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Radio Frequency Analysis Report

RI1546

51 Industrial Drive, North Smithfield, RI

September 16, 2024

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1. Overview

This RF Report has been prepared on behalf of New Cingular Wireless PCS, LLC ("AT&T") in support of the pending application to install a wireless telecommunications facility at 51 Industrial Drive in the Town of North Smithfield, Rhode Island. The proposed facility is needed to fill a coverage gap that will be created in AT&T's network within the Town of North Smithfield upon decommissioning of AT&T's temporary wireless facility at 51 Industrial Drive. The proposed facility will also maintain the prioritized preemptive wireless services for first responders known as FirstNet (discussed below).

AT&T proposes to install a wireless facility on a proposed 140' monopole tower at 51 Industrial Drive at a centerline elevation of 127 feet above ground level ("AGL"). The proposed location has been selected to address a substantial gap in 4G LTE coverage for AT&T's network in the area when the temporary facility is decommissioned.

This report concludes that the proposed facility will continue to provide adequate replacement coverage and capacity when AT&T's temporary facility located at 51 Industrial Drive is decommissioned. The areas at risk of becoming gaps in AT&T's wireless service include Victory Highway, State Highway 5, State Highway 146A, State Highway 146 and the surrounding areas in the proximity of the proposed permanent facility.

Included as Attachments to this report are coverage maps detailing the coverage from the facility, pertinent site information, a terrain map, and an AT&T network layout map.

2. Introduction

AT&T is licensed by the FCC to provide wireless communications services throughout the Northeast Region including Providence County and the Town of North Smithfield, RI. AT&T provides digital voice and data services using 4th Generation (4G) 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, and is deploying advanced 5th Generation (5G NR) services in the 700 MHz, 850 MHz, 1900 MHz, 2100 MHz, 2300 MHz and C-band, 3500 MHz, The 4G LTE network builds on the previous 3G data services that utilized 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 Rhode Island 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, tablets, and laptop air-cards. With the evolving rollout of 5G NR 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 Rhode Island, 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 installing the proposed facility at an antenna centerline height of 127 feet AGL, AT&T will be able to provide adequate replacement coverage and capacity to the residents, businesses, and traffic corridors within North Smithfield that would otherwise be located within gaps in service of AT&T's network after its temporary facility at 51 Industrial Drive is decommissioned.

3. Coverage Objectives

As mentioned above, AT&T is proposing to install a permanent facility to replace the coverage and capacity that will be lost in North Smithfield once the temporary facility at 51 Industrial Drive is decommissioned. The proposed facility is intended to maintain or improve the quality of service currently provided to this area of the Town.

AT&T currently operates wireless facilities similar to the proposed facility within North Smithfield and the surrounding cities/towns. Due in large part to the distances between the surrounding sites, the intervening topography, and volume of user traffic in the area, these facilities could not provide adequate service to this area of North Smithfield. Specifically, AT&T determined that North Smithfield will be without reliable service after the "RI7546" site is decommissioned in the following areas and town roads, including but not limited to:

- Victory Highway
- State Highway 5
- State Highway 146A
- State Highway 146
- The surrounding residential neighborhoods and businesses, which are currently within this coverage gap of AT&T's network.

By installing the permanent wireless communication facility on the proposed monopole at 51 Industrial Drive, AT&T will be able to maintain coverage and network quality and reliability for AT&T subscribers and first responders located in these areas of North Smithfield.

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/State	Location		Distance to Proposed Site (mi)	Antenna Height (ft AGL)	Structure Type	Status
			Latitude	Longitude				
MA1302	295 Mendon Street	Blackstone/MA	42.0613	-71.5536	4.7	200	Self Support	On-Air
MA3423	89 Aldrich Street	Uxbridge/MA	42.0393	-71.6274	4.3	174	Self Support	On-Air
MA3788	21 Chestnut Street	Bellingham/MA	42.0485	-71.4892	5.6	105	Water Tank	On-Air
MA4060	70 Quaker Street	Uxbridge/MA	42.0222	-71.5928	2.2	145	Self Support	On-Air
MA4133	610 Aldrich Street	Uxbridge/MA	42.0217	-71.65666	4.8	175	Self Support	On-Air
RI2357	526 Rhodes Avenue	Woonsocket/RI	42.0043	-71.5376	1.9	142	Water Tank	On-Air
RI4076	1477 Victory Highway	Oakland/RI	41.9642	-71.6417	4.2	168	Self Support	On-Air
RI4083	95 Sayles Hill Road	North Smithfield/RI	41.9713	-71.5151	3.3	135	Monopole	On-Air
RI4090	191 Social Street	Woonsocket/RI	42.0068	-71.5093	3.3	155	Rooftop	On-Air
RI4112	2612 Victory Highway	Burrillville/RI	41.9816	-71.6129	2.3	158	Monopole	On-Air
RI4255	1 Washington Street	Woonsocket/RI	41.9953	-71.5053	3.4	217	Self Support	On-Air
RI4257	646 Douglass	North Smithfield/RI	41.9414	-71.5575	3.7	147	Monopole	On-Air
RI4259	1184 Providence Pike	North Smithfield/RI	41.9706	-71.5558	1.8	90	Utility	On-Air
RI4267	1366 Iron Mine Hill Road	North Smithfield/RI	41.9595	-71.5011	4.3	118	Self Support	On-Air
RI4305	200 Brook Road	Harrisville	42.0061	-71.6833	5.8	188	Self Support	On-Air
RI7546	*51 Industrial Drive*	*North Smithfield/RI*	*41.9933*	*-71.5719*	*0.0*	*127*	*Monopole*	*Decomm*
RI1456	**51 Industrial Drive**	**North Smithfield/RI**	**41.9939**	**-71.5711**	**-**	**127**	**Monopole**	**Proposed**

Table 1: AT&T Site Information Used in Coverage Analysis[1,2]

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

[2] The site "RI7546" as italicized in the table above is the temporary facility that will be decommissioned.

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 and 5G NR, 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 are the spectrum layers that are 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 attachments 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 latency , and the substantial likelihood of unreliable service.

Attachments 1-5 below describe AT&T's network in and around the targeted area of North Smithfield and the need for the proposed permanent facility.

- Attachment 1 titled: "RI1546 – Existing 700 MHz LTE Coverage with RI7546 (temporary monopole) Site" depicts the 700 MHz LTE coverage provided from AT&T's existing sites listed in Table 1 and the "RI7546" site. The coverage shown is where the signal strengths are: > -83 dBm (minimum required for reliable, high quality service and performance at 700 MHz) and, > -93 dBm (minimum required for adequate level of service at 700 MHz). In an effort to provide the required levels of coverage to these areas, AT&T is proposing to install a wireless facility located at 51 Industrial Drive in North Smithfield, at centerline elevation of 127 feet AGL to maintain coverage once the "RI7546" site is decommissioned.
- Attachment 2 titled: "RI1546 – Existing 700 MHz LTE Coverage without RI7546 or Proposed Site" depicts the 700 MHz LTE coverage provided from AT&T's existing sites listed in Table 1 without the "RI7546" facility. As shown in this plot, the decommissioning of the "RI7546" site would open coverage gaps in North Smithfield along key road ways and other areas of town such as:
    - ~ 1.3 miles along Victory Highway;
    - ~ 0.8 miles along State Highway 5 ;
    - ~ 0.8 mile along State Highway 146A;
    - ~ 0.7 mile along State Highway 146;
    - ~ 1900 additional residents[3] and ~ 600 additional employees[4] within the surrounding area at the 700 MHz frequency; and,
    - The surrounding roads, neighborhoods, and major business areas within the proximity of the proposed site.

[3] Residential population counts referenced here and elsewhere within this report are based upon the 2020 U.S. Census data
4 Employee population counts referenced here and elsewhere within this report are based upon the 2020 U.S. Census Bureau LEHD database

- Attachment 3 titled: " RI1546 – Existing 700 MHz LTE Coverage with Proposed Site" shows how this proposed site would maintain coverage within the targeted areas once the temporary facility is decommissioned. As shown by the additional areas of coverage in comparison with Attachment 2, the proposed facility will provide coverage to:

    - ~ 1.4 miles along Victory Highway;
    - ~ 0.8 miles along State Highway 5 ;
    - ~ 0.7 mile along State Highway 146A;
    - ~ 0.8 mile along State Highway 146;
    - ~ 1970 additional residents and ~ 660 additional employees within the surrounding area at the 700 MHz frequency.

- Attachment 4 titled: " RI1546 — Area Terrain map " details the terrain features around the targeted area of deficient service intended to be served by the proposed site in North Smithfield. 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 and green shades correspond to lower ground elevations, whereas the yellow, red, and grey shades indicate higher ground elevations.

- Attachment 5 titled: "RI1546 - 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 temporary and existing AT&T sites in the surrounding area.

6. Summary

AT&T's temporary facility will be decommissioned, and a permanent facility is necessary to maintain reliable service throughout the areas of North Smithfield, RI. Installing a permanent monopole at 51 Industrial Drive with an antenna centerline of 127 feet AGL will adequately maintain coverage and capacity needed in the targeted areas including key roadways such as Victory Highway, State Highway 5, State Highway 146A, State Highway 146, and the surrounding roads and neighborhoods in the proximity of the proposed site.

As discussed in this report and depicted in the attached plots, the proposed AT&T site will address the public need for service in this area, by providing an appropriate coverage footprint for the North Smithfield community along with effective continued connectivity to the rest of AT&T existing network.

