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March 4, 2022

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Docket No. 507 – Application of Homeland Towers, LLC and Cellco Partnership d/b/a Verizon Wireless for a Certificate of Environmental Compatibility and Public Need for the Construction, Maintenance and Operation of a Wireless Telecommunications Facility at 222 Clintonville Road, North Branford, Connecticut**

Dear Ms. Bachman:

On behalf of Homeland Towers, LLC and Cellco Partnership d/b/a Verizon Wireless (“Applicants”), enclosed please find the original and fifteen (15) copies of Cellco’s Responses to the Connecticut Siting Council’s Pre-Hearing Interrogatories, Set One Nos. 1-4, 7-12, 14, 17, 19-24, 26-27, and 29-30. We respectfully request an extension of time to respond to the remaining Interrogatories. The Applicants will file the remaining responses on or before March 8, 2022.

Thank you in advance for your cooperation.

Sincerely,



Kenneth C. Baldwin

KCB/kmd
Enclosures

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE: :
 :
APPLICATION OF HOMELAND TOWERS, : DOCKET NO. 507
LLC AND CELLCO PARTNERSHIP D/B/A :
VERIZON WIRELESS FOR A CERTIFICATE :
OF ENVIRONMENTAL COMPATIBILITY :
AND PUBLIC NEED FOR THE :
CONSTRUCTION, MAINTENANCE AND :
OPERATION OF A WIRELESS :
TELECOMMUNICATIONS FACILITY AT :
222 CLINTONVILLE ROAD, NORTH :
BRANFORD, CONNECTICUT : MARCH 4, 2022

**RESPONSES OF HOMELAND TOWERS, LLC AND
CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS TO
CONNECTICUT SITING COUNCIL PRE-HEARING INTERROGATORIES, SET ONE**

On February 18, 2022, the Connecticut Siting Council (“Council”) issued Pre-Hearing Interrogatories, Set One to Homeland Towers, LLC and Cellco Partnership d/b/a Verizon Wireless (“Applicants”), relating to Docket No. 507. Below are Applicant’s Responses to Question Nos. 1-4, 7-12, 17, and 19-30. The remaining responses will be filed with the Council on or before March 8, 2022.

General

Question No. 1

Referencing Application Attachment 4, of the letters sent to abutting property owners, how many certified mail receipts were received? If any receipts were not returned, which owners did not receive their notice? Were any additional attempts made to contact those property owners?

Response

Of the fifteen (15) abutting owners notified, Homeland receive receipt confirmation from twelve (12) owners. Supplemental notice letters were sent via regular mail to Area Cooperative Education Services, Darius Bakula and Joseph Acampora III on February 24, 2022.

Question No. 2

Referencing Application p. 20, how is the construction cost of the facility recovered for both Homeland and Cellco?

Response

Homeland's costs are recovered through its leasing arrangements with wireless carriers sharing the tower. The costs associated with providing Cellco customers with the nation's most reliable wireless service network, including the cost for development of network infrastructure (small cells and macro-cells), are paid for by the individuals, corporations and government entities that purchase Cellco's wireless service.

Question No. 3

Referencing Application p.19, how many Town officials/area residents attended the October 28, 2021 public information meeting? What concerns were raised by residents and town officials and how were these concerns addressed?

Response

Approximately twenty-five (25) residents attended the October 28, 2021 public information meeting, out of the twenty-five (25) residents approximately ten (10) people spoke. Two (2) Town Council members were in attendance but did not speak. Some of the concerns raised were health and safety, property values and visual impacts. Homeland representatives responded to these concerns and explained that application would contain an RF Compliance

report as well a visual report showing views and non-views of the proposed facility. Homeland also explained that the Council does not consider impacts on property values as a part of its review process.

Site Search

Question No. 4

When did Homeland begin searching for a tower site in the Northford area?

Response

Homeland had begun their initial search for a site in the Northford area back in 2018. Additional search efforts took place in the beginning of 2020.

Question No. 7

Are small cells a feasible alternative to a new tower? Estimate the number of pole-mounted small cells that would be required for reliable service within the proposed service area. Would certain frequencies be limited through the use of small cells? What would be the cost of each small cell for both the use of existing utility poles and new poles specific for small cells. What type of equipment would be attached to each pole?

