STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. _____

Application of Vermont RSA Limited Partnership and Cellco	)
Partnership, each d/b/a Verizon Wireless, for a Certificate of	)
Public Good, pursuant to 30 V.S.A. § 248a, authorizing the	)
modification of an existing wireless telecommunications facility	)
located at 2382 Ridge Road in Brookfield, Vermont	)

AFFIDAVIT OF AJ LANPHER
ON BEHALF OF VERMONT RSA LIMITED PARTNERSHIP
AND CELLCO PARTNERSHIP, EACH d/b/a VERIZON WIRELESS

State of Vermont)
) ss:
County of Chittenden)

AJ Lanpher, being duly sworn, hereby states as follows:

1. The information in my prefiled testimony and all exhibits sponsored therein is accurate to the best of my knowledge.

2. I have personal knowledge of and am able to testify as to the validity of the information contained in my prefiled testimony and all exhibits sponsored therein.

AJ Lanpher

Sworn to before me, in the state and county stated above, this 22nd day of October, 2015.

Notary Public
My Commission Expires: 2/10/19

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PREFILED DIRECT TESTIMONY OF AJ LANPHER

ON BEHALF OF VERMONT RSA LIMITED PARTNERSHIP AND CELLCO PARTNERSHIP, EACH d/b/a VERIZON WIRELESS

October 22, 2015

Summary:

Mr. Lanpher's testimony will address the proposed telecommunications facility, the specific coverage needs that will be met, the service that will be provided, and how the Project will promote the general good of the State of Vermont.

1 **Q1. Please state your name, employer and current position.**

2 A1. My name is AJ Lanpher and I am a Radio Frequency ("RF") Design Engineer currently
3 working for Cellco Partnership d/b/a Verizon Wireless ("Verizon Wireless").

4 **Q2. Please state briefly your educational and professional background.**

5 A2. I have worked in the communications industry for 27 years and the cellular industry for
6 21 years. My credentials as an RF engineer include the following:

7 • Employed as an RF Engineer for Verizon Wireless for the past 6 years, designing
8 antenna transmitter facilities for the Cellular, Long Term Evolution ("LTE") and
9 Personal Communication Services ("PCS") in Vermont. This entails site selection,
10 antenna layout, regulatory filings, zoning, RF compliance, cell activation and
11 optimization.

12 • Prior to Verizon Wireless, I was employed by Rural Cellular Corporation
13 ("Unicel") for 16 years, 4 years as a Network Performance Engineer, which entailed
14 site selection, Cell Optimization, Capacity Engineering and Antenna Design /
15 Optimization; and 12 years as a Cellular Technician where I installed, optimized
16 and maintained Cell Sites for Unicel in the states of Vermont, New York, New
17 Hampshire and Massachusetts.

18 • Graduated from Electronic Technician A-School from the US Navy and also
19 graduated from 2 C-Class Schools, Shore Communications C-School and Navmacs
20 V5 Satellite Communications C-School.

21 **Q3. Have you ever testified before the Public Service Board?**

22 A3. Yes, I provided Prefiled Testimony for Verizon Wireless in Docket No. 7651, installation
23 of TMA systems on existing towers throughout the State; Docket No. 7695, antenna

modifications at several sites; and Docket No. 7732 (Williston), Docket No. 7893 (Plainfield), Docket No. 7922 (Jericho), Docket No. 7999 (Milton), Docket No. 8005 (Rutland), Docket No. 8134 (South Burlington), Docket No. 8163 (Essex), Docket No. 8169 (Duxbury), Docket No. 8219 (West Rutland), Docket No. 8220 (Bradford), and Docket No. 8451 (Rockingham) among others, all involving the issuance of a CPG authorizing the installation or upgrade of a Verizon Wireless telecommunications facility.

Q4. Please identify the location of the Project that is the subject to this § 248a filing.