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

7. Statement of Certification

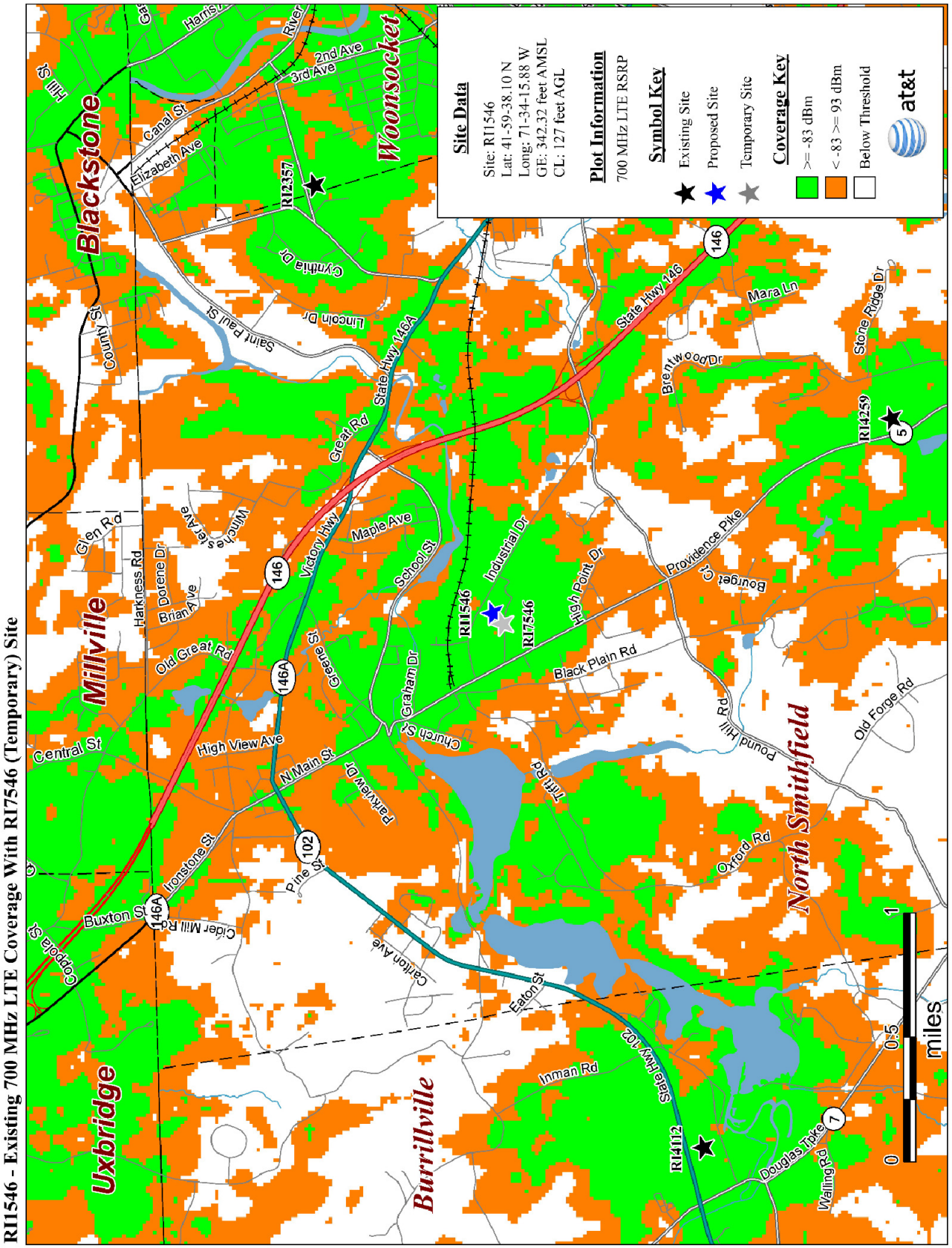
I certify to the best of my knowledge that the statements in this report are true and accurate.

Martin J. Lavin
Senior RF Engineer
C Squared Systems, LLC

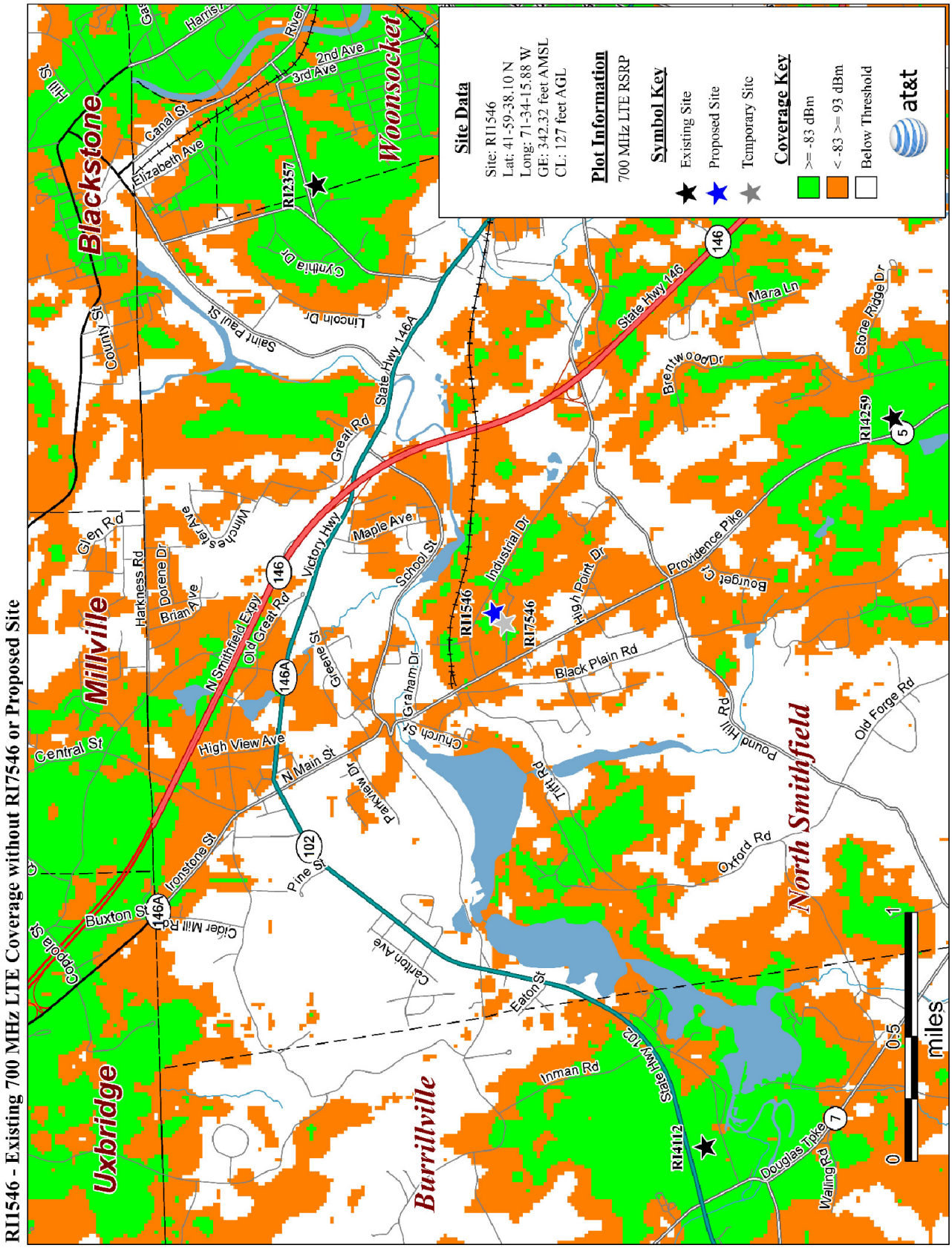
September 16, 2024
Date

8. Attachments

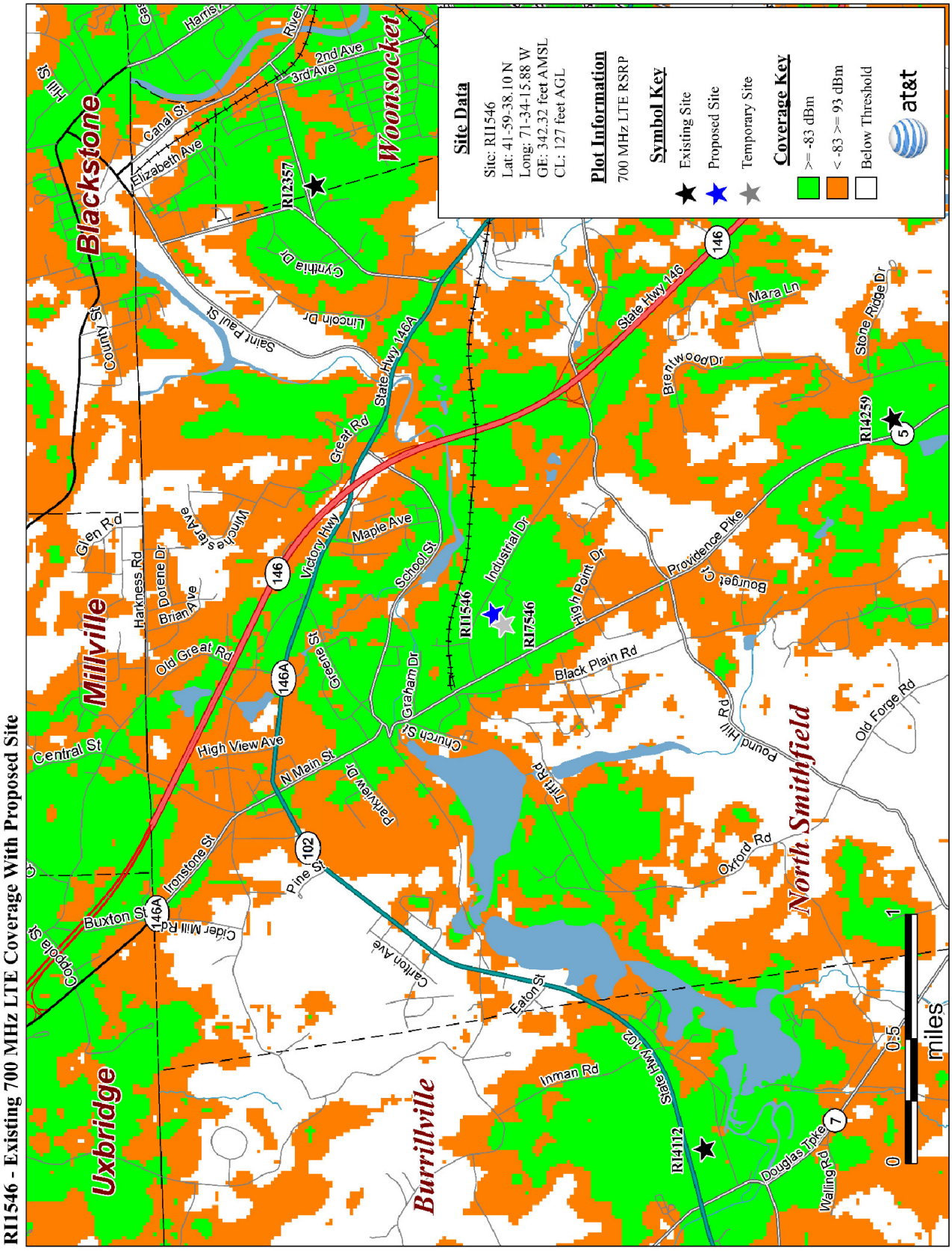
Attachment 1: RI1546 - Existing 700 MHz LTE Coverage with RI7546 (Temporary) Site