Response

It may be theoretically and technically possible to install a large number of small cells or Distributed Antenna System nodes in the area that could closely match the coverage footprint of the proposed Northford 2 Facility (macro cell). Such an approach, however, is not economically feasible and is not consistent with good RF Engineering practice. Typically, small cell facilities or DAS nodes would utilize existing infrastructure (i.e. electric distribution poles) along public rights of way in areas where coverage and/or capacity problems exist. These existing utility poles are often encumbered by other equipment (i.e. transformers, street lights and risers) that

will limit Cellco's ability to use the pole. Structural limitations of the existing poles will limit Cellco's ability to deploy all of the equipment needed to provide service in all of its operating frequencies. Providing some form of back-up power to small cells or DAS nodes is very difficult and, in many cases, impossible, making the service even more vulnerable to storm events. In areas where this existing infrastructure is not available, for example, along private roads or on private and municipal properties, property rights would need to be acquired and new poles would need to be installed. The actual number of small cell facilities that would be needed to provide a service comparable to that from the proposed Facility is not known but would be significant given the overall size of the area that Cellco is attempting to serve with the proposed facility. The estimate cost for each small cell installation would be between \$70,000 and \$75,000. Cellco's typical small cell installation includes one or more antennas, radio and electrical equipment, antenna cables and an electric meter.

Site/Tower

Question No. 8

Would any blasting be required to develop the site?

Response

Homeland does not anticipate the need for blasting. A complete geo-technical analysis will be completed as a part of the Development & Management Plan process if the proposed tower site is approved by the Council. At that point Homeland will know if blasting is required to construct the proposed improvements.

Question No. 9

What measures are proposed for the site to ensure security and deter vandalism?

(Including alarms, gates, locks, anti-climb fence design, etc.)

Response

The facility will be surrounded by an eight-foot tall chain link security fence and gate. Cellco's wireless equipment within the compound will be equipped with silent intrusion alarms that are monitored 24/7, 365 days a year.

Question No. 10

Pursuant to CGS §16-50p(a)(3)(G), identify the safety standards and/or codes by which equipment, machinery or technology that would be used or operated at the proposed facility.

Response

- 2018 Connecticut State Building Code.
- National Electric Code (NFPA70).
- 2018 CT State Fire Safety Code.
- TIA-222-H "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures".
- Occupational Safety and Health Administration (OSHA).

Homeland and Cellco will comply with these safety standards and codes as they may be updated over time.

Question No. 11

Does the cost estimate on Application p. 20 include a monopine design? What extra cost is attributed to the monopine?

Response

The cost estimate on page 20 in the Application is for a monopole design, there would be an extra cost of approximately \$55,000 attributed to a monopine design.

Question No. 12

What is the land use of the abutting property at 246 Clintonville Road?

Response

The Town of North Branford Assessor's Office lists the land use of the abutting property at 246 Clintonville Road known as Petry Commons as Store/Shop MDL-94. The parcel appears to contain some outdoor storage containers, a commercial building with small business offices and garages located on the lower level and an apartment on the upper level.

Coverage/Capacity

Question No. 14

Would the proposed antennas be capable of offering 5G services?

Response

Yes.

Question No. 17

Were any studies conducted on the Town's wireless service requirements? Is it necessary to install the municipal antennas at the top of the tower?

Response

During system design the Town investigated several antenna heights to provide the necessary coverage within the north side of town. Using computer modeling software Motorola recommended 110' as a minimum for the Town's antenna height.

Backup Power

Question No. 19

What would be the run time for Cellco's proposed generator before it would need to be refueled, assuming it is running at full load under normal conditions?

Response

Cellco intends to install a 50-kW propane-fueled generator and a 500-gallon propane tank at the proposed tower site. At 100% loading conditions, the proposed 50-kW generator could operate for approximately 43 hours before refueling would be necessary.

Question No. 20

If the backup generator failed to start, how long can the emergency battery provide power to Cellco's equipment?

Response

The backup battery system is designed to keep the cell site operating for up to eight (8) hours if the backup generator fails.

Question No. 21

Would the Town have a backup power source for its equipment? If yes, provide detail.

Response

No. Cellco intends to share its generator with the Town.

Question No. 22

Is it possible for Cellco and the Town to share a backup power source at the site?

Response

See response to Question No. 21.

Public Safety

Question No. 23

Would the proposed facility support text-to-911 service? Is additional equipment required for this purpose?

Response

Yes, the proposed Facility will be capable of supporting text-to-911. No additional cell site equipment is necessary to support this service.

Question No. 24

Referencing Application Attachment 13, revise the table to include the Town's antennas.

Response

See the attached Antenna Site FCC Compliance Assessment and Report.

Question No. 26

Besides the backup power source, what other facility equipment generates noise? Would the noise from this equipment comply with Department of Energy and Environmental Protection noise control standards at the property boundaries?

