Homeland Towers, LLC

NY161 TALLMAN SITE

350 Haverstraw Road
Montebello, New York

RF COVERAGE AND NEEDS ANALYSIS

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EXPERT WITNESS
RF ANALYSIS AND REPORT

The subject site was identified as a suitable location for a wireless communications facility and meets Verizon Wireless' coverage objectives in the Village of Montebello and supports additional carrier collocation. The proposed NY161 Tallman site will be located on a proposed 100-foot or 107-foot tower located at 350 Haverstraw Road in Village of Montebello, NY. Verizon Wireless proposes to install antennas at the centerline of 97 feet or 107 feet Above Ground Level (AGL).

QUALIFICATIONS

V-COMM, L.L.C. is a telecommunications engineering firm primarily focused on providing engineering and related services to municipalities and wireless carriers in the telecommunication industry. V-COMM was founded in 1995 with the intent of providing services to the emerging wireless and wired segments of the telecommunication industry. V-COMM's client base includes governmental entities, PCS operators, cellular, paging, ESMR and microwave operators, utility/telecommunications cooperatives, cable TV operators and Competitive Local Exchange Carriers (CLECs). Primary engineering and related services performed for these clients over the past twenty years include:

- RF Network Design, Implementation and Optimization
- Interconnect Network Design, Implementation and Optimization
- Telephony Signaling (SS-7) and Vertical Systems Design and Implementation
- Local Government Communication Systems
- Project Management of Network Implementation
- Expert Witness Zoning Testimony
- License Tender/Bid Technical Support

(Please see Mr. Villecco's and Mr. Stern's resumes at the end of the report)

WIRELESS SYSTEMS

The FCC licenses a specific and limited amount of radio frequency (RF) spectrum to each wireless carrier and stipulates that each carrier efficiently uses that spectrum to adequately service the public in its licensed areas. Proper network design and functionality requires the continuous reuse of the allocated radio frequencies throughout the licensed service area. This is accomplished by building small radio base stations, or cell sites, in a particular pattern (also known as a grid, which resembles honeycomb "cells" (hence the origin of the name "cellular" phones). The reuse of frequencies throughout the grid allows the wireless carrier the technical ability to provide service and is essential to the proper functionality of a cellular telephone system. By implementing this necessary technique (as originally defined by Bell Labs and further refined by the wireless industry), the same radio frequency can be reused at reasonably close intervals throughout the licensed area, without causing interference and defeating the functionality of the system. Noisy or dropped calls or the inability to originate a call are typical manifestations of interference.

When designing a wireless network, an RF Engineer starts with a theoretical grid pattern and applies it to the licensed area. Each licensed area has many variables that can affect the design and must be considered. These variables include terrain features, location of neighboring cell sites, land use considerations, zoning ordinances, availability of existing structures, traffic distribution and many others. In order to provide effective coverage while maintaining an efficient frequency reuse plan, the design engineer must perform a balancing test of all applicable variables. In short, there is often very limited flexibility as to where a cell site can be placed, and still work properly within the network.

The primary variables that the engineer must take into consideration are the location and the overall height of the cell site. If a cell site is too high, the signal will travel too far, and cause unacceptable interference throughout the rest of the wireless network. If a cell site is too low, it will fail to service the cell, and will fail to reach the neighboring cells and provide proper "handoff" to the neighboring cell.

A proper wireless network design begins with carefully and strategically located cell sites. As mentioned above, cell site location is critical to proper network functionality. Every cell site requires a structure for the antennae, such as a tower, building, steeple, water tank or sufficiently high structure on which antennas can be mounted. Typically, radio-transmitting equipment necessary for the antennas to function (i.e., the base station) is located at the base of the structure. Radio signals leave the base station and travel through transmission lines to the antennas, or from fiber optic cable to the remote radio head (RRH) at the top of structure and then to the antennas. Radio signals are broadcast through the antennas and travel to the customer's wireless phone, completing a call to the user. When a wireless user places a call, the signal is received by the antennas and travels down the transmission line and into the base station. The base station converts the signal into digital data and combines it with all the other wireless calls and digital traffic at that cell site. This data is then sent over fiber optic digital lines to the main switching computer. The main switching computer or Mobile Switching Center (MSC) is interconnected to the Public Switched Telephone Network (PSTN) and Internet Service Providers (ISP), where calls are routed to other wireless or land-line phones or internet locations.