A4. The Project will be located on approximately 71 acres of property owned by Douglas and Diane Haggett. American Tower Corp. ("ATC") owns the 85' monopole ("Monopole") which currently has twelve (12) AT&T panel antennas mounted at 81' above ground level ("AGL") and twelve (12) T-Mobile panel antennas mounted at 72' AGL. The site is accessed from the eastern side of Ridge Road and follows an approximately 1,000' gravel driveway. The coordinates of the Compound are latitude 44°-00'-38.69" North and longitude 72°-36'-58.37" West.

Q5. Please describe how and why the proposed site was chosen.

A5. The identification of new sites initiated by Verizon Wireless entails a process known as Search Area Development. This task is assigned to the RF Design Engineer employed by Verizon Wireless. As the RF Engineer for Vermont, I define Search Areas based on the following criteria: drive test analysis, review of statistical data from our existing network, customer feedback and multiple years of industry experience in the State of Vermont. This information, once reviewed, defines the Search Area, which is confirmed with the utilization of Propagation Analysis.

Once the search ring is designated, the Verizon Wireless Real Estate Group

searches within the defined Search Area for existing buildings, towers and other structures of sufficient height to fill the coverage gaps in the network. After exhausting the existing structures, "raw land" candidates for new towers are investigated. Proposed sites are verified by using a combination of drive test data and computer modeling of a location. The RF Design Engineer determines whether coverage and connectivity objectives with adjacent sites would be met by the proposed site.

As a part of its commitment to quality service for its wireless telecommunications subscribers in the State of Vermont, Verizon Wireless strives to provide continuous coverage and avoid call interruptions or "dropped calls." As the Propagation Plots (Exhibit AL-1) illustrate, Verizon Wireless currently has insufficient coverage in the area to be served by this facility. Construction of the Project will allow Verizon Wireless to provide improvements in service and coverage, including "4G LTE" service in the Town of Brookfield and along Interstate 89 and portions of Vermont Routes 12 and 14.

Verizon Wireless attempts to co-locate whenever possible, either on an existing tower or other structure that has sufficient height to accommodate the "line of sight" needs of a wireless telecommunications facility. This application is for a co-location on an existing tower.

In addition, two of Verizon Wireless' competitors, AT&T and T-Mobile are providing service from this location. Verizon Wireless would like to compete with those providers. Doing so will, by definition, increase choice for Brookfield residents and those of nearby towns.

Q6. From a Radio Frequency Engineer's prospective, please describe what site improvements will be necessary for the proposed Project.

A6. The original facility was permitted in 2009, pursuant to LUP#3R102. At that time, T-Mobile Northeast, LLC, constructed a 75' AGL monopole tower holding nine (9) panel antennas. In 2013, Public Service Board Docket No. 8126 authorized AT&T to add a 10' extension to the tower, mount twelve (12) panel antennas on a triangular frame at the top of the Monopole at approximately 85' AGL, and construct a 12' x 20' equipment shelter located on the ground in a fenced compound ("Compound") adjacent to the Monopole. *See* Dkt No. 8126, PSB Findings and Order, attached.

In order to improve the quality of its wireless service in this area, Verizon proposes to add a second 10' extension to the existing Monopole, raising the height of the tower to 95' AGL. Verizon proposes to locate twelve (12) antennas and six Remote Radio Heads ("RRH") at the top of the tower extension. A structural analysis completed by ATC on June 3, 2015, confirmed that the tower meets the requirements of the Vermont State Building Code and TIA-222 with the proposed extension and addition of antennas and equipment.

Verizon proposes to mount twelve (12) panel antennas and six (6) Remote Radio Heads ("RRH"), on a triangular mounting frame, with four (4) antennas and two (2) RRH per side or "sector", centered at a height of approximately 95' on the Monopole. Each sector will consist of two (2) 1900-2100 MHz AWS/PCS antennas measuring approximately 54.7" long by 12.7" wide, two (2) 700-850 MHz XLTE antennas measuring approximately 76.1" long by 11.9" wide.[1] (*see* the proposed Project Drawings; Exhibit LH-1; Antenna Specification; Exhibit AL-4). Each sector will have two (2) RRH measuring approximately 24.4" long and 10.63" wide installed directly behind the