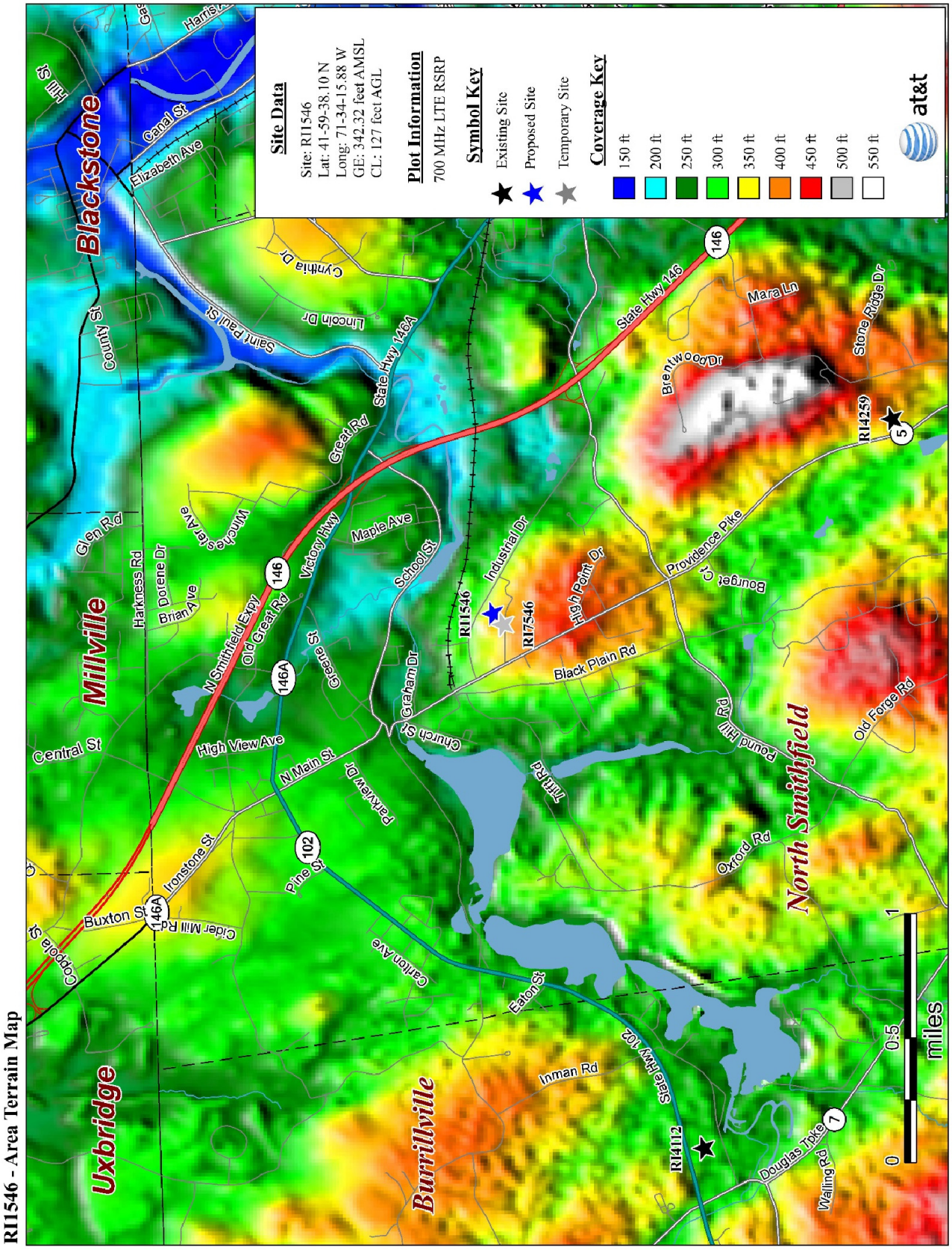
Attachment 2: RI1546 – Existing 700 MHz LTE Coverage without RI7546 or Proposed Site



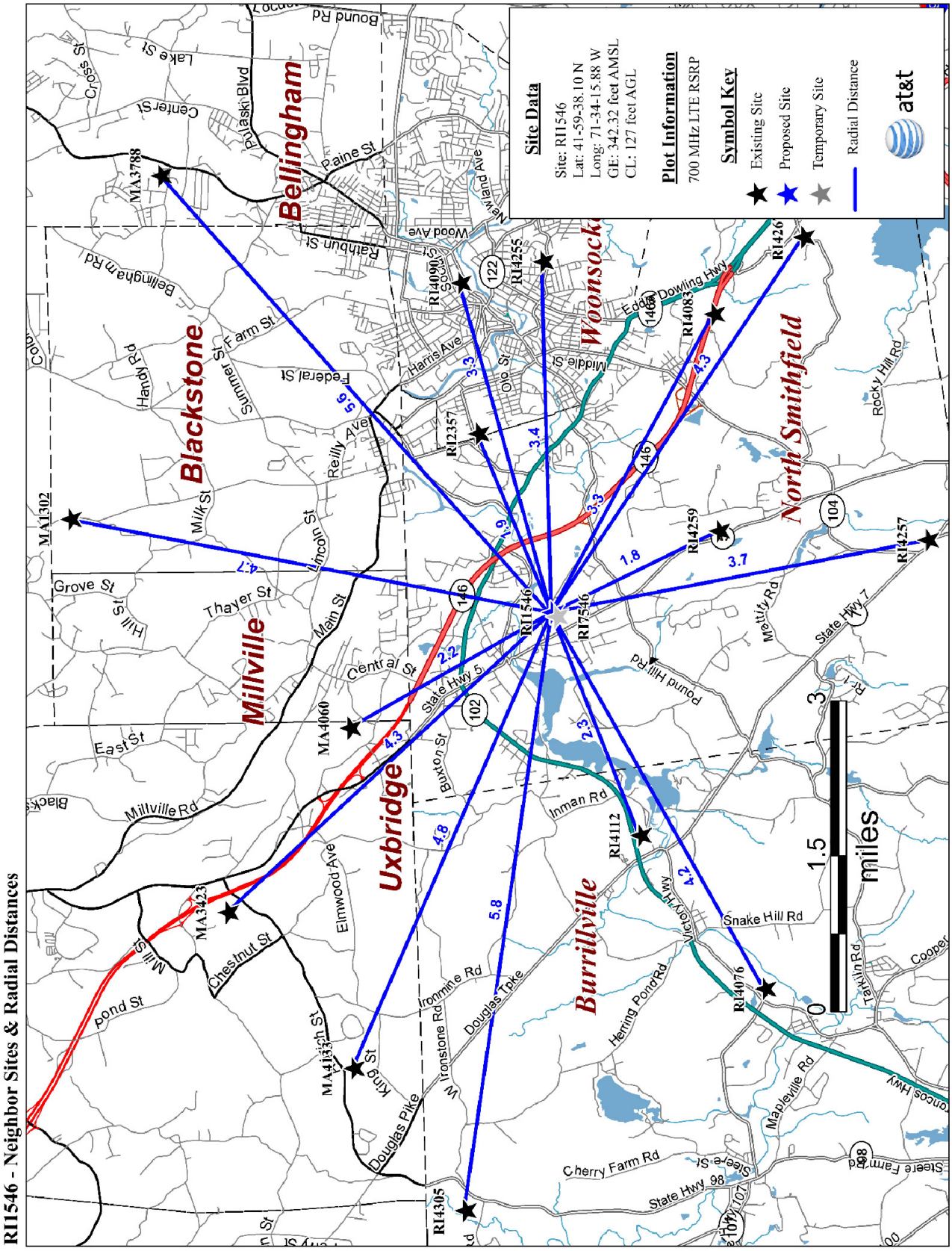
Attachment 3: RI1546 – Existing 700 MHz LTE Coverage with Proposed Site



Attachment 4: RI1546 – Area Terrain Map



Attachment 5: RI1546 – Neighbor Sites & Radial Distances



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RF Report

Proposed Wireless Facility
51 Industrial Drive
North Smithfield, RI 02896

October 21, 2024

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1. Overview

This RF Report has been prepared on behalf of Verizon Wireless in support of American Tower's proposal to the to the Town of North Smithfield for the installation and operation of a wireless facility located at 51 Industrial Drive. The facility is necessary as a more permanent solution to maintain wireless service in northern North Smithfield that would otherwise be lost when its temporary facility at 51 Industrial Drive is decommissioned. Verizon's component of the proposed facility generally consists of ground-based equipment cabinets along with antennas and associated equipment mounted on American Tower's proposed 140' monopole tower.

This report concludes that the proposed site will provide adequate coverage and capacity to maintain the wireless services currently provided to the Town. The gap in wireless service resulting from the loss of its temporary facility and replaced by the proposed permanent facility includes Route 146, Route 102/146A (Victory Highway), Route 5 (Providence Pike), Main Street, and the surrounding roads, residences, and businesses in the proximity of the proposed site.

Included in this report is: a brief summary of the site's objectives, maps showing Verizon Wireless' current network plan, and modeled Radio Frequency coverage of the subject site and the surrounding sites in Verizon Wireless' network.

2. Introduction

Verizon Wireless provides digital voice and data communications services using 4th Generation (4G) voice and data services over LTE technology in the 700 MHz, Cellular (800 MHz), PCS (1900 MHz), and AWS (2100 MHz) frequency bands as allocated by the FCC, along with the CBRS band (3.5-3.7 GHz). It is also deploying advanced 5th generation (5G) NR services in its cellular, C-band (3.7-3.98 GHz) and 28 GHz licensed frequency bands. These 4G and 5G networks are used to provide high-speed wireless connections used by mobile devices for fast web browsing, media streaming, video conferencing, and other applications that require broadband connections. The mobile devices that benefit from these advanced networks include typical smartphones, tablets, laptops, and Wi-Fi hot-spots. With the continual advancement of its networks, Verizon Wireless customers will enjoy even faster connections to people, information, and entertainment in a day and age when reliable wireless connectivity is an indispensable part of daily personal and business life.

As explained within this report, Verizon Wireless has identified the need for a permanent, replacement facility to its temporary facility at 51 Industrial Drive. The proposed permanent site will allow Verizon to maintain or improve its coverage and capacity to northern North Smithfield, RI.

To maintain a reliable and robust communications system for the individuals, businesses, public safety workers and others who use its network, Verizon Wireless deploys a network of cell sites (also called wireless communications facilities) throughout the areas in which it is licensed to provide service. These cell sites consist of antennas mounted on structures, such as buildings and towers, supported by radio and power equipment. The receivers and transmitters at each of these sites process signals within 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. Handset signals that reach the cell site are transferred through land lines (or other means of backhaul transport) and routed to their destinations by sophisticated electronic equipment. In order for

Verizon Wireless' network to function effectively, there must be adequate overlapping coverage between the "serving cell" and adjoining cells. This not only allows a user to access the network initially, but also allows for the transfer or "hand-off" of calls and data transmissions from one cell to another and prevents unintended disconnections or "dropped calls."

Verizon Wireless' 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 dropped and blocked calls, slow data connections, or no wireless service at all, and are commonly referred to as coverage gaps.

The size of the area potentially served by each cell site depends 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. The actual service area at any given time also depends on the number of customers who are on the network in range of that cell site. As customers move throughout the service area, the transmission from the phone or other device is automatically transferred to the Verizon Wireless facility with the best reception, without interruption in service, provided that there is overlapping coverage between the cells.

Each cell site must be primarily designed to strike a balance between the overall geographic coverage area it will serve, and the site's capacity to support the usage within the coverage footprint. In rural areas, cell sites are generally designed to have broader coverage footprints because the potential traffic is sparser and distributed over a larger area. In more densely populated suburban and urban environments, the capacity to handle calls and data transmissions is of increasing concern, and cell sites must limit their coverage footprint to an area where the offered network traffic can be supported by the radio equipment and resources. Due to the aggressive historical and projected growth of mobile usage, particularly for mobile data (more than quadrupled from 2017-2022 for mobile wireless data traffic in the U.S.[1]), instances arise where the usage demand can no longer be supported by the site(s) serving an area, and new facilities must be integrated to provide capacity relief to the overloaded sites.