As this technology enables mobile calling, once a wireless call is originated and the customer travels away from the cell site of origination, the system tracks the changes and begins a process of determining whether there is an available cell site that would provide more reliable service. Upon determination of a stronger serving site, the system automatically switches the wireless customer over to the new cell site. This process is known as a "handover" or "handoff" and allows for proper, seamless coverage within a wireless carrier's service area. By design, this process is supposed to happen so quickly that the wireless customer does not perceive it. If the network is designed properly, there is no interruption of service and connection quality remains adequate. This necessary design requires the proper location of sites, with minimal variance from the original grid pattern.

VERIZON WIRELESS EXISTING AND PROPOSED SITES IN & AROUND VILLAGE OF MONTEBELLO

V-COMM has identified the existing surrounding sites in the area of the proposed structure in the Village of Montebello. The proposed and existing Verizon sites are listed in Table 1, and are depicted in Figure 1.

TABLE 1 – VERIZON WIRELESS EXISTING AND PROPOSED SITES IN AND AROUND Village of Montebello, NY

Cell Name	Address	Structure Type	Antenna C/L in Ft.
NY161 Tallman (Proposed Site)	250 Haverstraw Road Village of Montebello, NY	Monopine	97 / 107
004 Wesley Hills 2	94 Lime Kiln Rd Suffern, NY	Monopine	150
030 Spring Valley RELO	5 Olympia Lane Monsey, NY	Lattice Tower	120
031 Suffern Park	255 Lafayette Ave Suffern, NY	Rooftop	92
090 Montebello	3 Executive Blvd Suffern, NY	Rooftop	99
091 Kaser	267 Eastview Rd Monsey, NY	Lattice Tower	137
123 Viola	145 College Rd Viola, NY	Monopine	126
167 Ramapo RELO	296 Route 17 Hillburn, NY	Monopole	67
243 Sloatsburg	3 Forest Rd Sloatsburg, NY	Monopole	120
345 Cranberry Pond	150 Route 17N Sloatsburg, NY	Flagpole	78
377 Suffern	35 Park Ave Suffern, NY	Rooftop	69.5
431 Monsey	175 Brick Church Rd Spring Valley, NY	Monopine	97
435 Suffern 2	Hemion Rd & I-287 Suffern, NY	Monopole	135
443 Torne Valley	44181 Lake St Ramapo, NY	Monopole	130
651 Ramapo RSC	261 Route 59 Airmont, NY	Rooftop	30.5

Figure 1 – Existing Verizon Wireless Sites In And Near Montebello

RF COVERAGE

V-COMM analyzed whether there was sufficient RF coverage and found insufficient and inadequate coverage for Verizon Wireless in both the 700 MHz and 2100 MHz frequency bands in this section of the Village of Montebello. In cases where the existing coverage in either 2100 MHz band or 700 MHz frequency band is not adequate, a new wireless facility is needed to provide enhanced coverage to the area.

The subject site was identified as a suitable location for a wireless communications facility and meets Verizon Wireless's coverage objectives in the Village of Montebello. The proposed NY161 Tallman site will be located on a proposed 100- or 110-foot Monopine located at 350 Haverstraw Road in Village of Montebello, NY. Verizon Wireless proposes to install its antennas at the centerline of 97 feet or 107 feet Above Ground Level (AGL). The antenna centerline of 97 feet is the height needed to provide the best coverage and increase capacity to the surrounding area for the Verizon Wireless network. The height of the subject site places it above all the vegetation in the targeted coverage area, increasing the site's coverage and service area. The antenna centerline of 107 feet would allow for improved coverage and additional clearance over the clutter for collocating carriers. Considering the coverage area and design requirements for a macrocell network in this town, the proposed site proves to be a suitable location.

The proposed monopine will have the ability to support collocation of up to 3 additional carriers. In the future, other carriers and operators will be able to add antennas to the monopine to supply supplementary coverage to the areas surrounding the site, as well.

