

Radio Frequency Analysis Report

MA4795

0 Rowe Road, Heath, MA



February 22, 2021

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1. Overview

This RF Report has been prepared on behalf of New Cingular Wireless PCS, LLC (“AT&T”) for itself and on behalf of the First Responder Network Authority (“FirstNet”) in support of the pending application for a new wireless telecommunications facility at 0 Rowe Road in Heath, Massachusetts. The proposed facility is needed to fill a coverage gap that currently exists in AT&T’s network within the Town of Heath, while providing prioritized, preemptive wireless services for first responders.

The proposed facility consists of ground-based equipment cabinets, and antennas mounted to a proposed 176’ monopole. The proposed facility has been selected as suitable for implementation of the National Public Safety Broadband Network (“NPSBN”), while also addressing a substantial gap in 4G LTE coverage for AT&T’s network.

This report addresses AT&T’s need for the proposed wireless facility and confirms that there are no other suitable existing structures that could address the coverage gaps in their wireless communications network. The coverage analysis completed by C Squared Systems confirms the following: AT&T has a gap in reliable service in Heath, and that the proposed facility located at 0 Rowe Road will provide AT&T with enhanced coverage in that service gap.

Included as exhibits in this report are coverage maps detailing the existing network and expected coverage from the proposed facility, pertinent site information, a terrain map, and a network layout map.

2. Introduction

AT&T is licensed by the FCC to provide wireless communications services throughout the Northeast Region including Franklin County and the Town of Heath, MA. AT&T provides digital voice and data services using 3rd Generation (3G) UMTS technology in the 800 MHz and 1900 MHz frequency bands, and is deploying advanced 4th Generation (4G) services over LTE technology in the 700 MHz, 850 MHz (Cellular), 1900 MHz (PCS), 2100 MHz (AWS), and 2300 MHz (WCS) bands, as allocated by the FCC. The 4G LTE network builds on the existing 3G data services that utilize UMTS technology. These data networks are used by mobile devices for fast web browsing, media streaming, and other applications that require broadband connections. As part of AT&T’s network expansion and enhancement in Massachusetts and elsewhere in the United States, AT&T is filling in existing coverage gaps and addressing capacity, interference, and high-speed broadband issues. The mobile devices that benefit from these advanced data networks are not limited to basic handheld phones, but also include devices such as smartphones, PDA’s, tablets, and laptop air-cards. With the evolving rollout of 4G LTE services and devices, AT&T customers will have even faster connections to people, information, and entertainment.

FirstNet is a federal agency with a mandate to create a nationwide, interoperable public safety broadband network for first responders. First responders across the country currently rely on more than 10,000 separate radio networks which oftentimes do not interoperate with one another. By deploying a nationwide broadband public safety network built specifically to meet the communications needs of first responders, the FirstNet network will provide a solution to the decades-long interoperability and communications challenges first responders have experienced, and which was highlighted by the 9/11 Commission’s 2004 Final Report.

FirstNet selected AT&T to build, manage and operate the National Public Safety Broadband Network (“NPSBN”) using FirstNet’s Band 14 spectrum (Call Sign WQQE234, 20 MHz of the 700 MHz spectrum), together with AT&T’s own wireless network. Using a combination of new and existing wireless facilities, AT&T provides prioritized, preemptive wireless services for first responders across Massachusetts, New England and nationwide, while also improving 4G LTE coverage for AT&T customers. AT&T works closely with local, state, and federal first responders in designing the FirstNet network and selecting each new site.

AT&T's network requires the strategic deployment of antenna structures throughout the area to be covered, which are connected to receivers and transmitters that operate in a limited geographic area known as a "cell". Mobile subscriber handsets and wireless devices operate by transmitting and receiving low power radio frequency signals to and from these cell sites. The signals are transferred through ground telephone lines (or other means of backhaul transport) and routed to their destinations by sophisticated electronic equipment. The size of the area served by each cell site is dependent on several factors including the number of antennas used, the height at which the antennas are deployed, the topography of the surrounding land, vegetative cover, and natural or man-made obstructions in the area. As customers move throughout the service area, the transmission from the portable device is automatically transferred to the AT&T facility with the best reception, without interruption in service, provided that there is overlapping coverage between the cells.

