

State of Virginia
Telecommunications Site Review
New Support Structure
Initial Report



Consultants, Inc.
7040 W. Palmetto Park Road #4, PMB 652
Boca Raton, FL 33433-3483
Phone: 877-438-2851 • Fax: 877-220-4593

December 23, 2014

Ms. Wendy Wheatcraft
Preservation Planner
Fauquier County, Planning Division
10 Hotel Street, 3rd Floor
Warrenton, VA 20186

RE: Cellco Partnership
Verizon Wireless ~ Site 'Casanova'

Dear Ms. Wheatcraft,

At your request on behalf of Fauquier County, Virginia, ("County") CityScape Consultants, Inc. ("CityScape") in its capacity as telecommunications consultant for the County, has considered the merits of an application submitted by Cellco Partnership d/b/a Verizon Wireless ("Applicant"), to construct a new one hundred fifty-four (154) foot Non-Concealed tower in an open field, see *figure 1*. The facility is intended to accommodate three (3) additional collocations for a total of four (4) wireless service providers. The initial tenant will be Verizon Wireless, who has indicated a need for new facilities. The facility owner is assumed to be Verizon Wireless. The underlying ground area of the facility is owned by The Revocable Trust of Alice Jane Childs and the facility is physically located at 5272 Casanova Road in Fauquier County, see *figure 2*.

This application is for a new antenna support structure intended to improve personal wireless coverage in the immediate area and will incorporate newer technologies known as Advanced Wireless Services ("AWS") and Long Term Evolution ("LTE"). Population is high both with the static number of residents in the vicinity but also the substantial mobile traffic along State Road 643. The volume of wireless telephone activity has resulted in a number of dropped or uncompleted calls.

The proposed facility is considered a new telecommunications site. The County is provided the necessary oversight authority to assure the need for additional wireless infrastructure is warranted. Within the County ordinance are specifications that any new wireless facilities not only are justified but each new facility should be designed to provide for collocations because the county desires to meet the needs of the industry but not allow excessive infrastructure. The County prefers that new facilities be concealed as much as possible and encourages new facilities to be located within existing tree canopy and not exceed eighty (80) feet in height; if these provisions are not met, a Special Exception is required. As a result, the applicant requests a Special Exception.

As the number of subscribers grows and they spend additional time on-line, existing sites reach capacity and the need for additional wireless infrastructure along with additional spectrum is required to meet the increased demand. The future for personal wireless devices will require more and more facilities. There are federal plans to allot more spectrum to the personal wireless devices in stages.

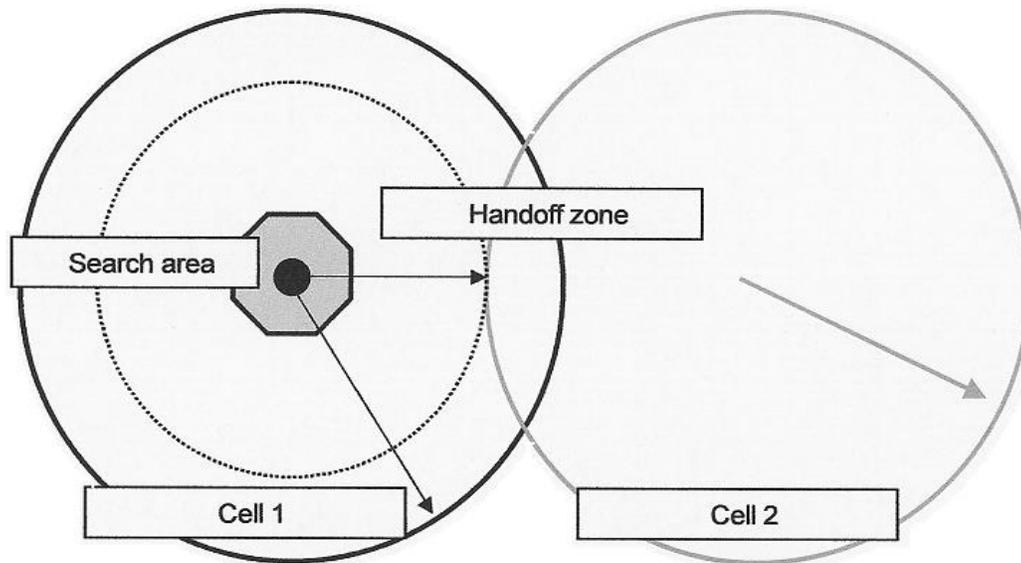
The criteria for the development of all new wireless facilities are similar. There is the identification of service coverage voids or a determination that a particular location is operating at or over the capacity of the available spectrum. All wireless communications systems depend on the concept of spectrum reutilization to achieve their great capacities. With some technologies, the individual channel frequencies are reused every few cells, but not too closely, since interference would result. In other systems, power from one base station interferes with the users on another, impacting network capacity. Therefore, it is undesirable for wireless phones to communicate with more than a few base stations simultaneously.

