



**SPOTSYLVANIA COUNTY, VA
TECHNICAL REVIEW**

Special Use Permit

Supplemental Report

NEW 150-ft SELF-SUPPORT MONOPOLE TOWER

ECO-SITE/T-MOBILE

**Plank Road
Fredericksburg, VA 22407**

Submitted by:

ATLANTIC TECHNOLOGY CONSULTANTS, INC.

A Member of The Atlantic Group of Companies

ATC PROJECT #: 1047-19

May 15, 2017



THE ATLANTIC GROUP
OF COMPANIES INC.

EXECUTIVE SUMMARY:

Eco-Site, a tower development infrastructure owner, and T-Mobile Wireless (T-Mobile), a wireless communications service provider, have made application to the County for the issuance of a Special Use Permit to construct a 150-ft Self Supportive monopole tower (with a 4-ft lightning rod) for a total of 154-ft AGL on property owned by the Central Crescent Investments, LLC.

T-Mobile is an FCC licensed wireless telecommunications provider authorized to provide services in the Spotsylvania County area. T-Mobile is seeking to co-locate on this tower if approved.

Eco-Site is proposing to construct a 154-ft self-supportive monopole type tower to enhance service delivery along Plank Road (Rt. 3), the I-95 corridor area, and the surrounding underserved areas.

It is the opinion of this consultant that the Applicant's plans conform to accepted design and construction practices for the construction of telecommunications support structures **however, because of public opposition from neighboring property owners the consultant believes that a compromise reduction in tower height of 120' AGL and movement of the tower 50' North of the proposed location on the same property would reduce the visibility to the adjoining property owners with a reduction in radio frequency coverage between 5 to 15%.**

This Consultant recommends that the request for issuance of a Special Use Permit to the Alternate/Compromised location be approved.



George N. Condyles, IV CPM
President and COO
Atlantic Technology Consultants, Inc.