In order for AT&T's network to function effectively, there must be adequate overlapping coverage between the "serving cell" and "adjoining cells". This not only allows access to the network, but once connected allows for the transfer or "hand-off" of calls from one cell to another and prevents involuntary disconnections or "dropped calls." AT&T's antennas also must be located high enough above ground level to allow transmission (a.k.a. propagation) of the radio frequency signals above trees, buildings and other natural or man-made structures that may obstruct or diminish the signals. Areas without adequate radio frequency coverage have substandard service characterized by poor voice quality, dropped and blocked calls, slow data connections and transmissions, or no wireless service at all. These areas are commonly referred to as "coverage gaps."

We have concluded that by utilizing the proposed monopole tower at 0 Rowe Road at an antenna centerline height of 176' AGL, AT&T will be able to provide significant coverage improvement to the residents, community areas, and traffic corridors within Heath that are currently located within deficient service areas of AT&T's network.

3. Coverage Objectives

AT&T is expanding and enhancing their 4G LTE high-speed wireless broadband services throughout New England by filling in existing coverage gaps and addressing capacity, interference, and high-speed broadband issues. In addition to improving 4G LTE coverage for AT&T customers, AT&T is also building, managing and operating the National Public Safety Broadband Network using FirstNet's 700 MHz Band 14 spectrum, in order to provide prioritized, preemptive wireless services for first responders across Massachusetts, New England and nationwide.

Due to the terrain characteristics and the distance between the targeted coverage area in Heath and AT&T's existing sites, AT&T has determined that significant gaps in service exist in and around the Town of Heath. In order to fill in these coverage gaps and improve the network reliability within Heath, AT&T must construct a new wireless facility in the area. Specifically, much of Heath is without reliable service, and gaps in coverage exist along substantial portions of the town's roadways, as listed below, and subsequently, the residential properties adjacent to these roads.

- State Highway 8A;
- Rowe Road;
- Branch Hill Road;
- The surrounding residential neighborhoods, which are currently within this coverage gap of AT&T's network;

By installing on the proposed wireless communication facility on the proposed monopole at 0 Rowe Road, AT&T will be able to provide significant coverage improvement and improved network quality and reliability for AT&T subscribers and first responders located in these areas of Heath.

4. Pertinent Site Data

Table 1 below details the site-specific information used to perform the coverage analysis and generate the coverage plots provided herein.

Site Name	Address	City	Location		Antenna Height (ft AGL)	Structure Type	Status
			Latitude	Longitude			
MA5119	65 SOUTH STREET	DRURY	42.6396	-72.9922	186	LATTICE	On-Air
MA2211	60 ENERGY LANE	HAWLEY	42.6148	-72.8666	186	LATTICE	On-Air
MA5167	2321 WHITNEY AVENUE	HAMDEN	41.3826	-72.9005	89	ROOFTOP	On-Air
MA5160	COOPER LANE	SHELBURNE	42.5975	-72.7115	175	LATTICE	On-Air
MA4795	0 Rowe Road	HEATH	42.6941	-72.8455	176	MONOPOLE	Proposed

Table 1: AT&T Site Information Used in Coverage Analysis¹

¹ Some sites listed in this table are outside the plot view but are included for completeness of information.

5. Coverage Analysis and Propagation Plots

The radio frequency coverage plots provided in this report were produced using deciBel Planner™, a Windows-based RF propagation computer modeling program and network planning tool. The software considers the topographical features of an area, land cover, antenna models, antenna heights, RF transmitting power and receiver thresholds to predict coverage and other related RF parameters used in site design and wireless network expansion.

