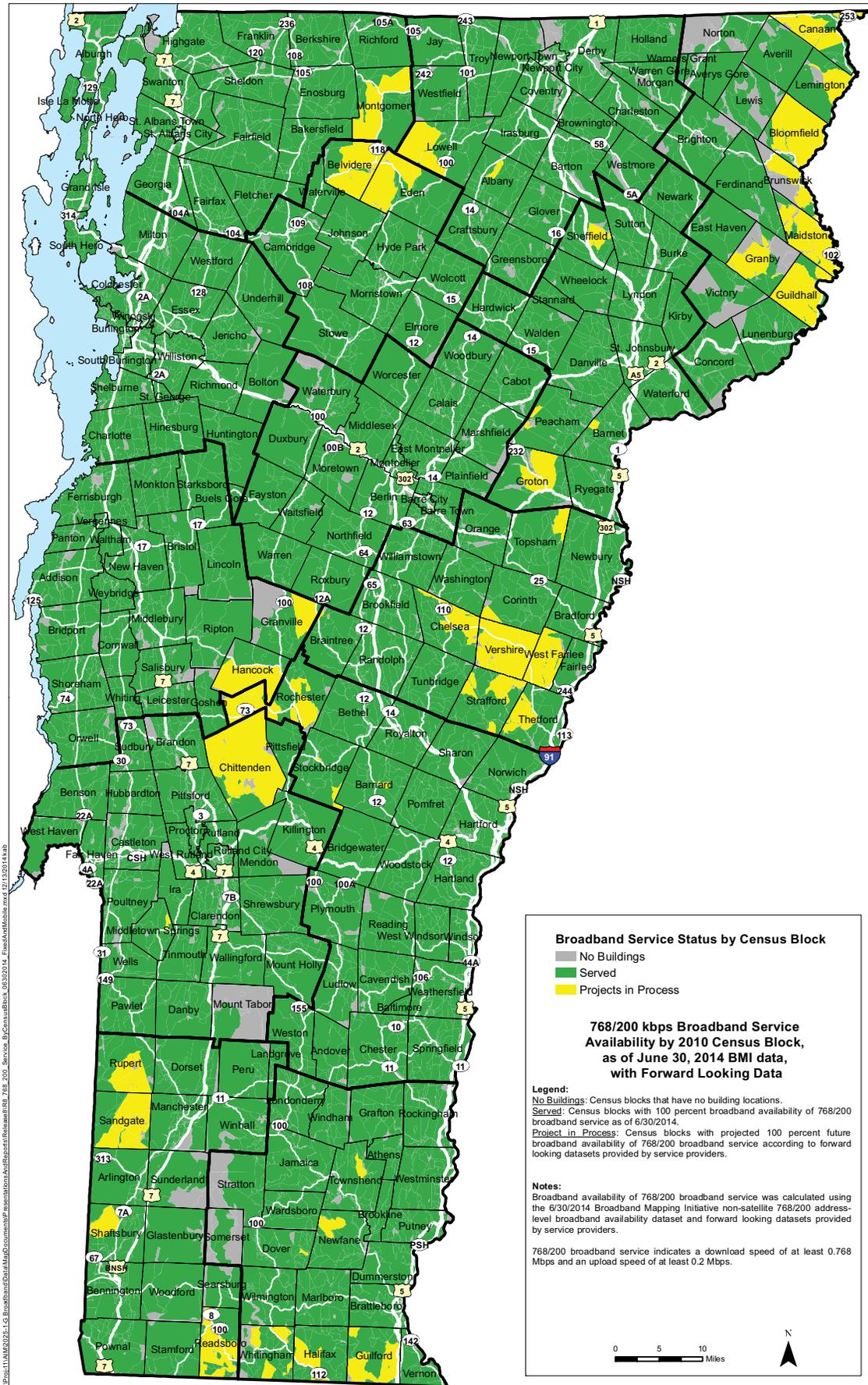
4. 'Served Addresses' indicates the number of building addresses currently served, as of 6/30/2014.

5. 'Percent Served' indicates the percent of building addresses currently served, as of 6/30/2014.

6. 'Projects in Process Addresses' indicates the number of building addresses unserved as of 6/30/2014, but to be served.