We have concluded that with the proposed monopole located at 51 Industrial Drive at an antenna centerline height of 137' AGL (above ground level), Verizon Wireless will be able to maintain or improve coverage and capacity that residents and visitors have been accustomed to in the area once the temporary facility at 51 Industrial Drive is decommissioned.

[1] "2023 Annual Survey Highlights", July 25, 2023, CTIA. https://www.ctia.org/news/2023-annual-survey-highlights

3. The Proposed Facility

Verizon Wireless' component of this proposed facility consists principally of the following elements:

1) A 10' x 30' ground lease area within American Tower's proposed 37' x 48' fenced compound for telecommunications cabinets and related equipment.
2) Twelve (12) panel antennas (3 sectors, 4 per sector) mounted on the proposed 140' monopole at a centerline elevation of 137' ± AGL.

4. Coverage and Capacity Objectives

As mentioned above, Verizon Wireless is in the process of advancing its 4G LTE high-speed wireless broadband system in the 700 MHz, Cellular, PCS, AWS and CBRS frequency bands, in accordance with its applicable licenses from the FCC. Verizon is also deploying a 5G NR system in its licensed cellular, C-Band, and 28 GHz frequency bands. In order to expand and enhance their wireless services throughout New England, Verizon Wireless must fill in existing coverage gaps and address capacity, interference, and high-speed broadband issues. As part of this effort, Verizon Wireless has determined that significant gaps in service will exist in and around sections of North Smithfield once the temporary facility is decommissioned as described further below.

Verizon Wireless currently operates wireless facilities similar to the proposed facility within North Smithfield and the surrounding cities/towns. Due in large part to the distances between the existing sites, the intervening topography, and volume of user traffic in the area, these existing facilities do not provide sufficient coverage and capacity to portions of North Smithfield. Specifically, Verizon Wireless determined that much of northern North Smithfield will be without reliable service in the following areas and town roads, after the decommissioning of the temporary facility at 51 Industrial Drive:

- Route 146 (N Smithfield Expressway)
- Route 102/146A (Victoria Highway)
- Route 5 (Providence Pike)
- Main Street
- The surrounding roads, residences, and businesses in the proximity of the proposed site.

The proposed site located at 51 Industrial Drive ("North Smithfield Relo") is needed to fill in these targeted gaps in service, in order to improve network quality and reliability for Verizon Wireless subscribers traveling along these roads, as well as to the numerous residents, businesses, and visitors in this area.

5. Site Search and Selection Process

To find a site that provides acceptable coverage, adequate capacity, and fills the gaps in service, computer modeling software is used to define a search area. The search ring identifies the area within which a site could be located (assuming sufficient height is considered) that would have a high probability of addressing the significant coverage gap and/or meeting the capacity objectives established by the Verizon Wireless RF (Radio Frequency) engineers.

Once a search ring is determined, Verizon Wireless' real estate specialists search within the proximity of the defined area for existing buildings, towers, and other structures of sufficient height that would meet the defined objectives. If none are found, then the focus shifts to "raw land" sites. A suitable site must satisfy the technical requirements identified by the RF engineers, must be available for lease, and must have access to a road and be otherwise suitable for constructing a cell site of the required size and height. Every effort is made to use existing structures before pursuing a "raw land" build to minimize the number of new towers throughout the cities and towns being served.

Since no suitable existing structures in the area have been identified as a permanent facility replacement to the existing temporary facility, Verizon Wireless concluded that the proposed monopole at 51 Industrial Drive is necessary to address its targeted coverage and capacity objectives.

6. Pertinent Site Data

Table 1 below details the site-specific information for the on-air and proposed Verizon Wireless macro-sites used to perform the coverage analysis and generate the coverage plots provided herein.

Site Name	Address	City/Town	Location		Structure Type	Antenna Height (ft AGL)	Status
			Latitude	Longitude			
Blackstone	83 Federal Street	Blackstone	42.0260	-71.5282	Monopole	125	On-Air
Burrillivlle	316 S Main Street	Pascoag	41.9503	-71.6950	Lattice	160	On-Air
Burrillivlle Oakland	141 Clear River Drive	Harrisville	41.9614	-71.6542	Monopole	160	On-Air
Burrillville 2	1992 Victory Highway	Burrillville	41.9748	-71.6285	Lattice	138	On-Air
Burrillville N	200 Brook Road	Harrisville	42.0060	-71.6881	Lattice	150	On-Air
Glocester NE	541 Cooper Road	Chepachet	41.9186	-71.6179	Lattice	160	On-Air
Lincoln N	33 Division Street	Manville	41.9707	-71.4752	Steeple Church	70	On-Air
Millville	70 Quaker Street	Uxbridge	42.0220	-71.5928	Lattice	135	On-Air
Millville 2	295 Mendon St	Blackstone	42.0613	-71.5537	Lattice	180	On-Air
N Smithfield	646 Douglas Pike	North Smithfield	41.9415	-71.5575	Monopole	168	On-Air
N Smithfield 2	575 Smithfield Road	North Smithfield	41.9834	-71.5187	Monopole	137	On-Air
N Smithfield 3	Iron Mine Hill Road	North Smithfield	41.9595	-71.5011	Lattice	88	On-Air
Smithfield 2	359 George Washington Hwy	Smithfield	41.9233	-71.5102	Lattice	130	On-Air
Smithfield 6	550 George Washington Hwy	Smithfield	41.9360	-71.4911	Rooftop	87	On-Air
Sprague ville	339 C Farnum PIKE	Smithfield	41.9148	-71.5449	Monopole	175	On-Air
Uxbridge RT146	89 Aldrich Street	Uxbridge	42.0393	-71.6274	Lattice	160	On-Air
Woonsocket	151 Social Street	Woonsocket	42.0068	-71.5092	Rooftop	145.9/149.75	On-Air
Woonsocket 2	434 Washington Street	Woonsocket	41.9953	-71.5051	Lattice	150	On-Air
Woonsocket 3	568 Rhodes Avenue	Woonsocket	42.0043	-71.5375	Watertank	102	On-Air
North Smithfield Temp	*51 Industrial Drive*	*North Smithfield*	*41.9933*	*-71.5719*	*Monopole*	*137*	*Decomm*
North Smithfield Relo	**51 Industrial Drive**	**North Smithfield**	**41.9939**	**-71.5710**	**Monopole**	**137**	**Proposed**

Table 1: Verizon Wireless Site Information Used in Coverage Analysis [2] [3]

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

[3] The site "North Smithfield Temp" as italicized in the table above is the temporary facility that will be decommissioned.

7. Coverage Analysis and Propagation Plots

The signal propagation 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 model coverage and other related RF parameters used in site design and network expansion.

The coverage plots included as attachments show coverage based on RSRP signal strengths of -105 dBm and above. All other areas (depicted in white) fall within coverage areas characterized by poor service quality, low data throughput, and the substantial likelihood of unreliable service. The shaded areas are categorized by the following thresholds: green indicates coverage greater than -85 dBm, yellow represents coverage between -85 dBm and -95 dBm, gray indicates coverage from -95 dBm to -105 dBm, and areas with coverage less than -105 dBm are shown in white.

Attachments A - J are discussed below:

Attachment A titled "*North Smithfield Relo RI – 700 MHz Coverage with North Smithfield Temp Site*" illustrates the current 700 MHz LTE coverage provided by existing "On-Air" macro-sites listed in Table 1, including the "North Smithfield Temp" site located at 51 Industrial Drive. As depicted in this plot and described in the Coverage and Capacity Objectives section of this report, the surrounding sites with the temporary site provide adequate coverage along Route 146 (N Smithfield Expressway), Route 102/146A (Victory Highway), Route 5 (Providence Pike), Main Street, and the surrounding roads, residences, and businesses in this area of North Smithfield.

Attachment B titled "*North Smithfield Relo RI - 700 MHz LTE Coverage without North Smithfield Temp or Proposed Site*" shows the existing 700 MHz LTE coverage without the "North Smithfield Temp" and proposed "North Smithfield Relo" permanent facility. As shown in this plot, decommissioning the "North Smithfield Temp" facility will open coverage gaps in northern Smithfield along key roadways and other areas of the Town. These deficiencies, particularly in the gray and white areas, highlight the areas in need for improved coverage to ensure reliable service throughout the region. The table below shows the loss areas of coverage once the "North Smithfield Temp" is decommissioned.

Coverage Loss from North Smithfield Temp Site (700 MHz)		
Category	**(≥ -85 dBm)**	**(≥ -95 dBm)**
Population:	~2,390	~2,990
Business:	~950	~1,000
Roadways (~ mi):		
Route 146 (N Smithfield Expressway	1.1	0.9
Route 102/146A (Victoria Highway)	1.4	2.6
Route 5 (Providence Pike)	0.9	0.8
Main Street	0.5	1.0

Table 2: Coverage Loss[4] [5] (700 MHz)

[4] Residential population counts referenced here and elsewhere within this report are based upon the 2020 U.S. Census data.

[5] Employee population counts referenced here and elsewhere within this report are based upon the 2020 U.S. Census Bureau LEHD database.

Attachment C titled "*North Smithfield Relo RI - 700 MHz LTE Coverage with Proposed Site*" shows the composite 700 MHz LTE coverage with the proposed "North Smithfield Relo" facility. As shown in this map, the proposed site would replace the coverage and capacity previously provided and preserve or improve the level of the service its customer base is accustomed to in North Smithfield, RI. The proposed facility will provide coverage to:

Incremental Coverage from Proposed Site (700 MHz)		
Category	**(≥ -85 dBm)**	**(≥ -95 dBm)**
Population:	~2500	~2920
Business:	~990	~1040
Roadways (~ mi):		
Route 146 (N Smithfield Expressway	1.2	0.9
Route 102/146A (Victoria Highway)	1.5	2.7
Route 5 (Providence Pike)	0.9	0.8
Main Street	0.5	1.1

Table 3: Incremental Coverage (700 MHz)

Attachment D titled "*North Smithfield Relo RI – 2100 MHz Coverage with North Smithfield Temp Site*" illustrates the 2100 MHz coverage provided by the "On-Air" macro-sites listed in Table 1, including the "North Smithfield Temp" Site.