While AT&T holds licenses in the 700 MHz, 850 MHz (Cellular), 1900 MHz (PCS), 2100 MHz (AWS), and 2300 MHz (WCS) bands, this report focuses on the 700 MHz layer, which is representative of the 4G LTE service most readily available to AT&T subscribers in the area, and is the spectrum layer that is essential to AT&T's ability to address the coverage needs for their 4G LTE service offerings. It is relevant to note that the 700 MHz coverage layer, which serves as the “base” layer for the LTE service, has a substantially larger coverage footprint due to the propagation characteristics of the frequency band. The 1900 MHz, 2100 MHz, and 2300 MHz overlay layers will have incrementally smaller footprints and are used by AT&T to manage capacity.

The plots included as exhibits show coverage based on the minimum required signal strength needed to support reliable 4G LTE service in this area. All other areas (depicted in white) fall within coverage areas characterized by poor voice and data quality, slow data speeds, high latency², and the substantial likelihood of unreliable service.

Exhibits 1-4 below describe AT&T's network in and around the targeted area of Heath, and the need for the proposed facility.

- Exhibit 1 titled: “MA4795 - Neighbor Sites & Radial Distances” provides an overview of AT&T's network of sites in the area, with distances shown from the proposed site to the existing AT&T sites in the surrounding area.
- Exhibit 2 titled: “MA4795 – Area Terrain Map” details the terrain features around the targeted area of deficient service intended to be served by the proposed site in Heath. These terrain features play a key role in determining site designs and dictating the unique coverage achieved from a given location. This map is included to provide a visual representation of the topography that must be considered when siting a wireless facility. The blue, light blue, green and yellow shades correspond to lower ground elevations, whereas the orange, red, grey and white shades indicate higher ground elevations.
- Exhibit 3 titled: “MA4795 - Existing 700 MHz LTE Coverage (-108 dBm)” depicts the 700 MHz LTE outdoor coverage provided from existing sites listed in Table 1 and demonstrates that there are currently gaps in 700 MHz LTE outdoor coverage effecting service along key roadways, and the surrounding neighborhoods in Heath. The coverage shown is where the signal strengths is: >-108 dBm (outdoor coverage). The deficient areas of 700 MHz LTE outdoor coverage are defined by the unshaded or “white” areas.

² In data transfer it is the delay or lapse in the time between initiating a request from the wireless device and receiving the response.

- Exhibit 4 titled: “*MA4795 – 700 MHz LTE Coverage with Proposed Site (-108 dBm)*” shows how this proposed site would fill in the existing 700 MHz LTE outdoor coverage gaps and improve AT&T’s 700 MHz LTE network within the targeted areas. As evident when compared against Exhibit 5, the proposed facility provides coverage improvement to the following:
 - ~ 3.2 miles of State Highway 8A;
 - ~ 1.4 miles of Branch Hill Road, Hosmer Road, and Rowe Road;
 - ~ 1.2 miles of Davis Mine Road;
 - ~ 290 additional residents within the surrounding area at the 700 MHz frequency;
 - ~ 40 additional employees within the proximity of the proposed facility;
 - The surrounding roads, neighborhoods and businesses within the proximity of the proposed site and the above-mentioned roadways.

6. Summary

AT&T has identified an area of deficient coverage affecting a significant portion of Heath, Massachusetts, including key traffic corridors and residential areas of town. The proposed facility will provide the needed fill-in coverage to significant portions of Heath along State Highway 8A, Branch Hill Road, Hosmer Road, Rowe Road and the surrounding roads and neighborhoods, all of which are currently within a coverage gap of AT&T's network.

As discussed in this report and depicted in the attached plots, the proposed AT&T site will provide the public need for service in this area, by providing an appropriate coverage footprint for the Heath community along with effective connectivity to the rest of AT&T existing network. In addition to providing improved LTE service to AT&T's customers to throughout the targeted areas of Heath, AT&T is providing enhanced services for first responders through the implementation of FirstNet's National Public Safety Broadband Network ("NPSBN").

Without a site in this area, at the height requested, significant gaps in service will continue to exist within the Town of Heath, and the identified public need for reliable wireless services in this area will not be met; therefore, AT&T respectfully request that the Town of Heath act favorably upon the proposed facility.

7. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate.