1.0 TECHNICAL

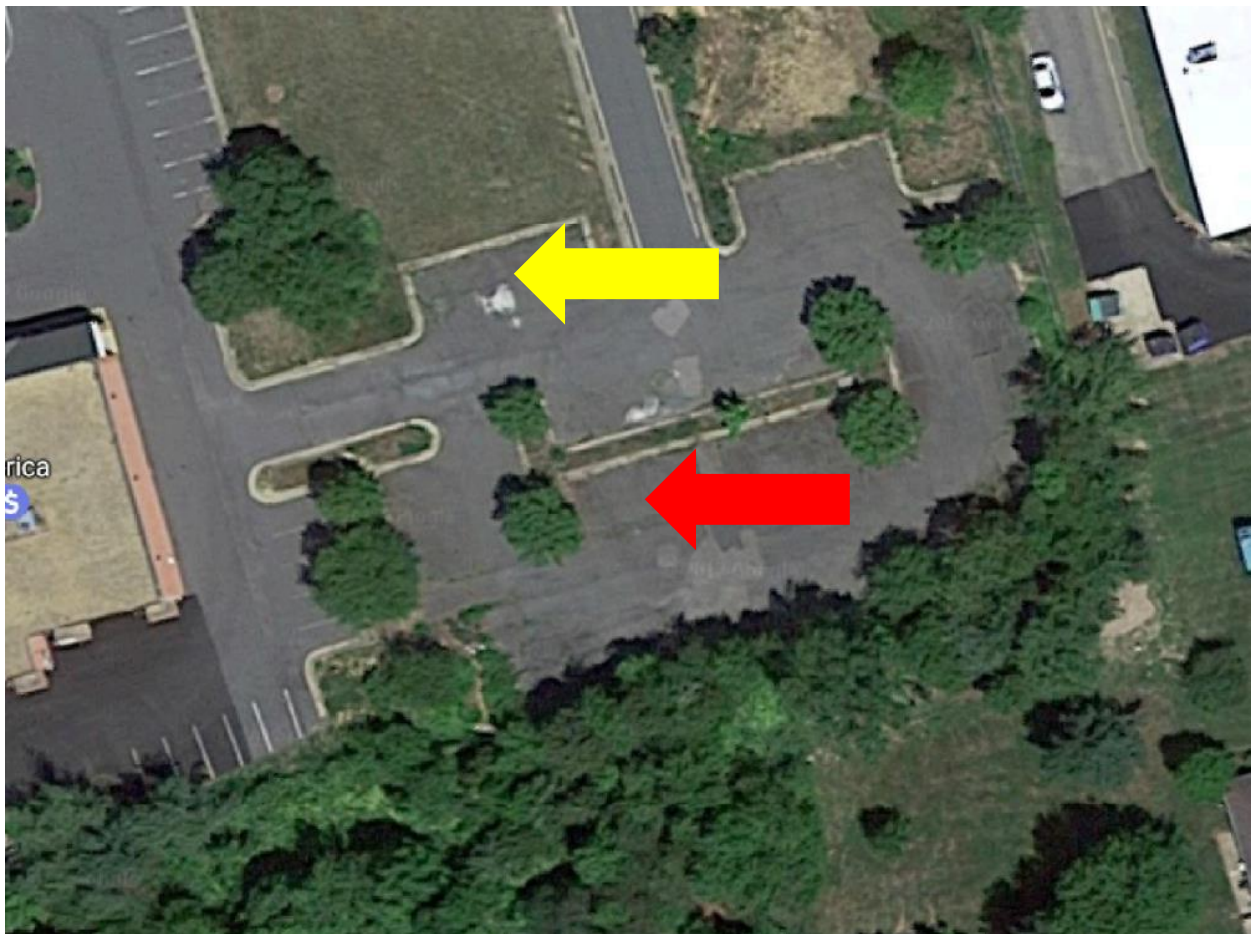
1.1 Siting

The original proposed tower site is a 40' x 63' lease area or 2,520 square foot portion of a 1.401 acre newly formed parcel. The property is zoned C-2/HCO and located on Tax Map 23-22-2. The original proposed site can be accessed from Plank Road and is physically