Attachment E titled "*North Smithfield Relo RI - 2100 MHz LTE Coverage without North Smithfield Temp or Proposed Site*" shows the 2100 MHz coverage without the "North Smithfield Temp" and proposed "North Smithfield Relo" facility. Because of the inferior propagation characteristics of 2100 MHz relative to 700 MHz, the extent of the coverage gaps shown here impact a much larger area than depicted in Attachment B. Decommissioning of the temporary facility "North Smithfield Temp" will create a gap in coverage to:

Coverage Loss from North Smithfield Temp Site (2100 MHz)		
Category	**(≥ -85 dBm)**	**(≥ -95 dBm)**
Population:	~160	~540
Business:	~100	~210
Roadways (~ mi):		
Route 146 (N Smithfield Expressway	-	0.4
Route 102/146A (Victoria Highway)	-	0.4
Route 5 (Providence Pike)	0.1	0.3
Main Street	0.1	0.1

Table 4: Coverage Loss (2100 MHz)

Attachment F titled "*North Smithfield Relo RI - 2100 MHz LTE Coverage with Proposed Site*" shows the composite 2100 MHz coverage with the "North Smithfield Relo" facility as a replacement for the "North Smithfield Temp" facility. As shown by the additional areas of coverage in this map, the proposed facility will provide coverage to:

Incremental Coverage from Proposed Site (2100 MHz)		
Category	**(≥ -85 dBm)**	**(≥ -95 dBm)**
Population:	~155	~540
Business:	~120	~230
Roadways (~ mi):		
Route 146 (N Smithfield Expressway	0.1	0.3
Route 102/146A (Victoria Highway)	-	0.4
Route 5 (Providence Pike)	-	0.3
Main Street	0.1	0.1

Table 5: Incremental Coverage (2100 MHz)

Attachment G titled "*North Smithfield Relo RI – 700 MHz LTE Sector Footprints with North Smithfield Temp*" depicts the areas primarily served by the sectors (a.k.a. signal "footprints") of the surrounding Verizon Wireless macro sites in the area, including the "North Smithfield Temp" site, which are shown by the unique color for each particular sector of interest. For clarity, all other sectors of less interest with respect to the proposed site are shown in grey. As demand for wireless voice and data services continues to grow, Verizon Wireless manages the footprint of each sector so that it can support the demand within the area it is primarily serving. As shown in this map by the dark green areas, the "North Smithfield Temp" is located in a busier area with heavier network demand, making it particularly suited to distribute the traffic load and provide a dominant server to this are of Town. Please note that the outer parts of each sector footprint may include areas that presently have signal strength below the targeted value required for reliable service to Verizon Wireless' customers. The fact that low-level signal may reach these areas does not mean that these areas experience adequate coverage. These unreliable areas of low signal level can impose a significant capacity burden on the sites primarily serving the area.

Attachment H titled "*North Smithfield Relo RI – 700 MHz LTE Sector Footprints without North Smithfield Temp or Proposed Site*" depicts the areas that would be served by the sectors of surrounding Verizon sites once the "North Smithfield Temp" facility is decommissioned. In addition to opening coverage gaps to the area, the network traffic in the area would be shifted to the surrounding sector(s) which results in substantially increasing the burden experienced by those surrounding sites trying to fill the coverage and capacity void left behind. Table 6 below details the additional load placed on the "Millville" beta sector (blue), "Woonsocket 3" gamma sector (red), "N Smithfield 2" gamma sector (yellow), and "Uxbridge RT 146" beta sector (orange) based on the sector footprints shown in Attachments G and H.

Sector	Current			Without "North Smithfield Temp"			Additional Load Summary		
	Area (mi^2)	Residental Pops	Employee Pops	Area (mi^2)	Residental Pops	Employee Pops	Total Area Added (mi^2)	Total Residential Pops Added	Total Employee Pops Added
Millville Beta	0.89	524	128	2.19	1963	559	**1.3 (+59.4%)**	**1439 (+73.3%)**	**431 (+77.1%)**
Woonsocket 3 Gamma	0.35	614	312	1.17	1218	788	**0.82 (+70.1%)**	**604 (+49.6%)**	**476 (+60.4%)**
N Smithfield 2 Gamma	2.34	3901	474	3.14	4697	646	**0.8 (+25.5%)**	**796 (+16.9%)**	**172 (+26.6%)**
Uxbridge RT146 Beta	4.41	992	73	5.58	1505	133	**1.17 (+21%)**	**513 (+34.1%)**	**60 (+45.1%)**

Table 6: Additional Capacity and Loading Summary

Attachment I titled "*North Smithfield Relo RI – 700 MHz LTE Sector Footprints with Proposed Site*" shows the composite coverage with the overall footprint of the proposed "North Smithfield Relo" facility in green as a replacement for the "North Smithfield Temp" site. As shown in this map, the proposed facility is an effective solution to backfill the void that would be left after decommissioning the "North Smithfield Temp" site and minimize the impact to the surrounding sites in the Verizon Wireless network. Table 7 below compares the loading of the "Millville" beta sector, "Woonsocket 3" gamma sector, "N Smithfield 2" gamma sector and "Uxbridge RT146" beta sector in its current state with "North Smithfield Temp" on-air, and with the proposed "North Smithfield Relo" site, based on the sector footprints shown in Attachments G and I. The overall change is that the proposed site will offset the increased burden on the "Millville" beta sector, "Woonsocket 3" gamma sector, "N Smithfield 2" gamma sector and "Uxbridge RT146" beta sector once the "North Smithfield Temp" site is decommissioned.

Sector	Current			Proposed With "North Smithfield Relo"			Delta Summary		
	Area (mi^2)	Residental Pops	Employee Pops	Area (mi^2)	Residental Pops	Employee Pops	Total Area Added (mi^2)	Total Residential Pops Added	Total Employee Pops Added
Millville Beta	0.89	524	128	0.9	493	129	**0.01 (+1.1%)**	**-31 (+-6.3%)**	**1 (+0.8%)**
Woonsocket 3 Gamma	0.35	614	312	0.32	605	278	**-0.03 (+-9.4%)**	**-9 (+-1.5%)**	**-34 (+-12.2%)**
N Smithfield 2 Gamma	2.34	3901	474	2.3	3877	466	**-0.04 (+-1.7%)**	**-24 (+-0.6%)**	**-8 (+-1.7%)**
Uxbridge RT146 Beta	4.41	992	73	4.62	1067	77	**0.21 (+4.5%)**	**75 (+7%)**	**4 (+5.2%)**

Table 7: Delta Summary

Attachment J titled "*North Smithfield Relo RI – Area Topography Map*" details the topographical features around the proposed "North Smithfield 4" site. These terrain features play a key role in dictating both the unique coverage areas served from a given location, and the coverage gaps within the network. This map is included to provide a visual representation of the terrain variations that must be considered when determining the appropriate location and design of a proposed wireless facility. The blue, green and yellow shades correspond to lower elevations, whereas the orange, red, grey and white shades indicate higher elevations.

8. Certification of Non-Interference

Verizon Wireless certifies that the proposed facility will not cause interference to any lawfully operating emergency communication system, television, telephone or radio, in the surrounding area. The FCC has licensed Verizon Wireless to transmit and receive in specific frequency blocks of the 700 MHz band, the Cellular band, the PCS band, the AWS band, the CBRS band, the C-band, and 28 GHz band of the RF spectrum. As a condition of the FCC licenses, Verizon Wireless is prohibited from interfering with other licensed devices that are being operated in a lawful manner. Furthermore, no emergency communication system, television, telephone, or radio is licensed to operate on these frequencies, and therefore interference is highly unlikely.

9. Summary

In undertaking its build-out of 4G LTE and 5G NR service in Providence County, Verizon Wireless has determined that a permanent facility is needed to maintain reliable service and capacity throughout areas of northern areas of North Smithfield. Verizon Wireless determined that collocating on the proposed wireless communications facility located at 51 Industrial Drive in North Smithfield at an antenna centerline height of 137 feet (AGL) will provide adequate replacement coverage and capacity needed in the targeted coverage areas including key roadways such as Route 146 (N Smithfield Expressway), Route 102/146A (Victory Highway), Route 5 (Providence Pike), Main Street, and to the surrounding roads, residences, and businesses in the proximity of the proposed site. Without the installation of the proposed site, Verizon Wireless will be unable to maintain its wireless communication services in this area of North Smithfield; therefore, Verizon Wireless respectfully requests that the Town of North Smithfield act favorably upon the proposed facility.

10. Statement of Certification

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

Keith Vellante

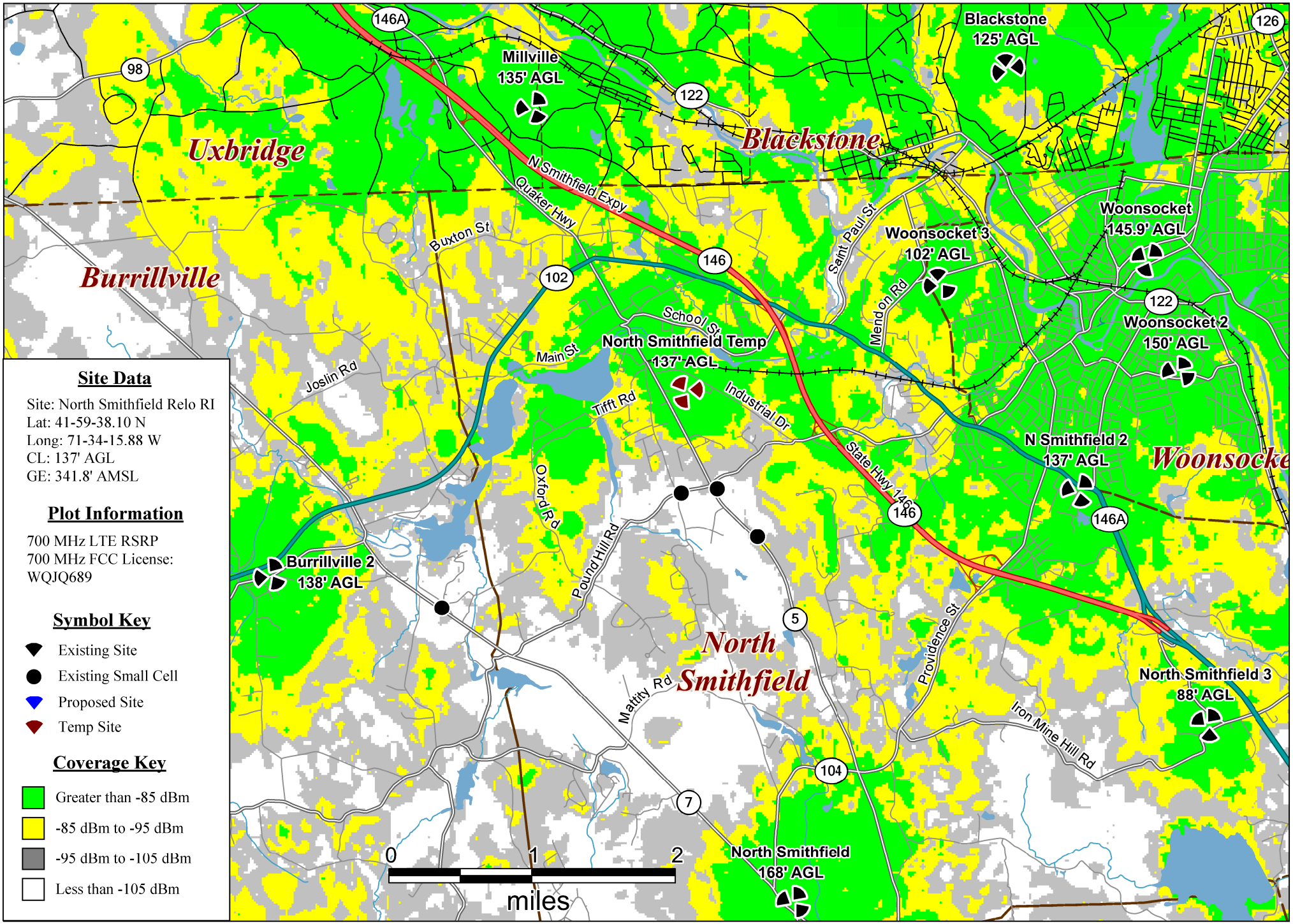
Keith Vellante
RF Engineer
C Squared Systems, LLC