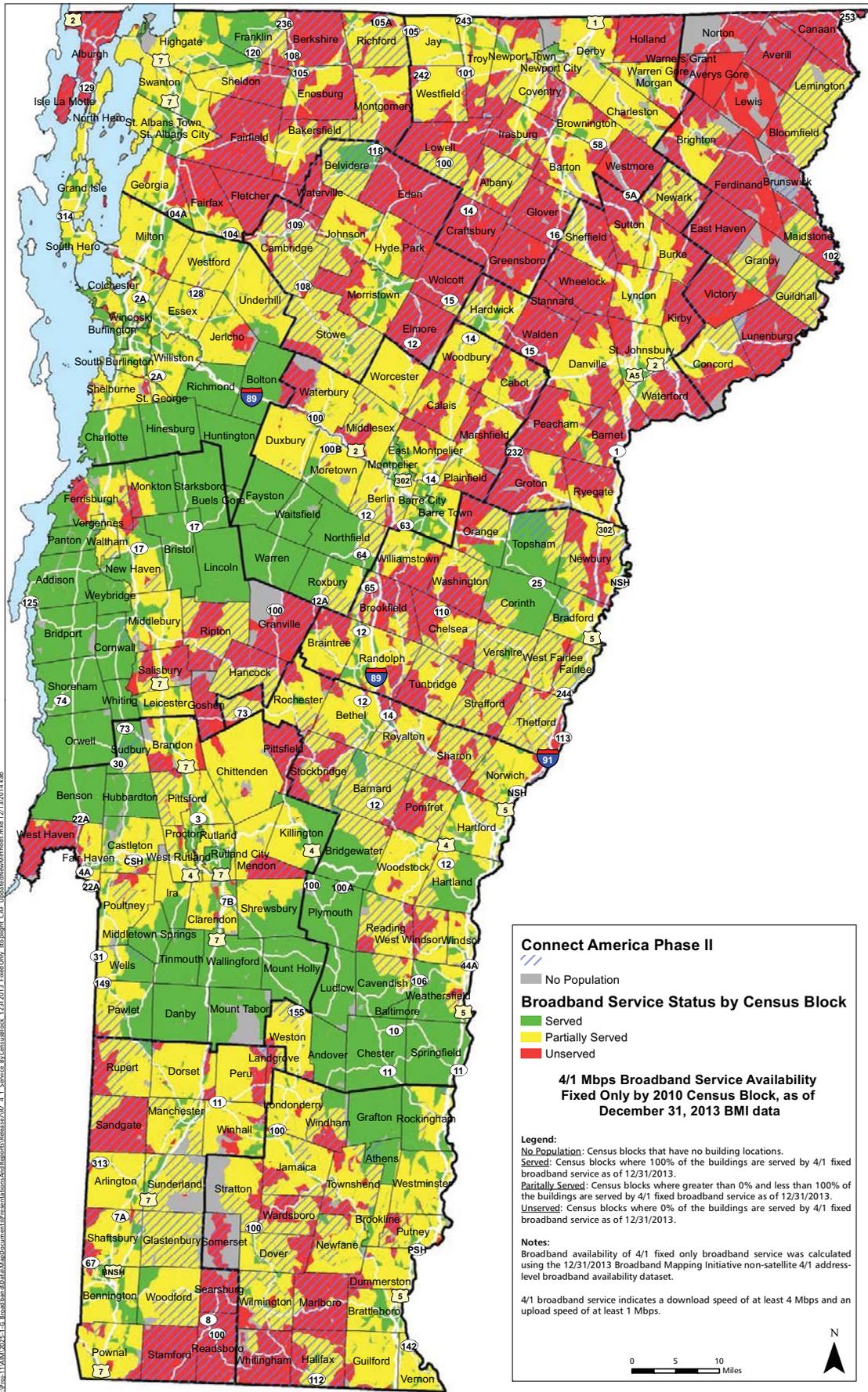
7. 'Percent Projects in Process' indicates the percent of building addresses currently unserved, as of 6/30/2014, but to be served.