located at 38° 17' 22.26" N and 77° 31' 33.67" W at a ground elevation of 282' ±. The proposed site is in a rear parking lot. (See aerial photo below.)

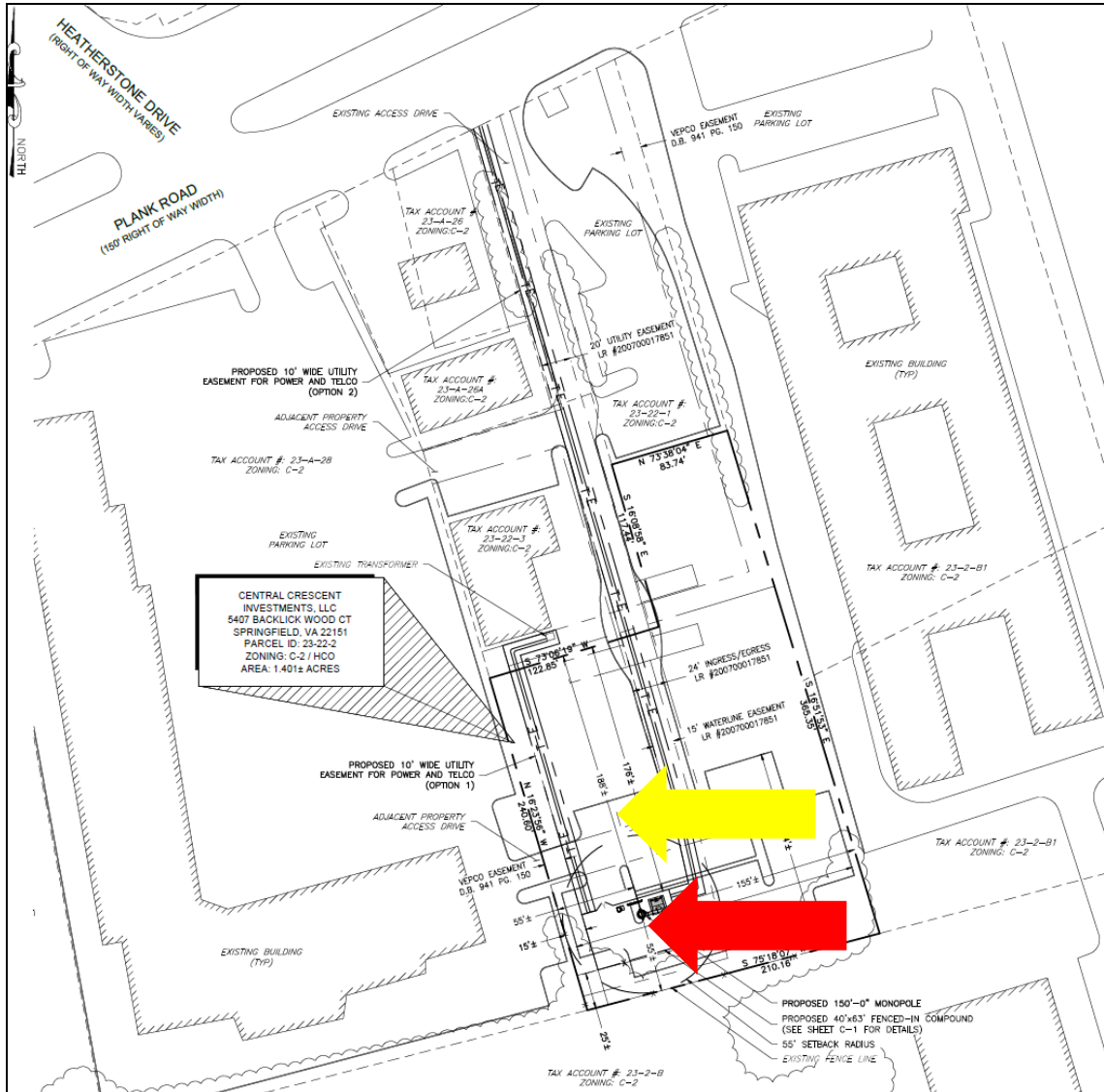
The Alternate/Compromised location would be approximately 50' north in the abandoned parking lot on the same parcel of property.