For this section of the Village of Montebello, the subject site serves a predominately suburban area with dense forests. As the antenna center line (ACL) descends from the proposed 97 feet, it enters into a range where clutter becomes an increasingly problematic factor. Examples of clutter are trees, houses, buildings, soil, and other physical objects on the ground. Clutter attenuates or weakens and disperses the RF energy necessary for wireless telecommunications.

The propagation maps shown below provide the service area for the Reference Signal Received Power (RSRP) level that is the minimally acceptable received signal level for adequate service. The radio signal propagation and RSRP level includes the surrounding environment and the attenuation of in-building and in-vehicle use of service. The propagation maps below show the minimum acceptable coverage criteria (LTE signal level requirement of -95 dBm) to provide reliable wireless service to customers.

The propagation maps shown in Figure 2 and Figure 3 below show the existing Verizon Wireless 700 MHz coverage in Montebello. Figure 3 zooms in on the focused gap identified. This includes residences along Zeke Court, Bayard Lane, and Orchard Circle.

The propagation maps shown in Figure 4 and Figure 5 show the existing Verizon Wireless 2100 MHz coverage in Montebello. Figure 5 zooms in on the focused gap identified. This coverage gab includes US Route 202, Mayer Drive, and residences on Zeke Court, Bayard Lane, Orchard Circle, Victory Road, and Moriah Lane.

The propagation maps in Figure 6 and Figure 7 show the proposed 700 MHz coverage for Verizon Wireless with the Tallman site. Figure 7 zooms in on the targeted area to fill coverage. It is expected that all areas identified in the gap have reliable coverage, including residences along Zeke Court, Bayard Lane, and Orchard Circle.

The propagation maps in Figure 8 and Figure 9 show the proposed 2100 MHz coverage for Verizon Wireless with the Tallman site. Figure 9 zooms in on the target area to fill coverage. It is expected that all areas identified in the gap have reliable coverage including US Route 202, Mayer Drive, and residences on Zeke Court, Bayard Lane, Orchard Circle, Victory Road, and Moriah Lane.