October 21, 2024
Date

11. Attachments

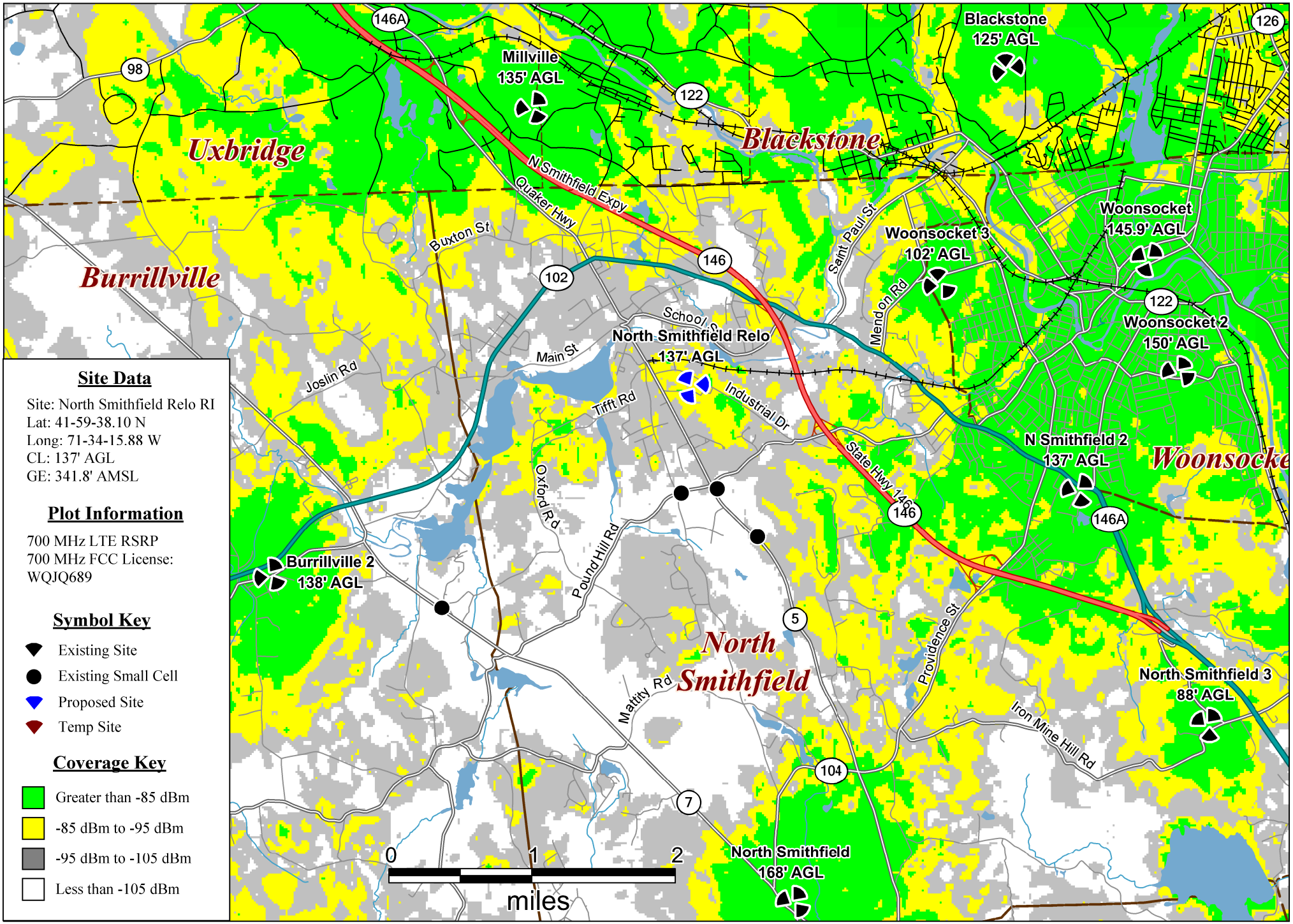
Attachment A:
North Smithfield Relo RI - 700 MHz LTE Coverage with North Smithfield Temp Site (Macro-Sites)

verizon



Attachment B:
North Smithfield Relo RI - 700 MHz LTE Coverage without North Smithfield Temp or Proposed Site (Macro-Sites)

verizon



Site Data

Site: North Smithfield Relo RI
Lat: 41-59-38.10 N
Long: 71-34-15.88 W
CL: 137' AGL
GE: 341.8' AMSL

Plot Information

700 MHz LTE RSRP
700 MHz FCC License: WQJQ689

Symbol Key

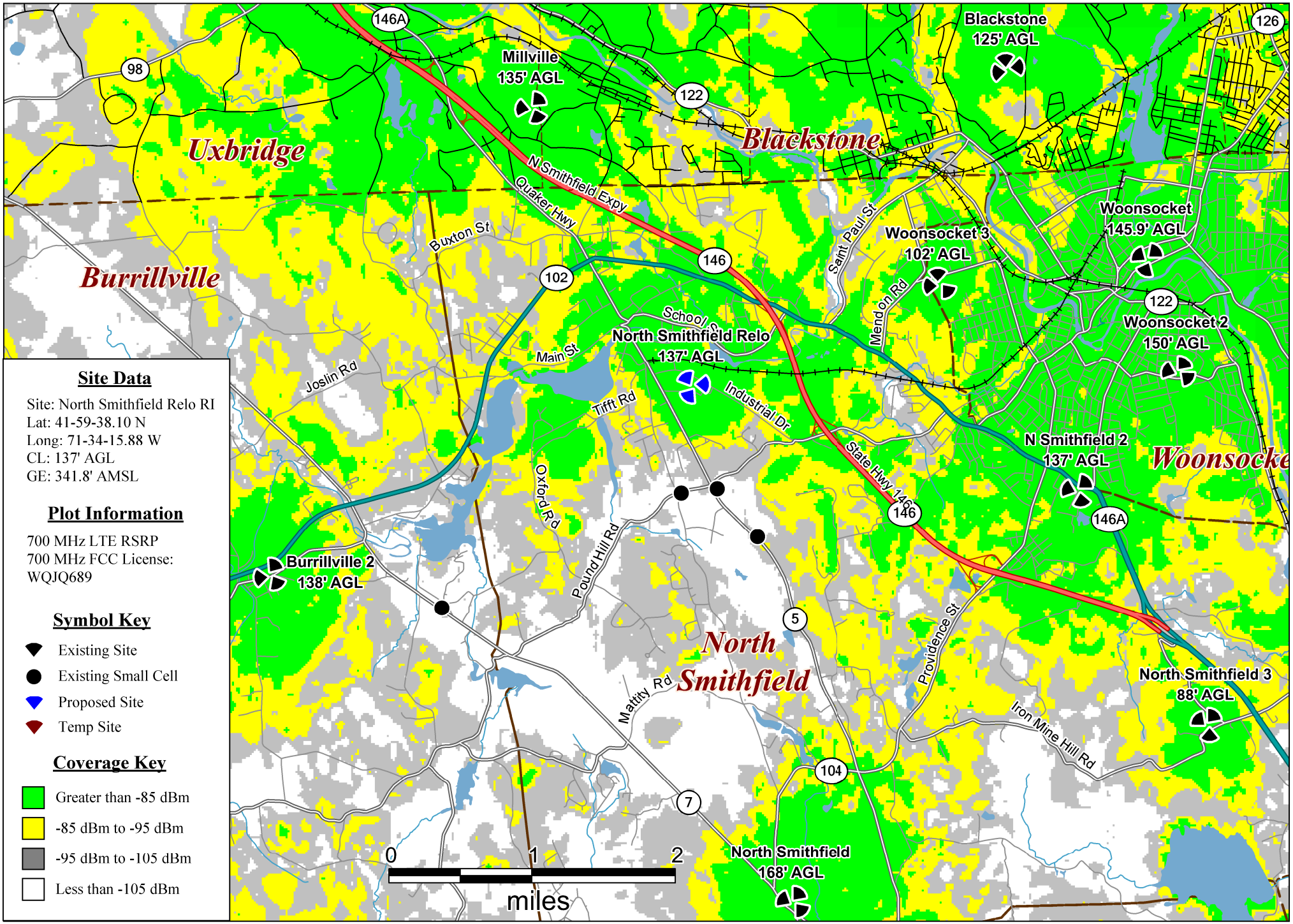
- Existing Site
- Existing Small Cell
- Proposed Site
- Temp Site

Coverage Key

- Greater than -85 dBm
- -85 dBm to -95 dBm
- -95 dBm to -105 dBm
- Less than -105 dBm

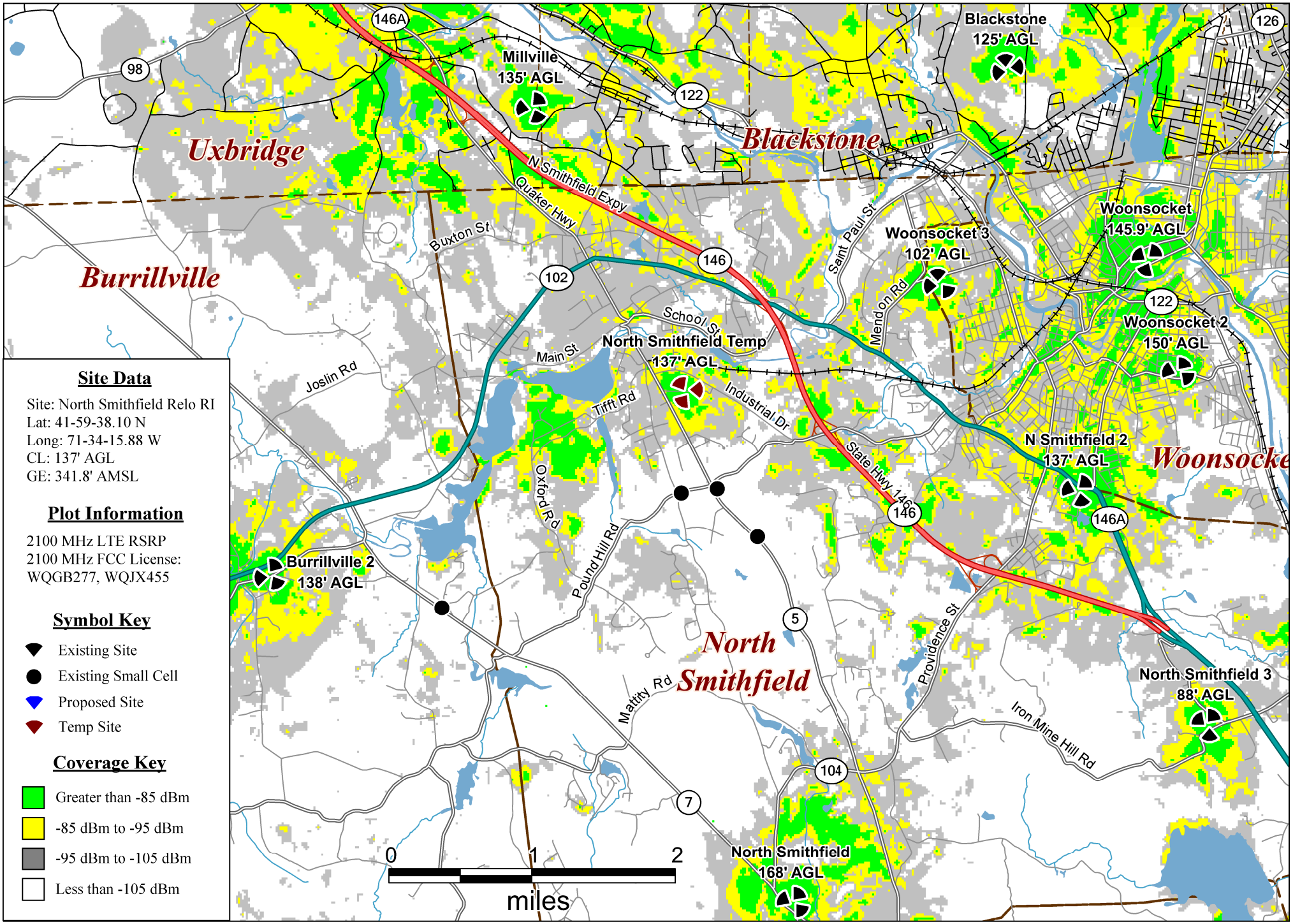
Attachment C:
North Smithfield Relo RI - 700 MHz LTE Coverage with Proposed Site (Macro-Sites)