Wireless Broadband or LTE/AWS, Cellular, PCS and EMSR service providers attain coverage through ground equipment base stations and antennas mounted on towers or other elevated structures and buildings. The height and location of the elevated antenna platform is critical to two aspects of radio frequency (RF) engineering. First is wireless network coverage.

Generally, the higher the antenna is mounted on the support structure, the farther the wireless signal penetrates a defined geographic area. However, the ground equipment at the base station has capacity limitations. In areas where wireless subscribers are intense and airtime minutes are high, caller volume will exceed the designed network capacity. To help remedy this situation, the antenna heights are mounted at lower elevations than would be necessary for coverage.

In the wireless system evolution, a provider will, in early phases of infrastructure development, provide service with a few coverage base stations with relatively tall antenna elevations to maximize the "footprint" for minimal cost. As subscriber totals grow, and network capacity for that base station is maximized, antennas must be lowered and the areas in between the former "tall" base stations fill in with lower-antenna "coverage" base stations.

Such a stipulation is not difficult to achieve in a new system. In most counties and cities and in all rural areas, wireless providers seek to maximize height in new systems in order to provide continuous coverage at the least expense to the provider. However, in urban-to-suburban areas, as demand increases, the base stations become less capable of meeting network objectives. Thus, wireless providers seek to deploy antennas mounted at lower elevations.



Sample 1: Search Area Determination

In Sample 1, the hexagonal search areas radius is one-quarter of the radius of the cells coverage less a 20 percent handoff overlap.

Application Specifics

Specifically, the undersigned has evaluated this proposal from the following perspectives:
That,

1. The proposed facility will assist in reducing the over-capacity issues and will accelerate the ability for all wireless services to further expand; and,
2. The applicant has followed the guidelines of the Telecommunications Act of 1996, State of Virginia Law and all applicable aspects of the Fauquier County Ordinance.

All designs and plans for the proposed new facilities were developed according to accepted practices of RF propagation engineering and the persons completing all work are sufficiently qualified within their disciplines. Arguably the most important documentation for any new wireless facility is the applicant's Search Ring. The applicant did provide a map with a circle, see *figure 3*. CityScape does not believe that to be an accurate demonstration of a search ring. This was communicated to the applicant with a request for a corrected ring. At the same time, there were requests for improved documentation so the County could better understand the goals and objectives of the applicant. Propagation maps were submitted that did provide improved details with descriptions of what each map represented. The updated maps provided the projected LTE service area at eighty (80) feet; one hundred (100) feet; one hundred twenty (120) feet; and at the applicant's preferred elevation of one hundred fifty (150) feet. The applicant also provided maps showing the service projection at the AWS frequencies. The coverage for AWS is approximately half of the coverage of LTE because the difference in frequency directly affects the total coverage area.

It was mutually believed that a meeting of the applicant, County and CityScape could be beneficial to all. On November 12th, 2014 there was a meeting of all parties at the County offices. The County stated concerns about the search ring and the lack of detail and insufficient parameters listed on the coverage maps was hindering the County from understanding the purpose for the application. Additional discussion related to the selected site and potential alternative locations which had been considered that would possibly meet the requirements as specified within the County ordinance. The applicant made no reference to modifying the proposal to a concealed structure.

Based on the information presented at the meeting, there may be alternatives in the area that clearly will meet the applicant's goals and objectives and better fit within the County ordinance. If you reference the applicant's provided Search Ring (again, CityScape does not believe it is the actual ring used to identify the location), there are numerous alternative locations with substantial tree canopy. Also note the ground elevation at the proposed location and the ground elevation in other locations within the Search Ring vary and in some situations the ground elevations are beneficial to the applicant's objectives.

In the opinion of the undersigned the applicant has justified the need for a new support structure in the general area, but the submittals did not meet the threshold for approval of a Special Exception. The applicant should provide sufficient documentation as to why any alternative locations within their search ring would not better meet the carrier's objectives and the conditions as stated in the Fauquier County Ordinance. The applicant did submit a statement of compliance with all FCC rules.