Figure 2 – Verizon Wireless Existing 700 MHz Coverage

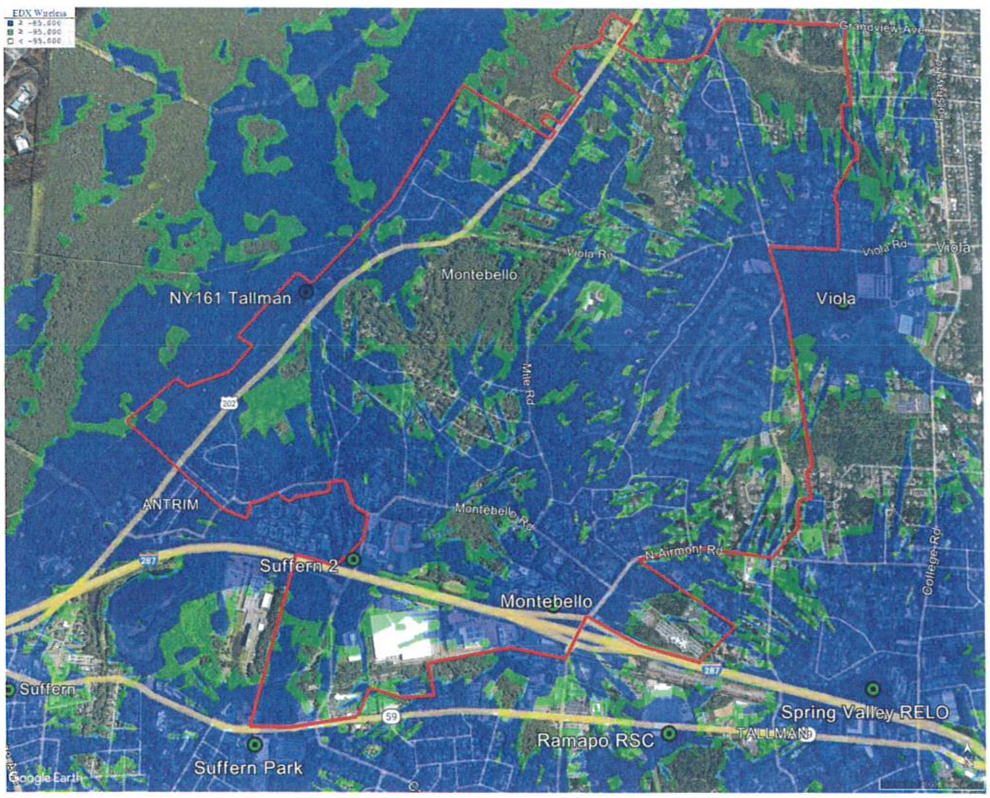


Figure 3 – Verizon Wireless Existing 700 MHz Coverage

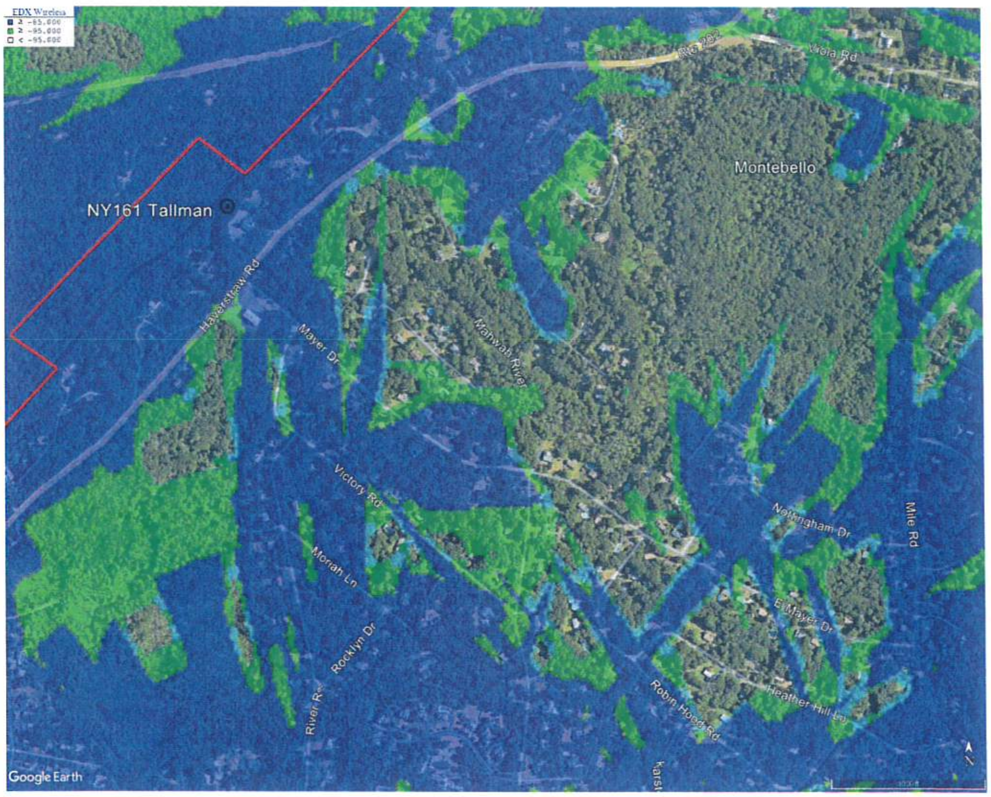