Response

Only the propane generator which is housed within a sound attenuation enclosure would generate noise. The applicant will further review and determine that noise control standards can be met at the property boundary. Some options to ensure noise levels are met could include relocating the generator further away from the property line, installation of sound blankets/solid fence or installation of a different generator enclosure that offers increased sound attenuation.

Environment

Question No. 27

Referencing Application Attachment 11, does the on-site pond have the ability to function as a vernal pool?

Response

Homeland's project team is currently evaluating the on-site pond to determine if it can

function as a vernal pool. The results of that evaluation will be presented as soon as they are available.

Question No. 29

Referencing Attachment 8, Visual Resource Assessment,

- a. would the shift of the tower location 45 feet to the south affect the areas of visibility shown on the viewshed map that was prepared for the initial site?
- b. what would be the expected visibility of the proposed tower from the open areas of the properties to the south and southeast of the site?
- c. the estimates of visibility on p. 9- *Viewshed Analysis Summary*- do not match the estimates provided on p. 10 - *Conclusion*. Clarify.
- d. estimate the number of residences that would have seasonal and/or year-round views within 0.5 miles of the proposed facility.
- e. Where is the nearest publicly accessible recreational area from the proposed tower? Identify the recreation area and describe the visibility from this area.

Response

Referencing Attachment 8, Visual Resource Assessment,

- a. **would the shift of the tower location 45 feet to the south affect the areas of visibility shown on the viewshed map that was prepared for the initial site?**

The shift of the tower location 45 feet to the south has no meaningful effect on the area of visibility shown on the viewshed map (*see* VRA Figures A1 and A2). Attached are revised viewshed maps illustrating the area of potential tower visibility at the currently proposed location.

The following table compares the total viewshed area for the original location and the currently proposed location:

	Area within 2-mile radius		Area within ½-mile radius	
	Acres	Percent	Acres	Percent
Original Tower Position	39	0.49%	10	2.0%
Shifted Tower Position	43	0.54%	13	2.6%
Change	+4	+0.05%	+3	+.03%

b. what would be the expected visibility of the proposed tower from the open areas of the properties to the south and southeast of the site?

The proposed tower will be visible very low to the tree line as viewed from affected properties to the south and southeast of the site. VRA Figure B-15 is a representative photo simulation illustrating the degree and character of tower visibility from Clintonville Road near #250 (the immediately abutting property to the south. Figure B-15 included in the VRA supplement dated January 19, 2022, is an updated photo simulation illustrating the visibility of the tower at its currently proposed location.

From the simulated vantage point approximately the upper 10-15 vertical feet of the tower may be visible above the tree line. Filtered visibility of the lower portion of the tower may occur from these properties through deciduous branching during winter leaf-off season.

c. the estimates of visibility on p. 9- *Viewshed Analysis Summary*- do not match the estimates provided on p. 10 - *Conclusion*. Clarify.

This inconsistency appears to be a typographic error, likely associated with an earlier (taller) tower under consideration. The visibility estimate found on page 9 is correct. visibility found on page 10 is incorrect. The calculations presented in the table above in

response to interrogatory question 29 (a) have been crosschecked and are accurate.

d. **estimate the number of residences that would have seasonal and/or year-round views within 0.5 miles of the proposed facility.**

Based on viewshed analysis and field observation during the February 24, 2021 balloon visibility test, we estimate that the upper portion of the tower may be visible above the tree line from one or two residences on Pistapaug Road (refer to photo simulations provided as Figure B 21 in the January 19, 2022 Supplemental VRA). The upper portion of the tower may also be visible above the tree line from three or four residences on Clintonville Road (refer to photo simulations provided as Figure B-15 in the Supplemental VRA).

We also estimate approximately 25-30 residences may view a portion of the tower through deciduous branches and stems during winter leaf-off season. Such views will be substantially or completely screened during summer leaf-on season.

e. **Where is the nearest publicly accessible recreational area from the proposed tower? Identify the recreation area and describe the visibility from this area.**

Public ball fields and tennis courts are found at the Stanley T. Williams Community Center at 1388 Middletown Road, approximately 2,100 feet south of the Facility. Based on viewshed analysis and field observation during the February 24, 2021 balloon visibility test the upper 15-20 vertical feet of the tower may be visible above the tree line. Filtered visibility of the lower portion of the tower may occur from this area through deciduous branching during winter leaf-off season.

Photo 62 on Figure B31 found in Appendix B of the September 1, 2021 VRA provides a photograph taken from Stanley T. Williams Community Center during the February 24,

2021 balloon visibility test. Please note the balloon was floated to a height of 104 feet (top of balloon) on that date (approximately 6 feet lower than the top of the tower as currently proposed.