verizon



Attachment D:
North Smithfield Relo RI - 2100 MHz LTE Coverage with North Smithfield Temp Site (Macro-Sites)

verizon



Site Data

Site: North Smithfield Relo RI
Lat: 41-59-38.10 N
Long: 71-34-15.88 W
CL: 137' AGL
GE: 341.8' AMSL

Plot Information

2100 MHz LTE RSRP
2100 MHz FCC License:
WQGB277, WQJX455

Symbol Key

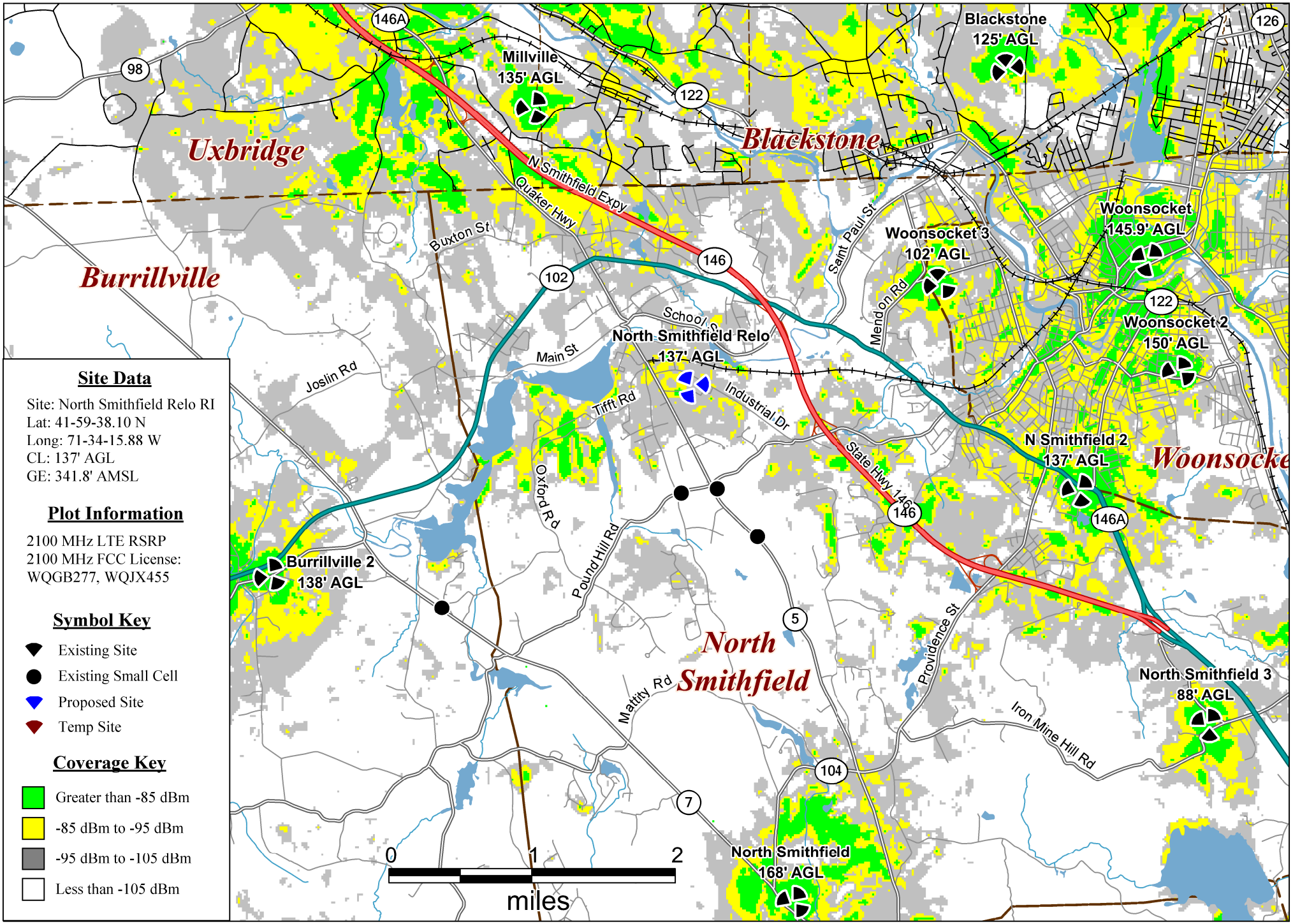
- Existing Site
- Existing Small Cell
- Proposed Site
- Temp Site

Coverage Key

- Greater than -85 dBm
- -85 dBm to -95 dBm
- -95 dBm to -105 dBm
- Less than -105 dBm

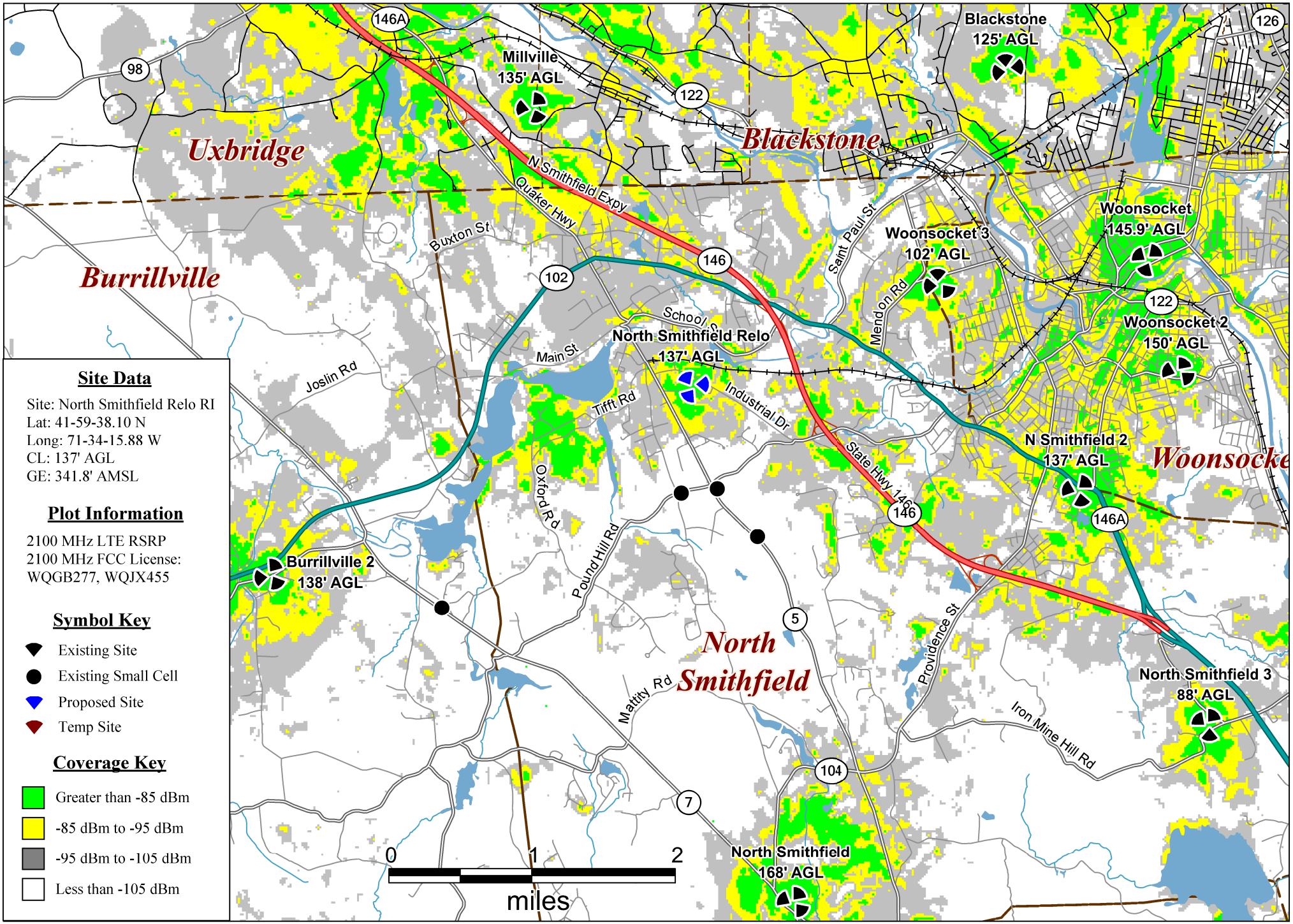
Attachment E:
North Smithfield Relo RI - 2100 MHz LTE Coverage without North Smithfield Temp or Proposed Site (Macro-Sites)