Yellow: Alternate/Compromised Location

Red: Original Proposed Location



Site Plan



Move Proposed Tower approx. 50' north to Alternate Location.

The consult believes that reducing the height to 120' AGL and moving the tower approximately 50' north of the proposed location would enable the tower developer to still have a rentable site and only reduce T-Mobile coverage by 5 to 15% in the data mode calculations.

The tower would still provide three (3) carrier "slots" for all licensed Cell/PCS carriers in the market. The "slots" would be 120', 105' and 90' AGL.

T-Mobile would be the first "tenant" of the facility @ 120' AGL.

1.2 Setbacks

Spotsylvania County's Zoning Ordinance, Chapter 23 Zoning, Article 7A Division has two (2) major requirements for communications tower setbacks.

They are:

Sec.23-7A.4.1.2.

2. The following setback requirements shall apply:

(a) All antenna support structures must maintain a minimum setback of one hundred and ten percent (110%) of the ANSI collapse zone standard from the nearest legally occupied structure and from all adjoining property lines. In the event that the same person(s) own several parcels, the setback shall be to the peripheral property lines created by the aggregate of the parcels.

Section 23-7A.1.2.6 Wireless Communication Facilities goals states the following:

The goals of this section are:

6. (a) Promote the public health, safety and general welfare of the community. To avoid potential damage to adjacent properties from tower failure and falling objects through engineering structural standards and setback requirements.

Consultant's Opinion:

The Alternate/compromised location would meet all Set=Back Requirements.

There are several occupied dwellings in the immediate area. One is the office building to the north of the proposed tower at approximately 150'. To the west is a retail strip mall that is approximately 100'. The nearest Residential occupied dwelling (Assisted Living Facility) is approximately 150'+ from the centerline of the proposed monopole tower. To the south, residential homes are approximately 350'.

The tower has an engineered "fall-zone" of 50 feet. This is accomplished by the structure having a "double buckling" effect if failure was to occur. What "double buckling" means is that the monopole tower would "fold over itself twice at specific designed elevations to minimize the fall zone. The structural design of the tower would prevent it from a catastrophic fall as falling like a tree with failure at the base plate.