Question No. 30

Submit photographic site documentation with notations linked to the site plans or a detailed aerial image that identifies locations of site-specific and representative site features. The submission should include photographs of the site from public road(s) or publicly accessible area(s) as well as Site-specific locations depicting site features including, but not necessarily limited to, the following locations as applicable:

For each photo, please indicate the photo viewpoint direction and stake or flag the locations of site-specific and representative site features. Site-specific and representative site features include, but are not limited to, as applicable:

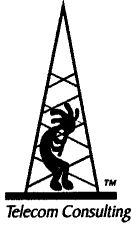
- a. wetlands, watercourses and vernal pools;
- b. forest/forest edge areas;
- c. agricultural soil areas;
- d. sloping terrain;
- e. proposed stormwater control features;
- f. nearest residences;
- g. Site access and interior access road(s);
- h. tower location/compound;
- i. clearing limits/property lines;
- j. mitigation areas; and
- k. any other noteworthy features relative to the Project.

A photolog graphic must accompany the submission, using a site plan or a detailed aerial image, depicting each numbered photograph for reference. For each photo, indicate the photo location number and viewpoint direction, and clearly identify the locations of site specific and representative site features shown (e.g., physical staking/flagging or other means of marking the subject area).

The submission shall be delivered electronically in a legible portable document format (PDF) with a maximum file size of <20MB. If necessary, multiple files may be submitted and clearly marked in terms of sequence.

Response

See the attached Remote Field Review.



PINNACLE TELECOM GROUP

Professional and Technical Services

ANTENNA SITE FCC RF COMPLIANCE ASSESSMENT AND REPORT

HOMELAND TOWERS, LLC

**SITE "CT021 – NORTH BRANFORD"
222 CLINTONVILLE ROAD
NORTHFORD, CT**

MARCH 2, 2022

14 RIDGEDALE AVENUE, SUITE 260 • CEDAR KNOLLS, NJ 07927 • 973-451-1630

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CERTIFICATION

APPENDIX A. BACKGROUND ON THE FCC MPE LIMIT

APPENDIX B. SUMMARY OF EXPERT QUALIFICATIONS

INTRODUCTION AND SUMMARY

At the request of Homeland Towers, LLC, Pinnacle Telecom Group has performed an independent expert assessment of radiofrequency (RF) levels and related FCC compliance for proposed wireless antenna operations on a new 110-foot tower to be located at 222 Clintonville Road in Northford, CT.

Homeland Towers refers to the prospective site as “CT021 – North Branford. At this time, Verizon Wireless plans to occupy the mounting position at 96 feet. The Town of North Branford proposes to operate antennas at the top of the tower.

The FCC requires wireless antenna operators to perform an assessment of the RF levels from all the transmitting antennas at a site whenever antenna operations are added or modified, and ensure compliance with the FCC Maximum Permissible Exposure (MPE) limit in areas of unrestricted public access, i.e., at street level around the site.

The analysis will conservatively assume all the wireless carriers are operating at maximum capacity and maximum power in each of their FCC-licensed frequency bands. With that extreme degree of conservatism incorporated in the analysis, we can have great confidence that the actual RF effects from any combination of wireless operators, however they might actually be positioned on the tower, would be in compliance with the FCC’s MPE limit.

This assessment of antenna site compliance is based on the FCC limit for general population “maximum permissible exposure” (MPE), a limit established as safe for continuous exposure to RF fields by humans of either sex, all ages and sizes, and under all conditions.

The result of an FCC compliance assessment can be described in layman’s terms by expressing the calculated RF levels as simple percentages of the FCC MPE limit. In that way, the figure 100 percent serves as the reference for compliance, and calculated RF levels below 100 percent indicate compliance with the MPE limit. An equivalent way to describe the calculated results is to relate them to a “times-below-the-limit” factor. Here, we will apply both descriptions.

The result of the FCC compliance assessment in this case is as follows:

- At street level around the site, the conservatively calculated maximum RF level caused by the combination of antenna operations is 4.7963 percent of the FCC general population MPE limit, well below the 100-percent reference for compliance. In other words, even with calculations designed to significantly overstate the RF levels versus those that could actually occur at the site, the worst-case calculated RF level in this case is still more than 20 times below the limit defined by the federal government as safe for continuous exposure of the general public.
- The results of the analysis provide a clear demonstration that the RF levels from the combination of proposed antenna operations will satisfy the criteria for controlling potential human exposure to RF fields, and the antenna operations will be in full compliance with the FCC regulations and limits concerning RF safety. Moreover, because of the conservative methodology and operational assumptions applied in the analysis, RF levels actually caused by the antennas will be even less significant than the calculation results here indicate.