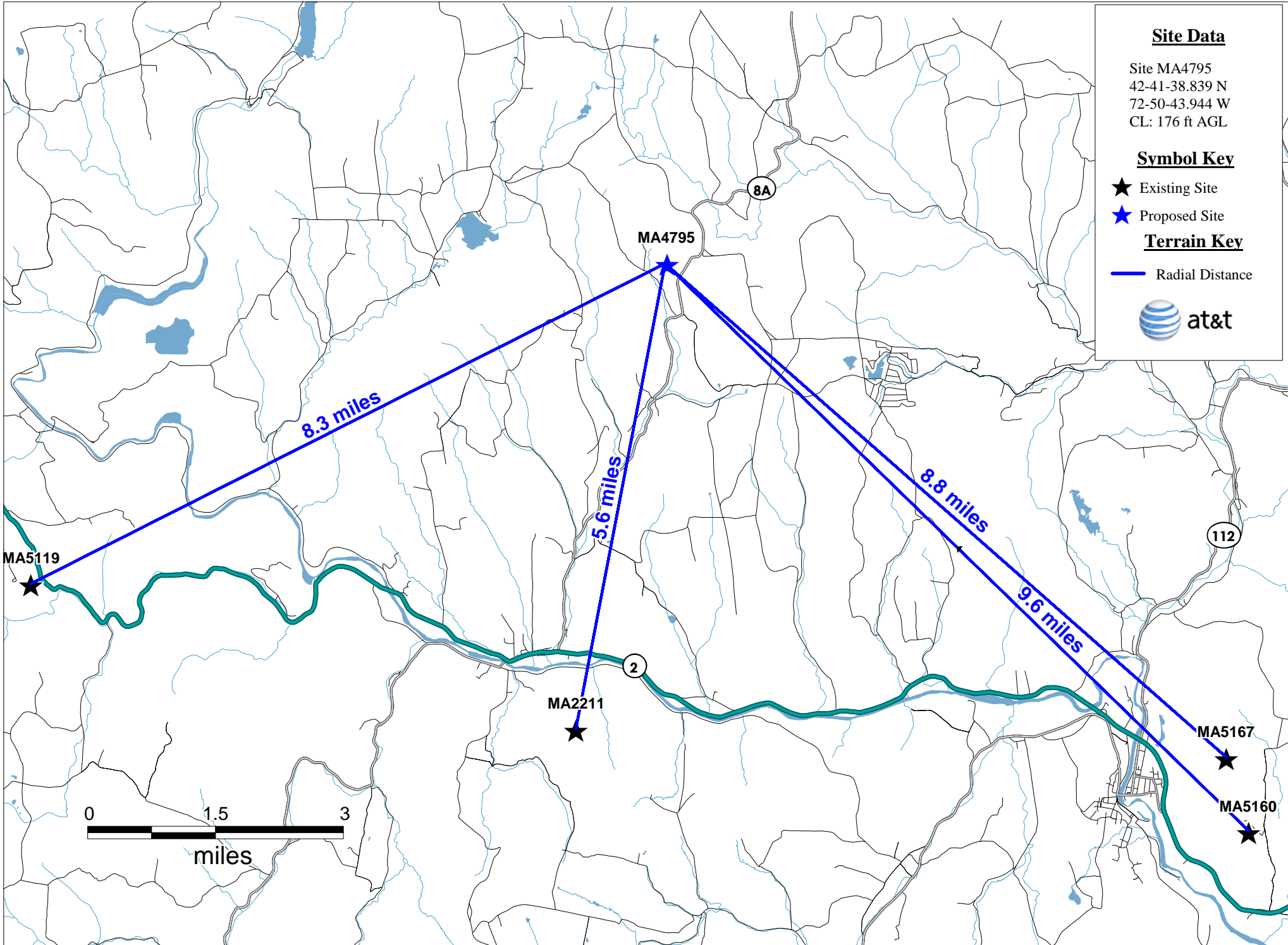


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