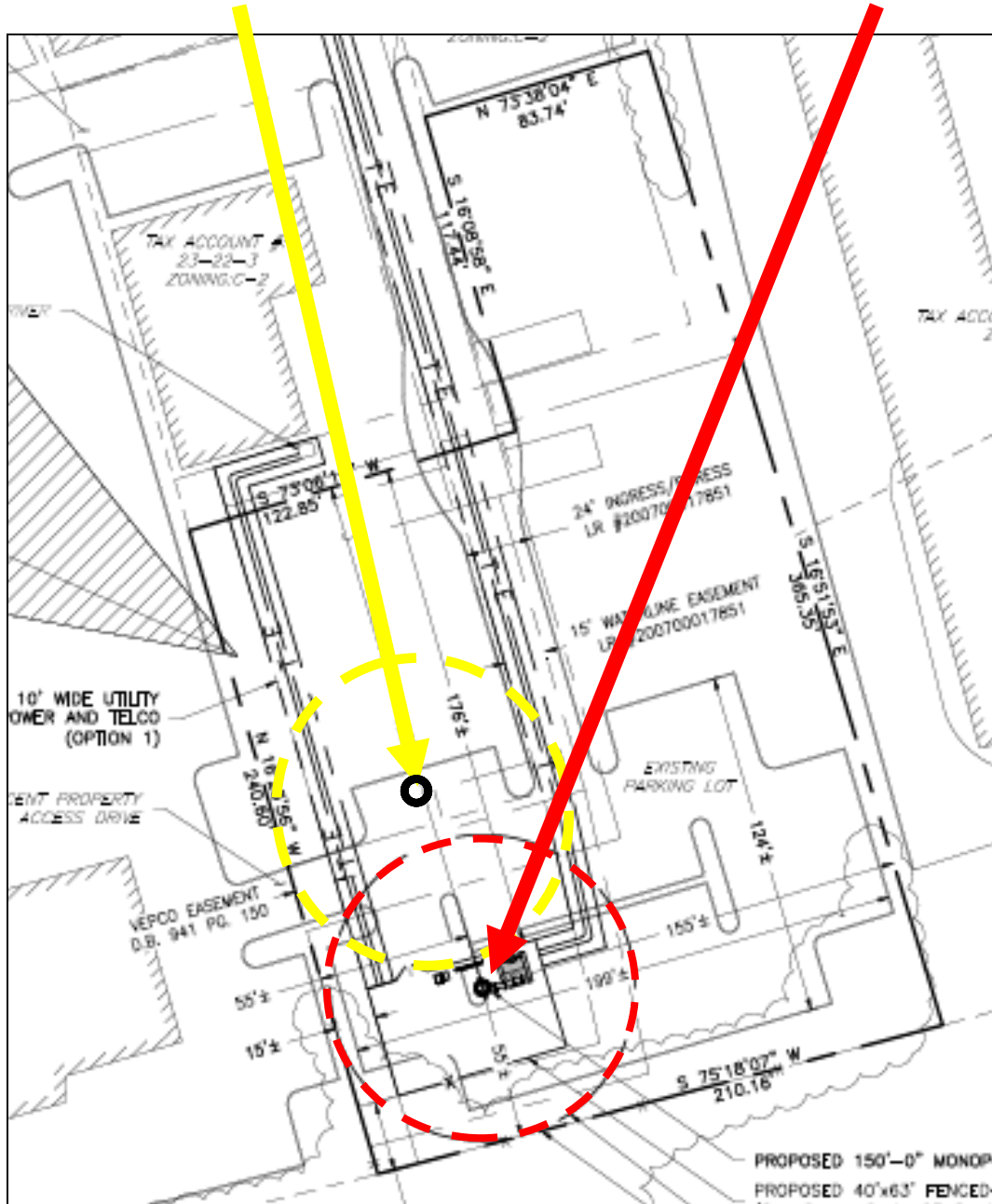
To meet the 110% Fall Zone as specified, it has a designed Fall Zone of 55' which this facility would fall within thus complying with the County's setback requirements.

The likelihood of a structural failure is minimal, as well as the possibility of falling on any occupied dwelling.

This has been attested to by the Project Engineer: Phillip A. Burtner, P.E. in the Site Plan submitted by the Applicant: Eco-Site in drawings dated 10/25/16.

Yellow: 120' Alternate/Compromised

Red: 150' Proposed



1.3 Co-location

Proposed Tower Capabilities

3 Wireless Carriers

Slot #1....T-Mobile: Top @ 120'

Slot #2.....Vacant @105'

Slot #3.....Vacant @ 90'

Eco-Site does have pre-approved written agreements with other carriers to allow for co-location. The tower and compound are being designed to accommodate a total of three (3) co-locations.

1.4 Landscape Buffer

The proposed site is “open/developed” commercially zoned property to the front and both sides. In the rear of the property (between the proposed site and **residential neighborhood**) the site has a buffer of 40-ft to 60-ft soft and hardwood trees. The buffer is approximately 50 to 80 feet from the fence of the proposed compound.

In the winter, the tower may be seen from the residential housing area. The tower will protrude approximately 40 to 50 feet above the tree line.

The **tower compound** will not be visible from the closest homes in the general vicinity. Approximately the top 50' to 100' of the tower will be exposed.

The Applicant has re-submitted photo simulations from various locations and directions. Upon review of these photos, the Consultant concurs with the “estimated” view from various locations.

If the tower is reduced to 120' AGL and moved approximately 50' north, the reduction in visibility will increase.

1.5 Structural (No Change)

1.6 RF Exposure (No Change)

1.7 Grounding (No Change)

1.8 General Safety (No Change)

1.9 Interference (No Change)

2.0 PROCEDURAL

2.1 FAA Study (No Change)

2.2 FCC Antenna Site Registration (No Change)

2.3 Environmental Impacts (No Change)

2.4 Historic Impacts (No Change)

2.5 Results of NEPA Phase 1 and SHPO (No Change)

2.6 Supporting Documentation

This tower facility will be used for:

1. Voice Communications
2. Light Data such as Text and PDA activity (APPs)
3. Broadband (Full motion video, deep and wide “pipe” for downloading and uploading data, etc.) Tele-commuters will benefit.