Figure 4 – Verizon Wireless Existing 2100 MHz Coverage

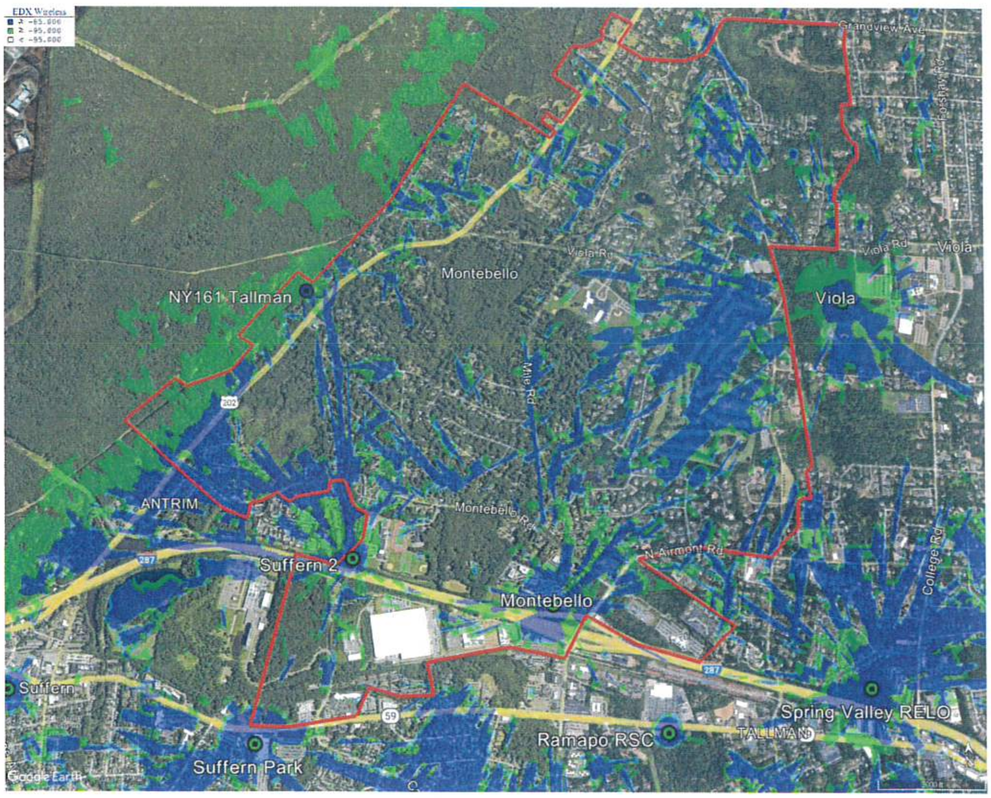
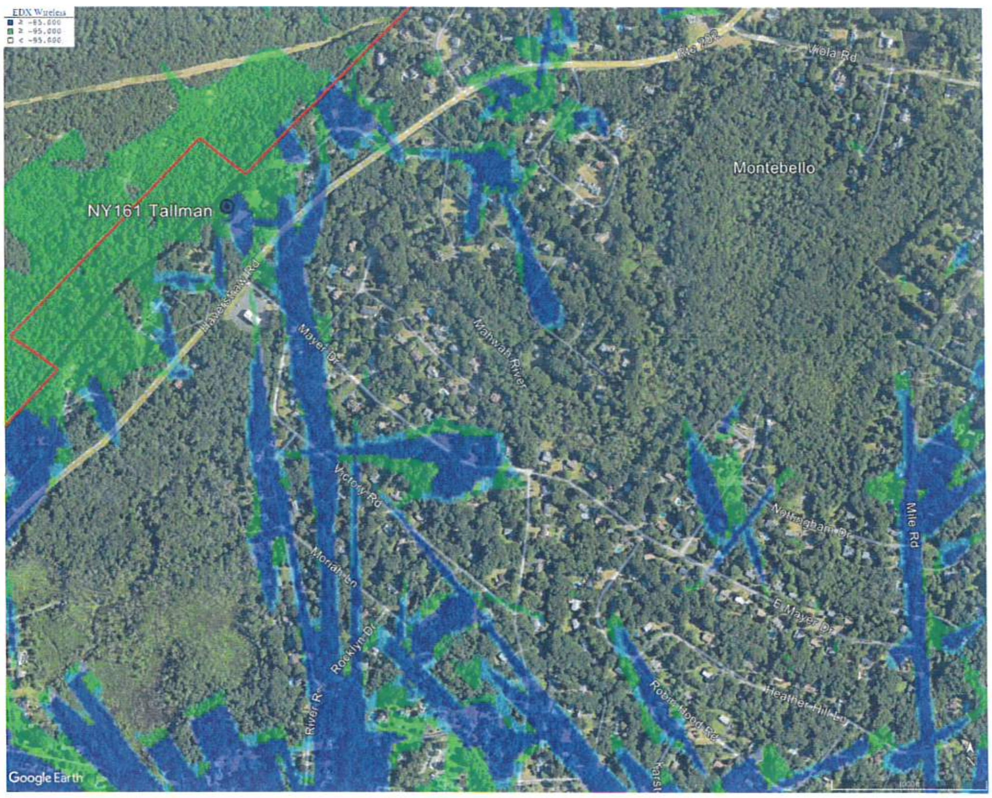
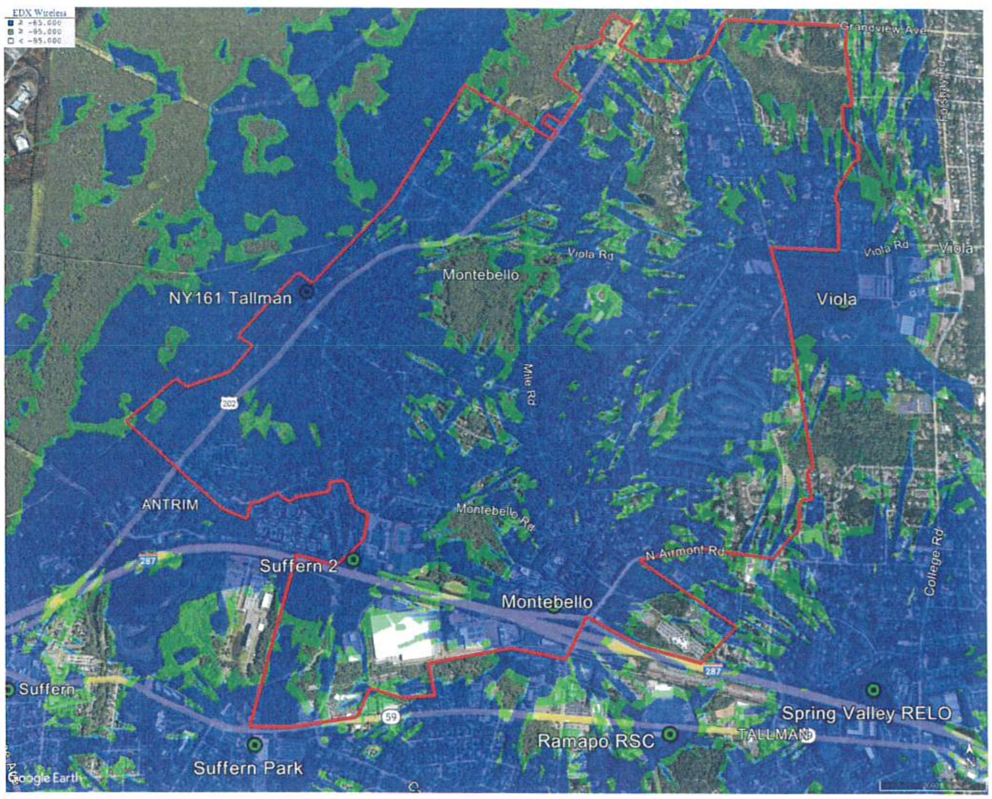