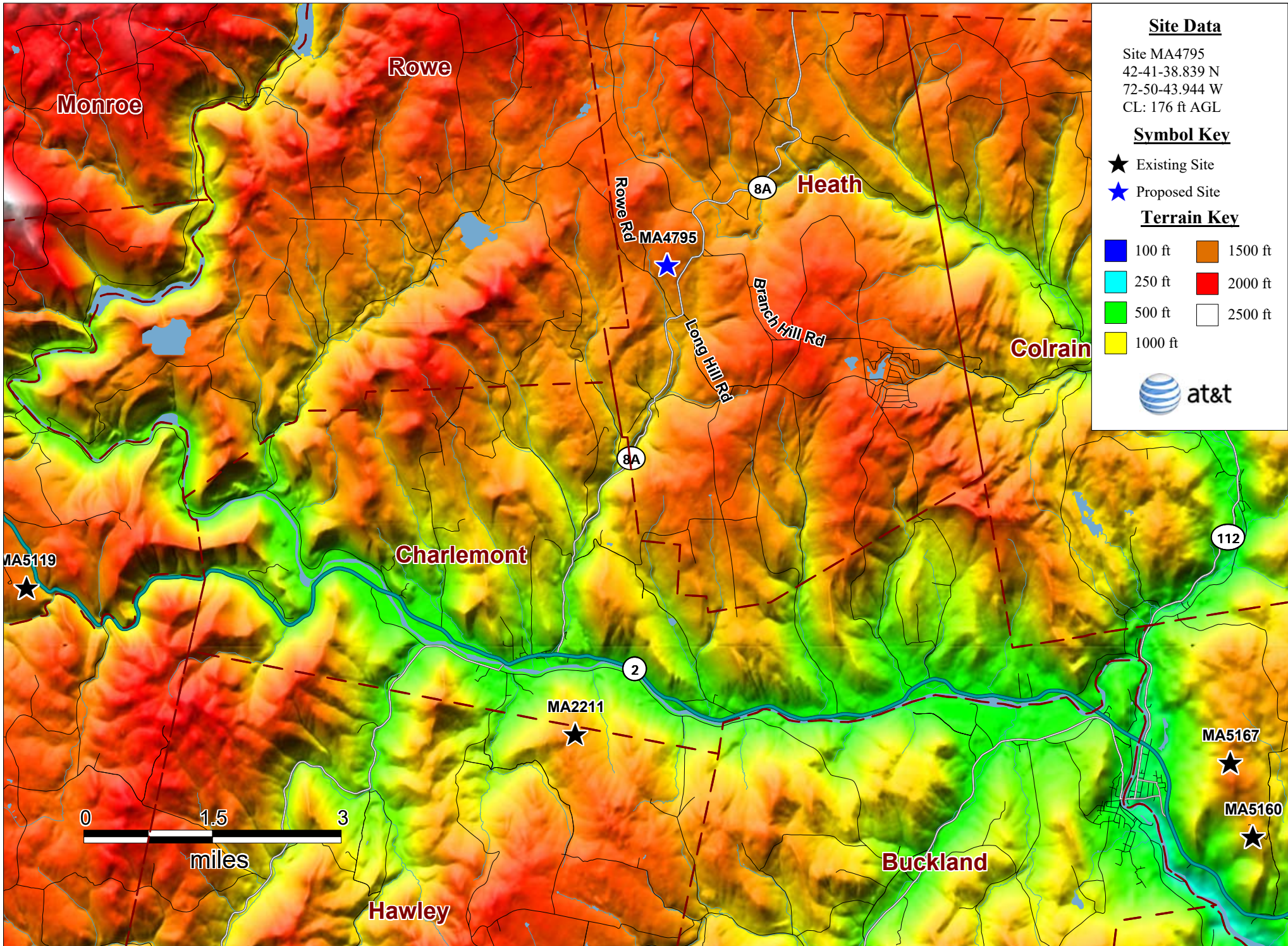
February 22, 2021
Date