Appendix 2
768/200 kbps Broadband Availability, Fixed and Mobile Served, Projects in Progress, and Target Communities Mapping Initiative Release 8



Sources: This dataset was developed by Stone Environmental using the non-satellite 768/200 address level fixed and mobile broadband availability dataset developed by the Broadband Mapping Initiative (BMI) and forward looking data. The BMI, a collaboration of VCGI, the VT DPS, and the VTA, is funded through a SBDD grant from the NTIA. Forward looking data was provided by broadband service providers; 2010 census blocks, US Census Bureau; Wire center boundaries, VCGI; Administrative boundaries, VCGI.

Appendix 3
4/1 Mbps Percent Broadband Availability With Fixed Only Service
Release 7



Sources: This dataset was developed by Stone Environmental using the non-satellite 4/1 address level fixed only broadband availability dataset developed by the Broadband Mapping Initiative (BMI). The BMI, a collaboration of VCGI, the VT DPS, and the VTA, is funded through a SBDD grant from the NTIA. 2010 census blocks, US Census Bureau; Wire center boundaries, VCGI; Administrative boundaries, VCGI.

**Address Summary of Wireless Voice Service as of September 2013 by County
January 17, 2014**

County Name	Currently Served Addresses ¹	Percent Currently Served ²	Currently Unserved Addresses ³	Percent Currently Unserved ⁴	Total Addresses
ADDISON	16,121	95.2%	814	4.8%	16,935
BENNINGTON	18,002	90.2%	1,947	9.8%	19,949
CALEDONIA	13,884	91.3%	1,320	8.7%	15,204
CHITTENDEN	54,849	99.6%	240	0.4%	55,089
ESSEX	3,358	68.0%	1,583	32.0%	4,941
FRANKLIN	19,549	92.3%	1,631	7.7%	21,180
GRAND ISLE	5,611	100.0%	-	0.0%	5,611
LAMOILLE	10,677	89.0%	1,318	11.0%	11,995
ORANGE	9,362	62.9%	5,529	37.1%	14,891
ORLEANS	13,761	88.2%	1,848	11.8%	15,609
RUTLAND	27,109	90.7%	2,773	9.3%	29,882
WASHINGTON	24,389	94.2%	1,502	5.8%	25,891
WINDHAM	24,602	91.0%	2,436	9.0%	27,038
WINDSOR	27,741	89.9%	3,109	10.1%	30,850
Total	269,015	91.2%	26,050	8.8%	295,065

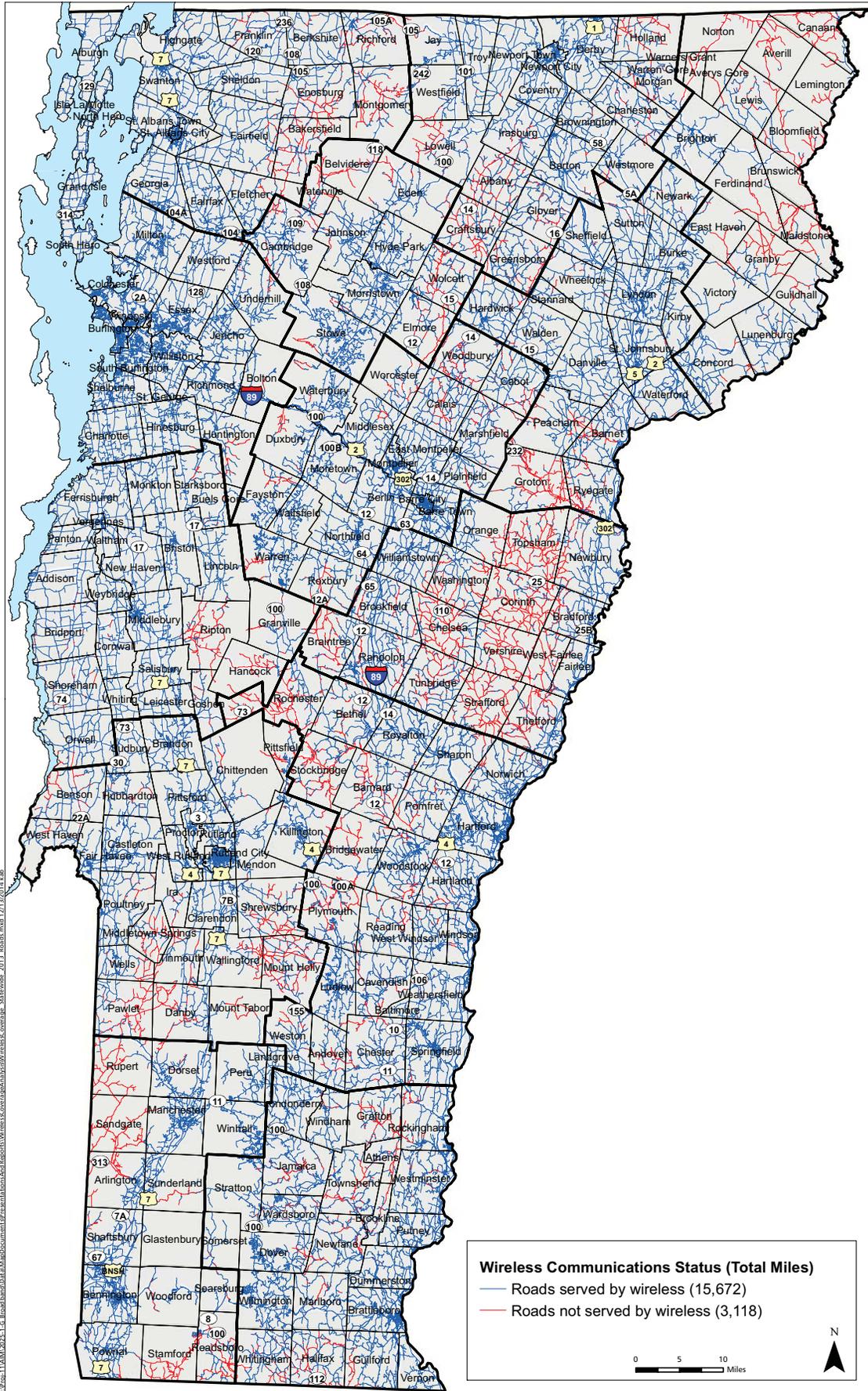
1. 'Served Addresses' indicates the number of building addresses currently served, as of September 2013.