The proposed tower is to support LTE Service delivery.

The standard for 4-G Service is -74dBm signal strength.

This signal strength is greater than $-74 + 104 = 30$ dBm stronger signal.

This represents a 16.85 % gain or higher signal strength for this system to operate.

RF Analysis

An independent RF analysis has been performed by this Consultant (forwarded to Spotsylvania Planning Staff dated April 25, 2017), which indicates that the Applicant will be able to meet their stated coverage objectives by co-location at 150-ft RAD center as proposed. Additionally, and as indicated, no proximal sites affording co-location potential and meeting the stated coverage goals are available.

A. Frequency Bands with 3 sets of antennas:

- a. 700 MHz : Voice
- b. 1700 MHz : Light Data
- c. 1850 MHz: PCS Broadband

B. Strength Required for 4G:

- 74 dBm : Excellent
- 74 dBm to -82 dBm : Very good
- 82 dBm to -92 dBm : Good
- > -92 dBm : Poor and pixilation failure.

C. Signal Strength required for older 2/3G Service:

-104 dBm.

LTE Service requires a higher Signal Strength.

The Propagation maps are calculated at the following heights and “Penalties” associated with Coverage areas in relationship to the tower height:

Tower/Antenna Center line Height - feet	Penalty or Reduction in Coverage- %
80' AGL	35-45 %
90' AGL	25-35 %
110' AGL	15-25 %
130' AGL	5- 15%
150' AGL	0 %

In summary, the new LTE service (Digital Broadband) requires antenna/tower placement in a closer proximity to the receiving and transmitting device.

The consultant believes if the tower is reduced to 120' it will cover all east and west objectives and only be reduced 5 to 15% in the north-South direction.

3.0 RECOMMENDATIONS

This request for approval to construct a 150-ft monopole tower (with a 4-ft lightning rod) as proposed represents an appreciable intent on the part of the Applicant to conform to all applicable federal, state, and local regulations, accepted industry practices, and specific County ordinances regarding telecommunications towers. However, because of Public Opinion against this Application, it is the consultants opinion that if the tower is moved approximately 50' north and reduced in height to 120' AGL, that this site would be a compromise/alternative site and have less residential view shed.

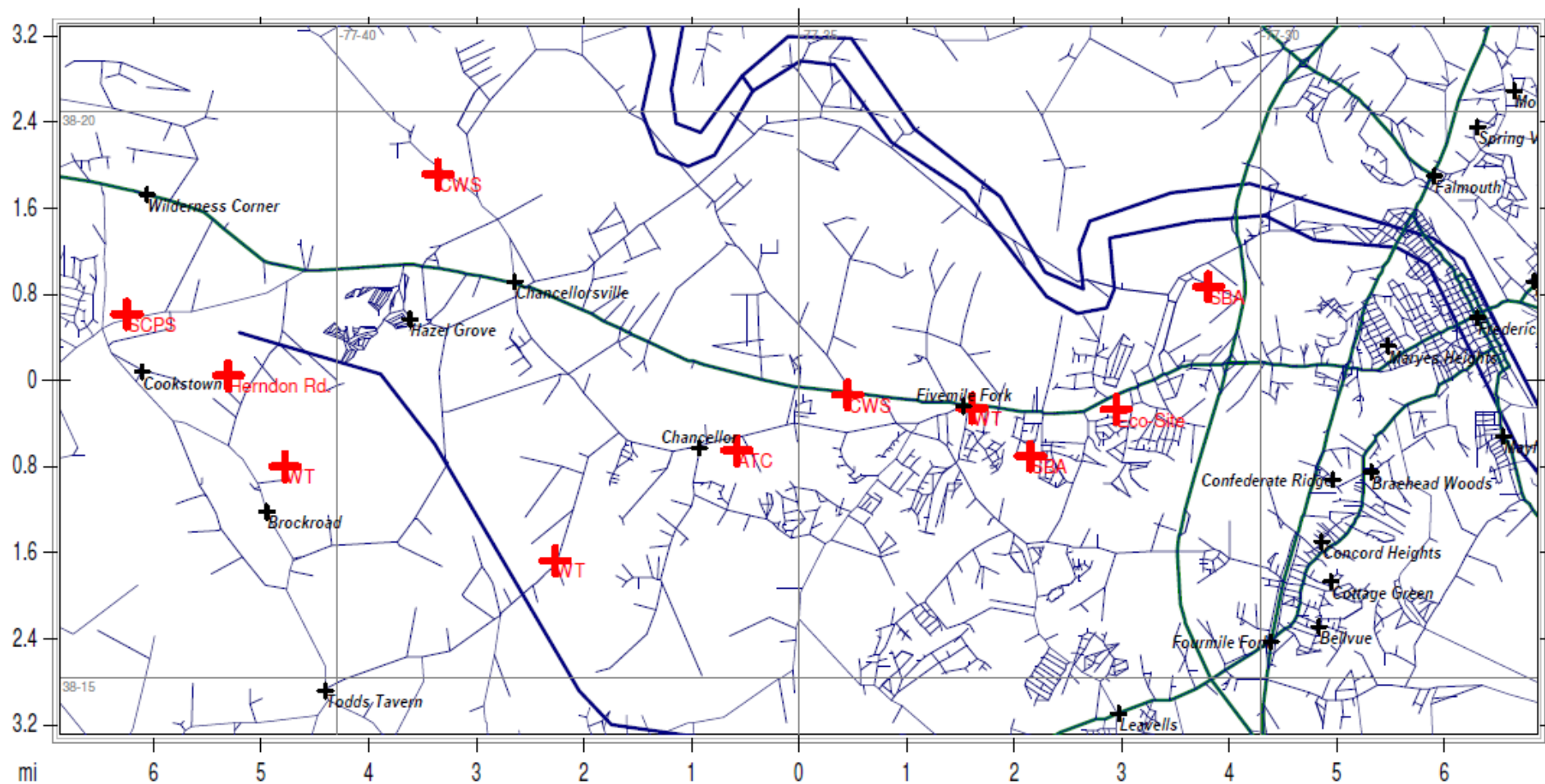
If the Applicant/ Eco Sites would agree to these recommendations of this Consultant that the request for issuance of a Special Use Permit should be approved.