The remainder of this report provides the following:

- relevant technical data on the parameters for the proposed wireless carriers;
- a description of the applicable FCC mathematical model for assessing compliance with the MPE limit, and application of the relevant technical data to that model; and
- analysis of the results of the calculations, and the compliance conclusion for the proposed site.

In addition, two Appendices are included. Appendix A provides background on the FCC MPE limit, along with a list of key FCC references on MPE compliance, and Appendix B provides a summary of the qualifications of the expert certifying the FCC compliance for the subject antenna operations.

ANTENNA AND TRANSMISSION DATA

As noted at the outset, there are two proposed wireless operations at this site. For Verizon Wireless, we will conservatively assume operation with maximum channel capacity and at maximum transmitter power per channel to be used by each wireless operator in each of their respective FCC-licensed frequency bands. For the Town of North Branford, we will rely on the transmission parameters in its FCC license.

Verizon Wireless is licensed to operate in the 746 MHz, 869 MHz, 1900 MHz, 2100 MHz, 3500 MHz and 3700 MHz frequency bands. In the 746 MHz band, Verizon uses an Effective Radiated Power (ERP) of 2409 watts per antenna sector. In the 869 MHz band, Verizon uses an Effective Radiated Power (ERP) of 2465 watts per antenna sector. In the 1900 MHz band, Verizon uses an Effective Radiated Power (ERP) of 5648 watts per antenna sector. In the 2100 MHz band, Verizon uses an Effective Radiated Power (ERP) of 5914 watts per antenna sector. In the 3500 MHz band, Verizon uses an Effective Radiated Power (ERP) of 168 watts per antenna sector. Lastly, In the 3700 MHz band, Verizon uses an Effective Radiated Power (ERP) of 26125 watts per antenna sector.

The Town of North operates in the 770 MHz and 850 MHz frequency bands, using an ERP of 150 watts in each band.

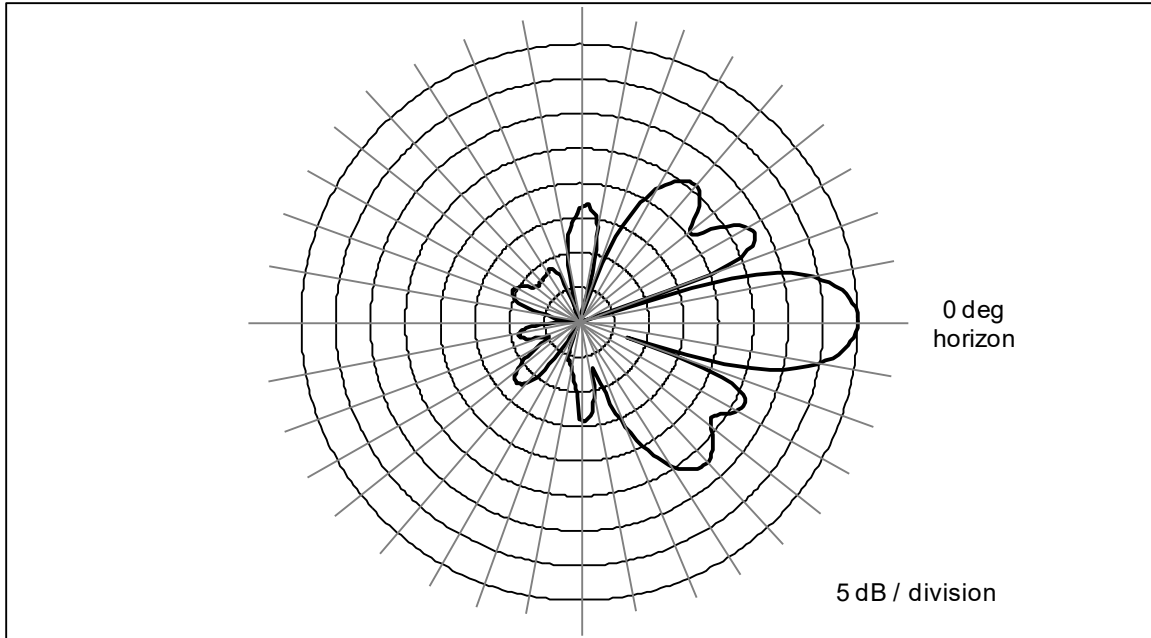
The area below the antennas, at street level, is of interest in terms of potential “uncontrolled” exposure of the general public, so the antenna’s vertical-plane emission characteristic is used in the calculations, as it is a key determinant in the relative level of RF emissions in the “downward” direction.