2. 'Percent Served' indicates the percent of building addresses currently served, as of September 2013.

3. 'Unserved Addresses' indicates the number of building addresses currently unserved, as of September 2013.

4. 'Percent Unserved' indicates the percent of building addresses currently unserved, as of September 2013.

Appendix 6
Wireless Communications Service by Road Segment
2013



Sources: This dataset was developed by Stone Environmental using wireless communications coverage data developed by the Broadband Mapping Initiative (BMI). The data was produced by Pericle represents 2013. The BMI, a collaboration of VCGI, the VT DPS, and the VTA, is funded through a SBDD grant from the NTIA. Administrative boundaries, roads (E911, July 2013), VCGI.

Address Summary of 4/1 Broadband Service as of 6/30/14 by County

County Name	Currently Served Addresses ¹	Percent Currently Served ²	Currently Unserved Addresses ³	Percent Currently Unserved ⁴	Total Addresses
ADDISON	14,381	84.9%	2,554	15.1%	16,935
BENNINGTON	16,034	80.4%	3,915	19.6%	19,949
CALEDONIA	8,530	56.1%	6,674	43.9%	15,204
CHITTENDEN	52,855	95.9%	2,234	4.1%	55,089
ESSEX	1,136	23.0%	3,805	77.0%	4,941
FRANKLIN	14,890	70.3%	6,290	29.7%	21,180
GRAND ISLE	3,134	55.9%	2,477	44.1%	5,611
LAMOILLE	6,687	55.7%	5,308	44.3%	11,995
ORANGE	8,130	54.6%	6,761	45.4%	14,891
ORLEANS	7,941	50.9%	7,668	49.1%	15,609
RUTLAND	27,788	93.0%	2,094	7.0%	29,882
WASHINGTON	21,574	83.3%	4,317	16.7%	25,891
WINDHAM	20,352	75.3%	6,686	24.7%	27,038
WINDSOR	25,817	83.7%	5,033	16.3%	30,850
Total	229,249	77.7%	65,816	22.3%	295,065

1. 'Served Addresses' indicates the number of building addresses currently served, as of June 2014.

2. 'Percent Served' indicates the percent of building addresses currently served, as of June 2014.

3. 'Unserved Addresses' indicates the number of building addresses currently unserved, as of June 2014.

4. 'Percent Unserved' indicates the percent of building addresses currently unserved, as of June 2014.