In closing, this consultant remains available to address any comments or questions which may arise following review of this report. Any interested party with such comments or questions may feel free to contact this firm, which remains committed to delivering independent, objective, unbiased, and thorough consulting services.

Respectfully submitted,

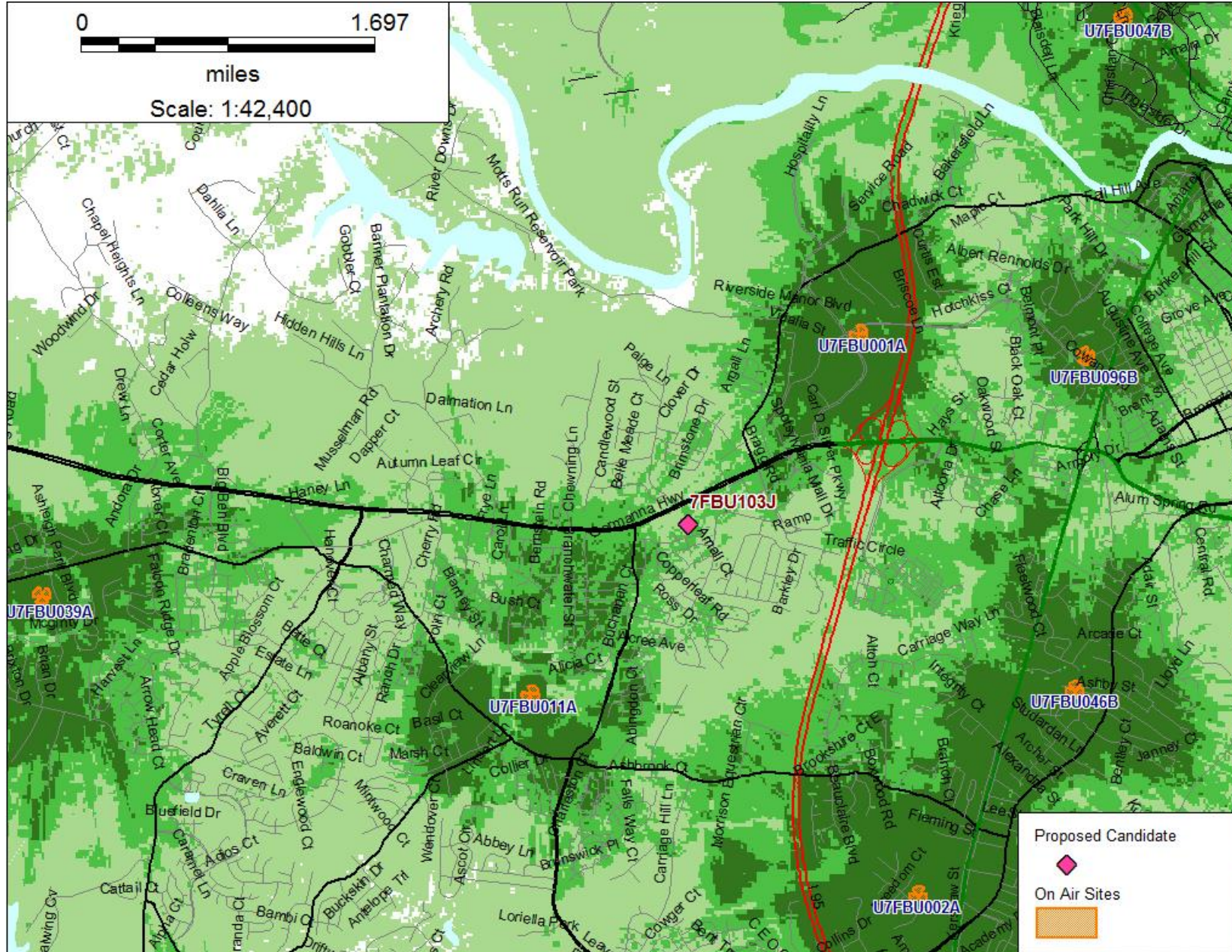
A handwritten signature in black ink, appearing to read "George N. Condyles, IV", followed by a stylized flourish or "X" mark.