verizon



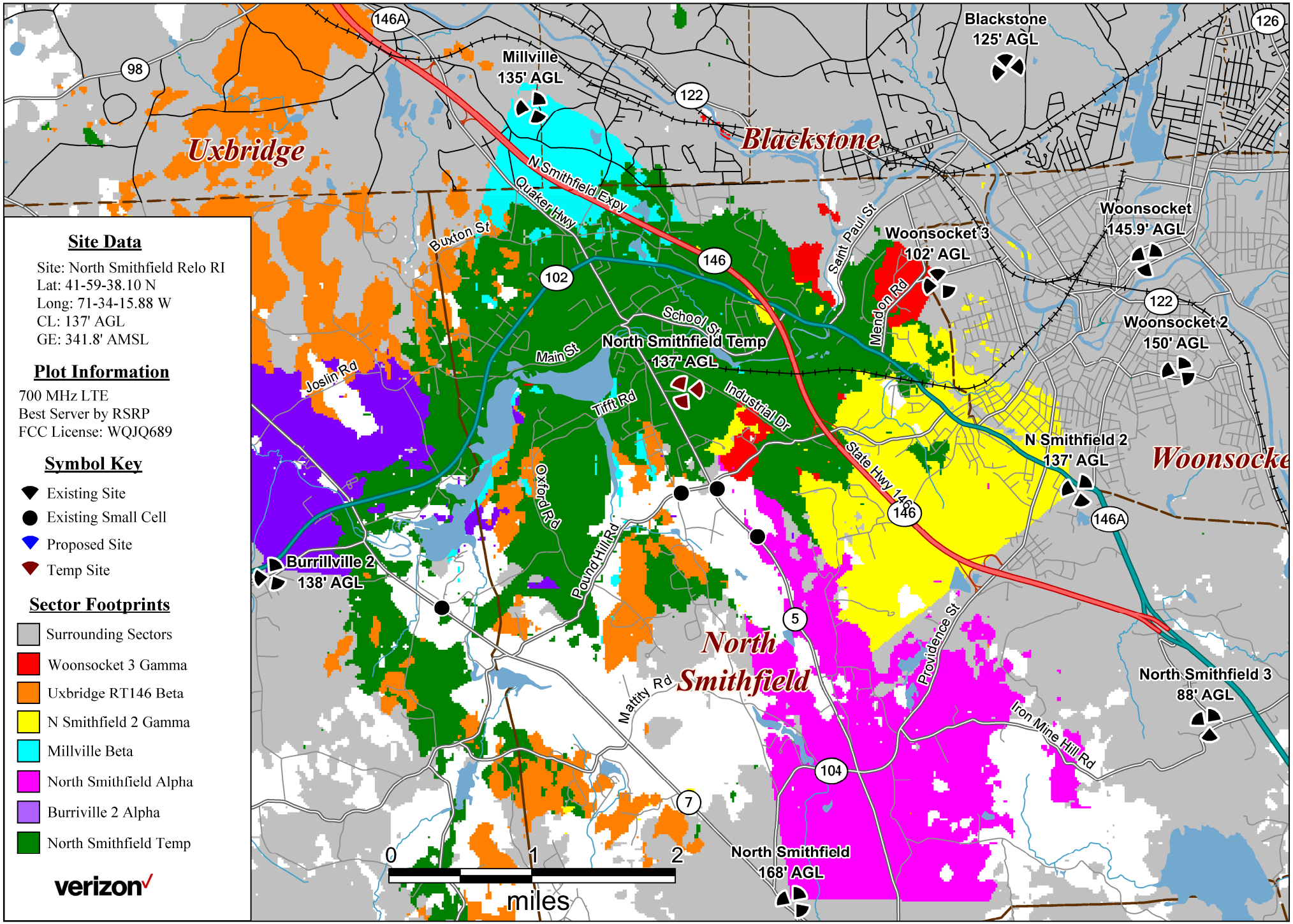
Attachment F:
North Smithfield Relo RI - 2100 MHz LTE Coverage with Proposed Site (Macro-Sites)

verizon



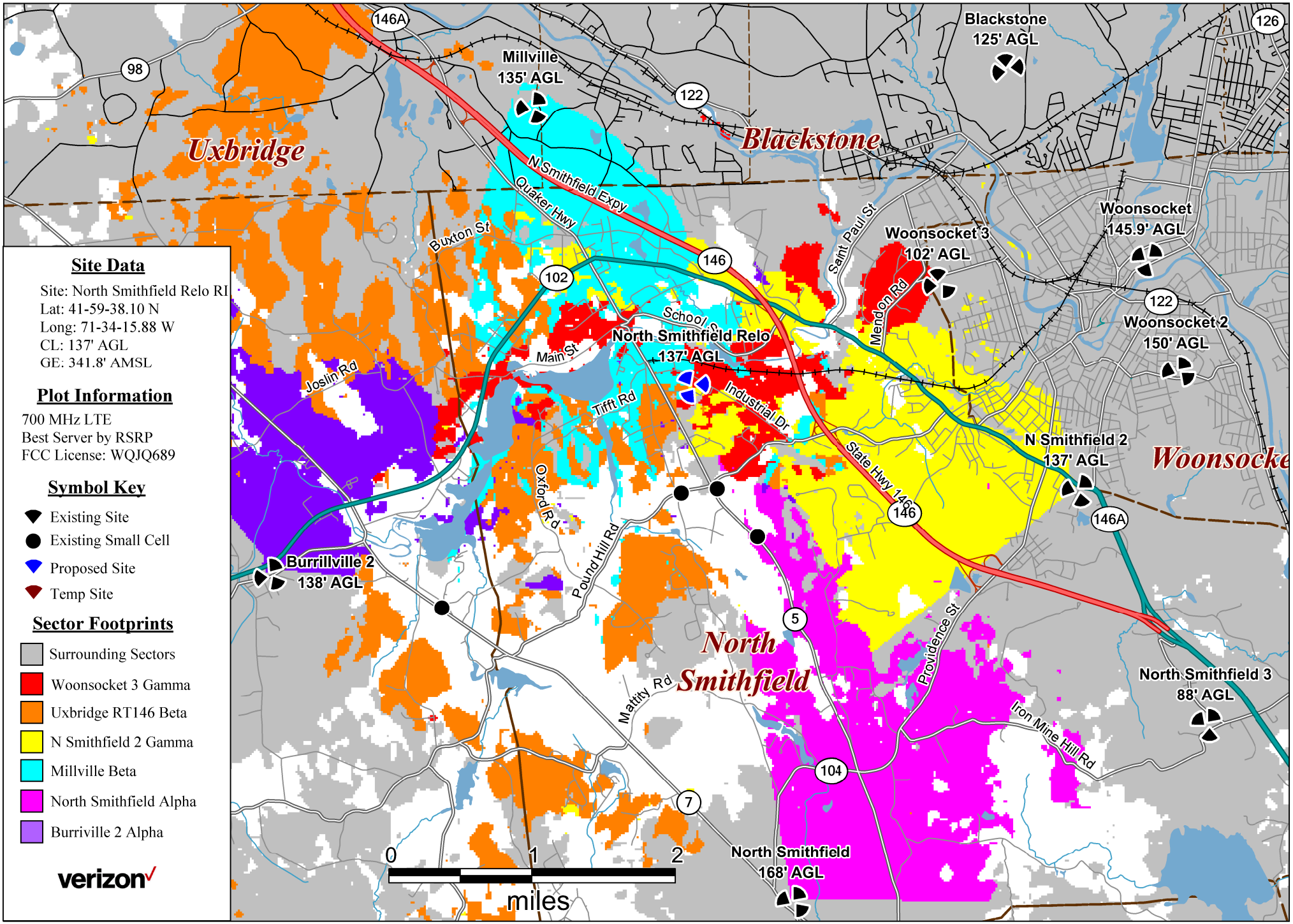
Attachment G:
North Smithfield Relo RI - 700 MHz LTE Sector Footprints with North Smithfield Temp (Macro-Sites)

verizon



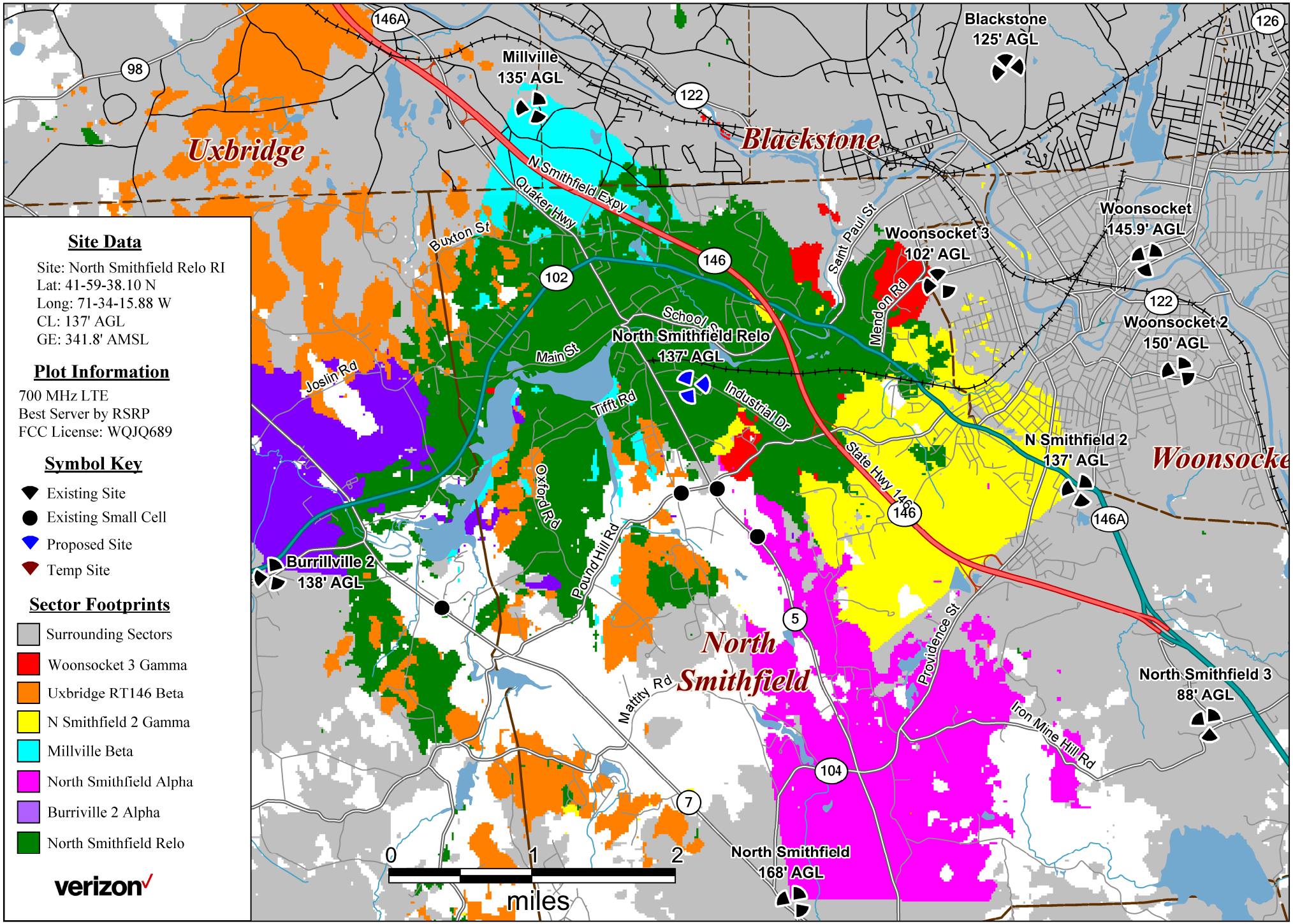
Attachment H:
North Smithfield Relo RI - 700 MHz LTE Sector Footprints without North Smithfield Temp or Proposed Site (Macro-Sites)

verizon



Attachment I:
North Smithfield Relo RI - 700 MHz LTE Sector Footprints with Proposed Site (Macro-Sites)

verizon



Attachment J:
North Smithfield Relo RI - Area Topography Map

verizon