By way of illustration, Figure 1, below, shows the vertical-plane pattern of a typical 1900 MHz panel antenna. The antenna is effectively pointed at the three o’clock position (the horizon) and the pattern at different angles is described using decibel units. The use of a decibel scale incidentally visually understates the relative directionality characteristic of the antenna in the vertical plane. Where the antenna pattern reads 20 dB, the relative RF energy emitted at the corresponding downward angle is 1/100th of the maximum that occurs in the main beam (at 0

degrees); at 30 dB, the energy is 1/1000th of the maximum.

Note that the automatic pattern-scaling feature of our internal software may skew side-by-side visual comparisons of different antenna models, or even different parties' depictions of the same antenna model.

Figure 1. 1900 MHz Directional Panel Antenna – Vertical-plane Pattern



Compliance Analysis

FCC Office of Engineering and Technology Bulletin 65 (“OET Bulletin 65”) provides guidelines for mathematical models to calculate potential RF exposure levels at various points around transmitting antennas.

Around an antenna site at ground level (in what is called the “far field” of the antennas), the RF levels are directly proportional to the total antenna input power and the relative antenna gain (focusing effect) in the downward direction of interest – and the levels are otherwise inversely proportional to the square of the straight-line distance to the antenna. Conservative calculations also assume the potential RF exposure is enhanced by reflection of the RF energy from the intervening

ground. Our calculations will assume a 100% “perfect”, mirror-like reflection, which is the absolute worst-case approach.

The formula for ground-level MPE compliance assessment of any given wireless antenna operation is as follows:

$$\text{MPE}\% = (100 * \text{TxPower} * 10^{(\text{Gmax-Vdisc})/10} * 4) / (\text{MPE} * 4\pi * R^2)$$

where

MPE%	=	RF level, expressed as a percentage of the FCC MPE limit applicable to continuous exposure of the general public
100	=	factor to convert the raw result to a percentage
TxPower	=	maximum net power into antenna sector, in milliwatts, a function of the number of channels per sector, the transmitter power per channel, and line loss
$10^{(\text{Gmax-Vdisc})/10}$	=	numeric equivalent of the relative antenna gain in the direction of interest downward toward ground level
4	=	factor to account for a 100-percent-efficient energy reflection from the ground, and the squared relationship between RF field strength and power density ($2^2 = 4$)
MPE	=	FCC general population MPE limit
R	=	straight-line distance from the RF source to the point of interest, centimeters

The MPE% calculations are normally performed out to a distance of 500 feet from the facility to points 6.5 feet (approximately two meters, the FCC-recommended standing height) off the ground, as illustrated in Figure 2, on the next page.