George N. Condyles, IV, CPM
President & COO

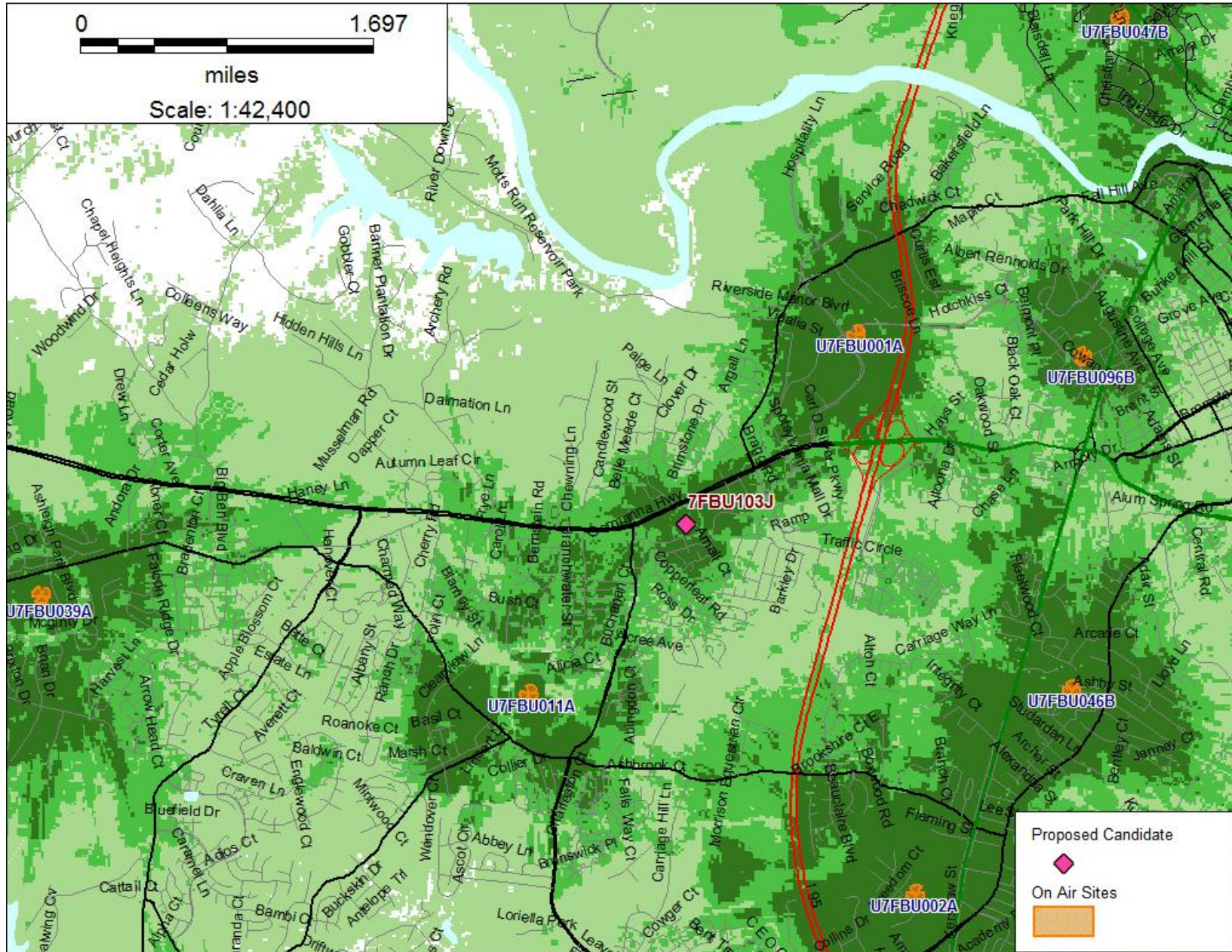


Tower and Water Tank Sites in South/Central Spotsylvania County

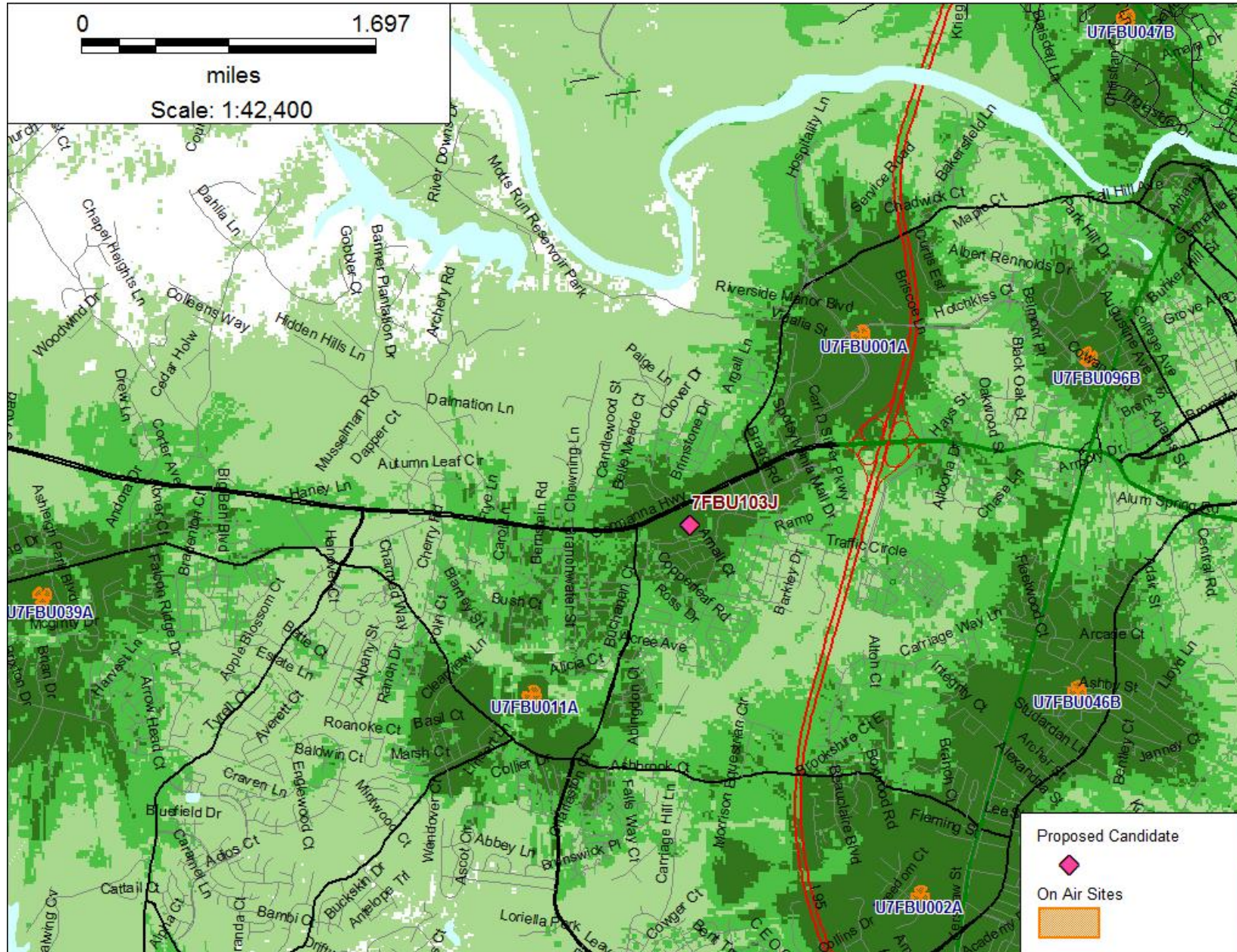
Existing T-Mobile Service



T-Mobile Service with a 100' AGL Tower



T-Mobile Service with a 120' AGL Tower



T-Mobile Service with a 150' AGL Tower