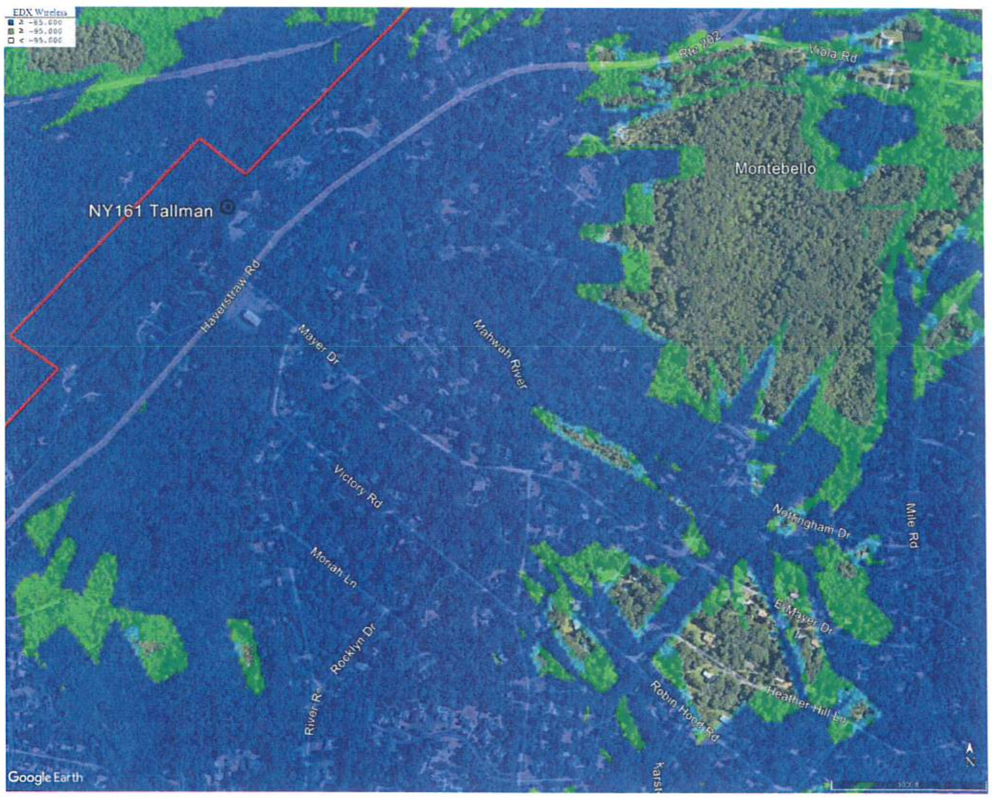
Figure 5 – Verizon Wireless Existing 2100 MHz Coverage