[1] From time to time, equipment manufacturers may slightly alter their products or Verizon may purchase from different suppliers. Therefore, there is a possibility that the actual antennas may be a different model than what is described in this document.

antennas. The topmost point of the tallest antenna will extend approximately 38" above the top of the Monopole to a height of 98'2" AGL. *Id.*

Verizon Wireless proposes to extend the existing Compound by approximately 1,000 square feet, from the existing 28' x 50' to 50' x 50', in order to accommodate its 12'x30' two-room equipment shelter within the Compound. The shelter will contain the transmitting and receiving base station equipment and a diesel-fueled emergency generator that will provide back-up power if needed. The Prefiled Testimony of Louis Hodgetts, Project Manager and Civil Engineer at DuBois & King, Inc., filed with this Application, will elaborate on the specifications of the proposed equipment shelter and emergency generator.

Q7. Why is Verizon Wireless seeking to add height to the Monopole?

A7. Cellular communication is essentially a "line of sight" technology. In order to provide effective signal propagation, a wireless carrier's antennas need to be above surrounding obstructions, including vegetation. This is especially true in the 1900 (PCS) and 2100 (AWS) Megahertz bands, in which Verizon Wireless operates.

When co-locating antennas on the same vertical structure as a competing carrier, there must be a certain amount of vertical separation between the antennas of different carriers or harmful interference will result. It is common knowledge in the cellular industry that there must be ten feet of separation between the centerlines of such competing antennas.

In this case, T-Mobile has antennas mounted at 75' AGL, and AT&T has antennas extending to 85' AGL. The October 23, 2009 Brookfield Zoning Board of Adjustment decision that authorized the construction of the Monopole found that the

1 surrounding tree height then was 65' AGL. *See* Exhibit AL-___ at 2. We assume that
2 some growth has occurred in the intervening six years. Therefore, applying the 10-foot
3 rule, Verizon Wireless would be centering its antennas at 65' AGL if it were to go below
4 T-Mobile. In such a case, Verizon Wireless' antennas would be in the trees and
5 attenuated by the existing foliage.

6 Because AT&T has occupied the next available spot, at the top of the 85-foot
7 Monopole, Verizon Wireless must extend that pole by at least ten feet to achieve the
8 required vertical separation.

9 **Q8. Can you quantify the benefits that this Project will provide to the Town of**
10 **Brookfield?**

11 A8. Trying to quantify the increase in coverage and capacity is not an exact science. At best,
12 we can use estimates of the likely number of people who will receive coverage in their
13 residences (from Census data) and an estimate of the number of data sessions that
14 additional capacity will allow. But I must stress that these numbers are very rough
15 estimates. Using predictive software, and an assumption of a certain signal strength, I
16 estimate that approximately 250 residents of Brookfield will receive coverage in their
17 homes from the Project. With other towns, that total rises to approximately 587. Of
18 course, these figures do not take into account users travelling through Brookfield. With
19 regard to capacity, predictive software estimates that the Project will allow approximately
20 200 Verizon Wireless subscribers to use each of three sectors of the site simultaneously.

21 **Q9. Please address the level of radiation associated with the proposed equipment.**

22 A9. Under federal law, Verizon Wireless is required to comply with the radiofrequency
23 ("RF") emission levels established by the Federal Communications Commission (FCC").

1 Exhibit AL-5 is a power density calculation illustrating that even using the most extreme
2 assumptions, which could not possibly be duplicated at the site, RF emission levels will
3 still be well below the Maximum Permissible Exposure ("MPE") limits established by the
4 FCC.

5 **Q10. Does this conclude your Prefiled Direct Testimony?**

6 A10. Yes.

Exhibits to Prefiled Testimony of AJ Lanpher

Exhibit AL-1	Propagation Plots
	Exhibit AL-2 Calculation of Acreage
	Exhibit AL-3 Data Sessions Estimate
Exhibit AL-4	Antenna Specifications
Exhibit AL-5	Power Density Calculation/MPE