Conclusion and Recommendation

CityScape is of the opinion that the approval for construction of a facility is warranted to improve wireless services in the general area and will provide advanced 4th Generation technology known as LTE and AWS. The proposed location has not met the specifications within the Fauquier County Ordinance; therefore, the undersigned recommends the County to either request the applicant to respond to the outstanding questions below or the application for a new facility at the proposed location be denied, based on the lack of supporting documentation that any or all other alternative locations have been exhausted. The lack of concealment is shown in *Exhibit A*; a photo of the proposed facility location as viewed directly from the Casanova .

CityScape recommends the Applicant respond to the following:

1. A statement of alternative sites considered and why they were rejected; and,
2. A statement that the applicant did consider meeting the provisions within the ordinance to construct the facility within an existing tree canopy; and ,
3. A statement as to why the applicant cannot use higher ground elevation to increase the antenna elevation through natural means; and,
4. The applicant exhausted all other alternatives prior to submission of the application.

Respectfully submitted,



Richard L. Edwards
FCC Licensed
PCIA Certified
CityScape Consultants, Inc.

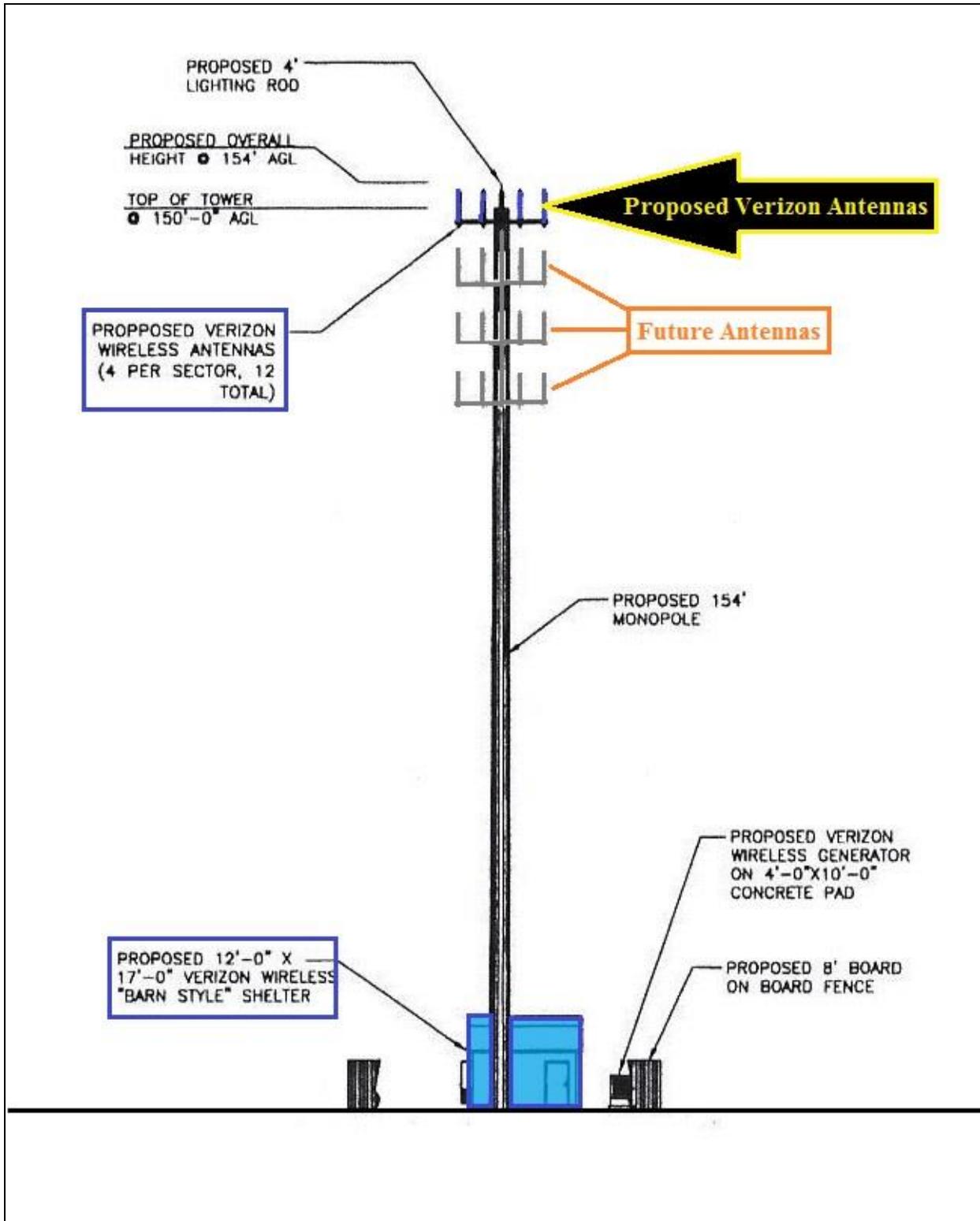


Figure 1. Tower Elevation

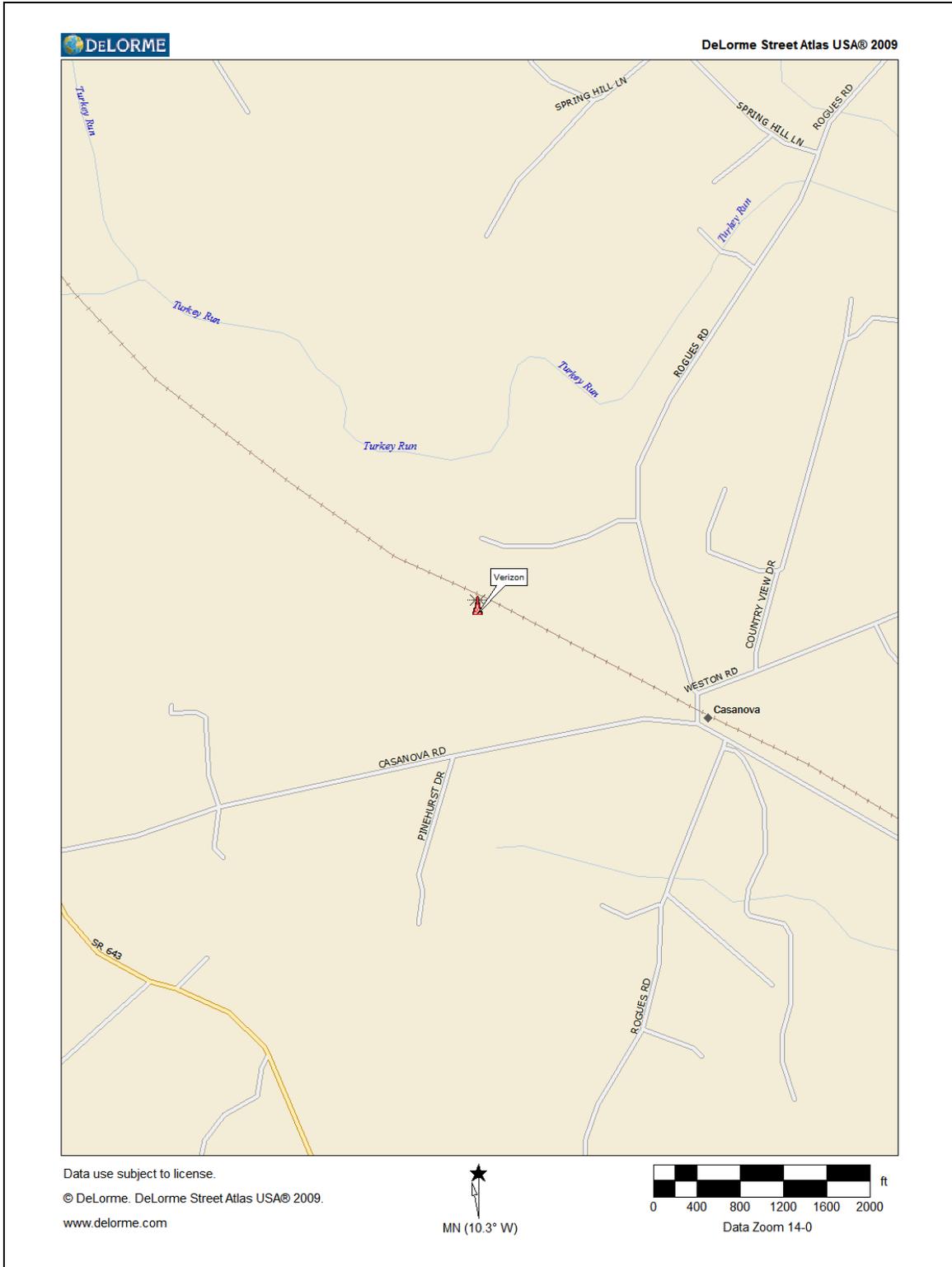


Figure 2. Proposed Facility Location

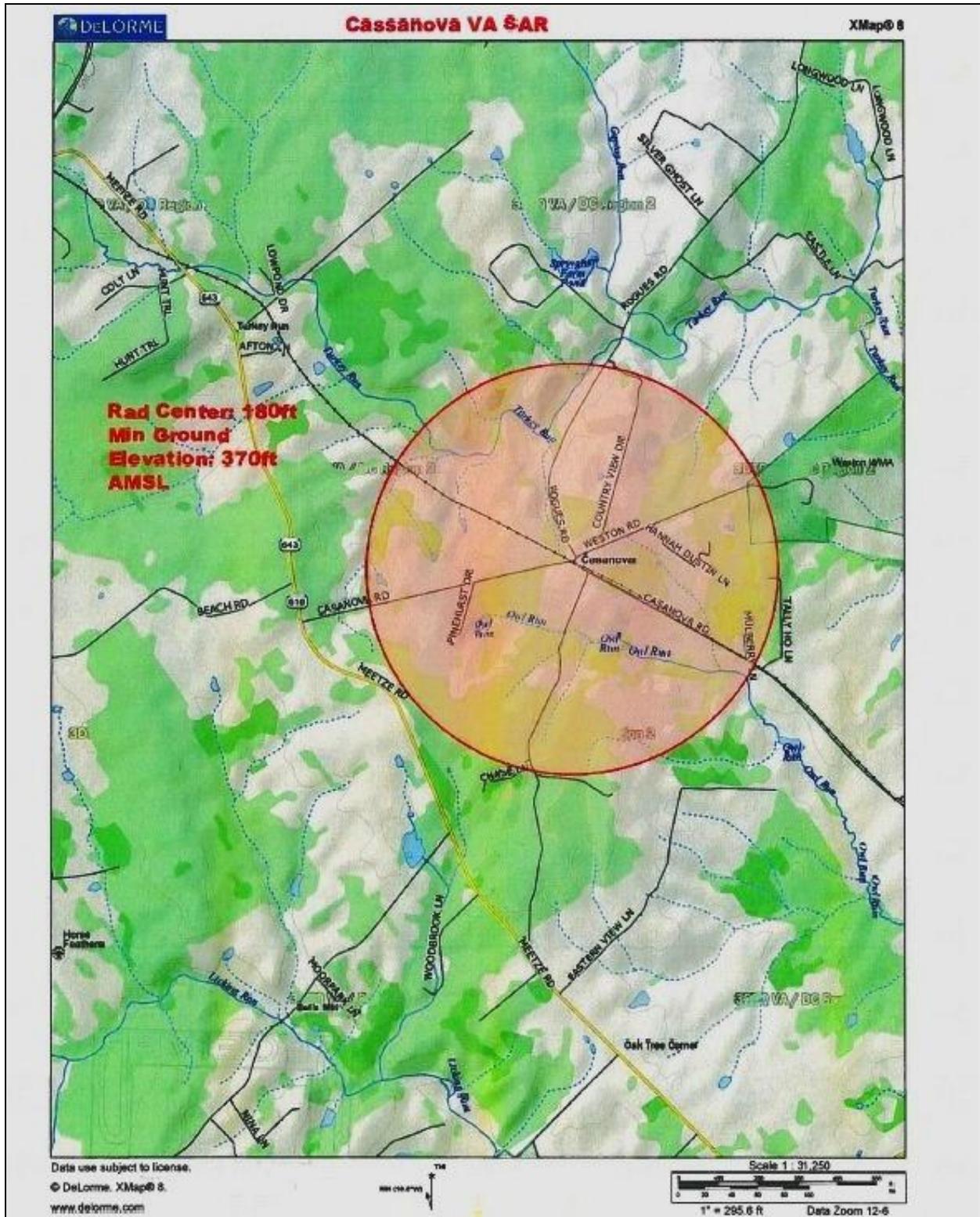


Figure 3. Search Ring



Figure 4. Search Ring Showing Tree Canopy and Ground Elevation



Exhibit A. Proposed Location Viewed from Roadway