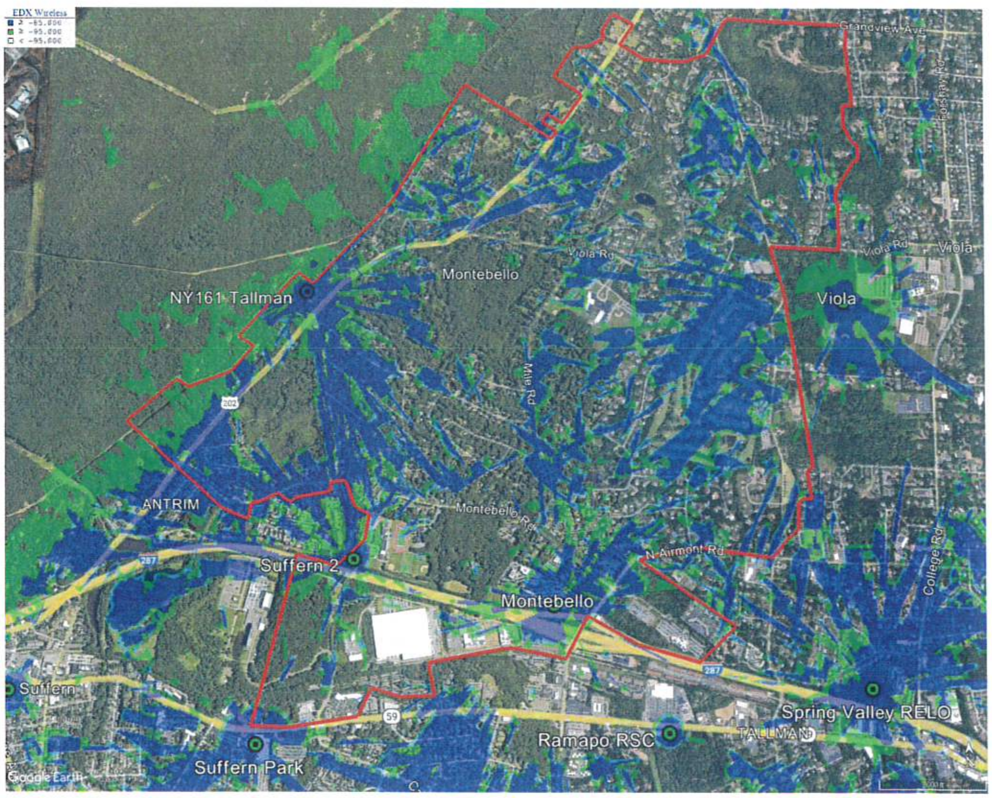
Map 6 – Verizon Wireless Proposed 700 MHz Coverage with 'NY161 Tallman'



Map 7 – Verizon Wireless Proposed 700 MHz Coverage Gap with 'NY161 Tallman'



Map 8 – Verizon Wireless Proposed 2100 MHz Coverage with 'NY161 Tallman'



Map 9 – Verizon Wireless Proposed 2100 MHz Coverage Gap with 'NY161 Tallman'