9. Exhibits

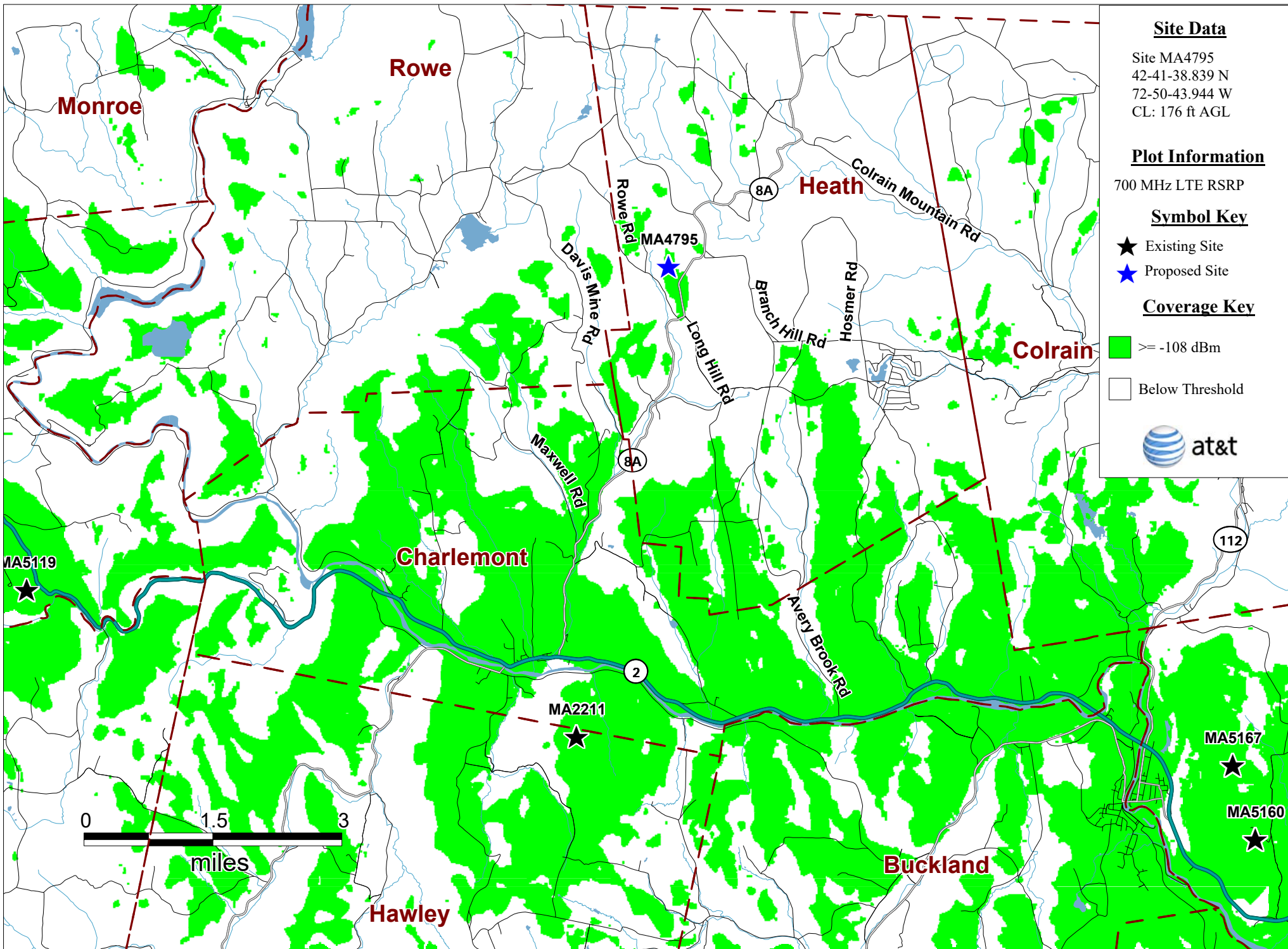
MA4795 - Neighbor Sites & Radial Distances



MA4795 - Area Terrain Map



MA4795 - Existing 700 MHz LTE Coverage (-108 dBm)



MA4795 - Existing 700 MHz LTE Coverage with Proposed Site (-108 dBm)