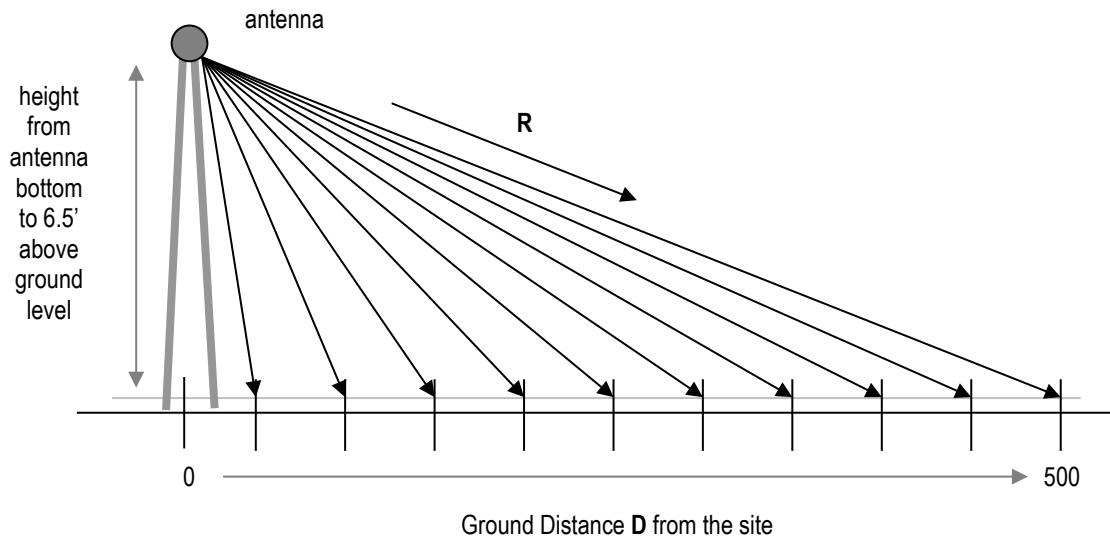


Figure 2. Street-level MPE% Calculation Geometry

It is popularly thought that the farther away one is from an antenna, the lower the RF level – which is generally but not universally correct. The results of MPE% calculations fairly close to the site will reflect the variations in the vertical-plane antenna pattern as well as the variation in straight-line distance to the antennas. Therefore, RF levels may actually increase slightly with increasing distance within the range of zero to 500 feet from the site. As the distance approaches 500 feet and beyond, though, the antenna pattern factor becomes less significant, the RF levels become primarily distance-controlled and, as a result, the RF levels generally decrease with increasing distance. In any case, the RF levels more than 500 feet from a wireless antenna site are well understood to be sufficiently low and always in compliance.

FCC compliance for a collocated antenna site is assessed in the following manner. At each distance point away from the site, an MPE% calculation is made for each antenna operation, including the individual components of dual-band operations. Then, at each point, the sum of the individual MPE% contributions is compared to 100 percent, where the latter figure serves as a normalized reference for compliance with the MPE limit. We refer to the sum of the individual MPE%

contributions as “total MPE%”, and any calculated total MPE% result exceeding 100 percent is, by definition, higher than the limit and represent non-compliance and a need to take action to mitigate the RF levels. If all results are below 100 percent, that indicates compliance with the federal regulations on controlling exposure.

Note that the following conservative methodology and assumptions are incorporated into the MPE% calculations on a general basis:

1. The antennas are assumed to be operating continuously at maximum RF power – i.e., with the maximum number of channels and the maximum transmitter power per channel.
2. The power-attenuation effects of any shadowing or visual obstruction to a line-of-sight path from the antennas to the points of interest at ground level are ignored.
3. The calculations intentionally minimize the distance factor (R) by assuming a 6’6” human and performing the calculations from the bottom (rather than the centerline) of the antenna.
4. The potential RF exposure at ground level is assumed to be 100-percent enhanced (increased) via a “perfect” field reflection from the intervening ground.

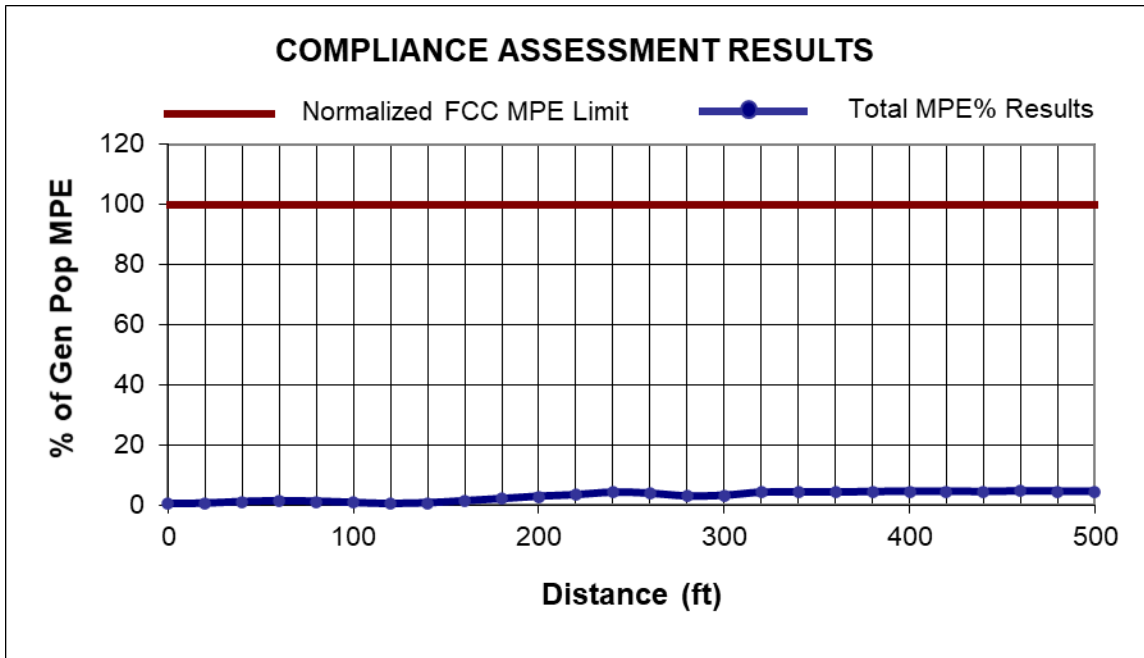
The net result of these assumptions is to intentionally and significantly overstate the calculated RF levels relative to the RF levels that will actually occur – and the purpose of this conservatism is to allow “safe-side” conclusions about compliance with the MPE limit.

The table that follows provides the results of the MPE% calculations for each antenna operation, with the worst-case overall result highlighted in bold in the last column.

Ground Distance (ft)	Verizon Wireless MPE%	Town of Branford MPE%	Total MPE%
0	0.4412	0.0010	0.4422
20	0.6126	0.1582	0.7708
40	1.1750	0.5065	1.6815
60	1.4321	0.7929	2.2250
80	1.2402	0.9154	2.1556
100	0.8539	0.9304	1.7843
120	0.4921	0.8610	1.3531
140	0.7088	0.7643	1.4731
160	1.4236	0.6681	2.0917
180	2.1171	0.5758	2.6929
200	2.9285	0.5010	3.4295
220	3.4331	0.4298	3.8629
240	4.2622	0.3805	4.6427
260	3.9361	0.3320	4.2681
280	3.0130	0.2917	3.3047
300	3.1958	0.2641	3.4599
320	4.2584	0.2352	4.4936
340	4.2700	0.2106	4.4806
360	4.3102	0.1896	4.4998
380	4.4318	0.1715	4.6033
400	4.6013	0.1558	4.7571
420	4.5474	0.1422	4.6896
440	4.4665	0.1302	4.5967
460	4.6739	0.1224	4.7963
480	4.5993	0.1129	4.7122
500	4.5570	0.1044	4.6614

As indicated, the overall worst-case calculated result is 4.7963 percent of the FCC general population MPE limit – well below the 100-percent reference for compliance, particularly given the significant conservatism incorporated in the analysis.

A graph of the overall calculation results, provided on the next page, provides perhaps a clearer *visual* illustration of the relative compliance of the calculated RF levels. The line representing the overall calculation results shows an obviously clear, consistent margin to the FCC MPE limit.



COMPLIANCE CONCLUSION

The FCC MPE limit has been constructed in such a manner that continuous human exposure to RF fields up to and including 100 percent of the MPE limit is acceptable and completely safe.

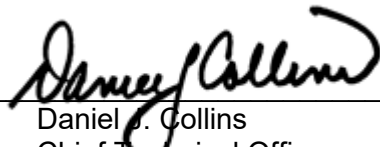
The conservatively calculated maximum RF effect at street level from the proposed wireless carriers is 4.7963 percent of the FCC general population MPE limit. In other words, even with an extremely conservative analysis intended to dramatically overstate the RF effects of any wireless collocation scenario at the site, the calculated worst-case RF level is still more than 20 times below the FCC MPE limit.

The results of the calculations indicate clear compliance with the FCC MPE limit. Moreover, because of the extremely conservative calculation methodology and operational assumptions we applied in the analysis, RF levels actually caused by the antennas will be significantly lower than the calculation results here indicate.

CERTIFICATION

It is the policy of Pinnacle Telecom Group that all FCC RF compliance assessments are reviewed, approved, and signed by the firm's Chief Technical Officer who certifies as follows:

1. I have read and fully understand the FCC regulations concerning RF safety and the control of human exposure to RF fields (47 CFR 1.1301 *et seq*).
2. To the best of my knowledge, the statements and information disclosed in this report are true, complete and accurate.
3. The analysis of site RF compliance provided herein is consistent with the applicable FCC regulations, additional guidelines issued by the FCC, and industry practice.
4. The results of the analysis indicate that the subject antenna operations will be in compliance with the FCC regulations concerning the control of potential human exposure to the RF emissions from antennas.



Daniel J. Collins
Chief Technical Officer
Pinnacle Telecom Group, LLC

3/2/22

Date

Appendix A. Background on the FCC MPE Limit

As directed by the Telecommunications Act of 1996, the FCC has established limits for maximum continuous human exposure to RF fields.

The FCC maximum permissible exposure (MPE) limits represent the consensus of federal agencies and independent experts responsible for RF safety matters. Those agencies include the National Council on Radiation Protection and Measurements (NCRP), the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), the American National Standards Institute (ANSI), the Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA). In formulating its guidelines, the FCC also considered input from the public and technical community – notably the Institute of Electrical and Electronics Engineers (IEEE).

The FCC's RF exposure guidelines are incorporated in Section 1.301 *et seq* of its Rules and Regulations (47 CFR 1.1301-1.1310). Those guidelines specify MPE limits for both occupational and general population exposure.

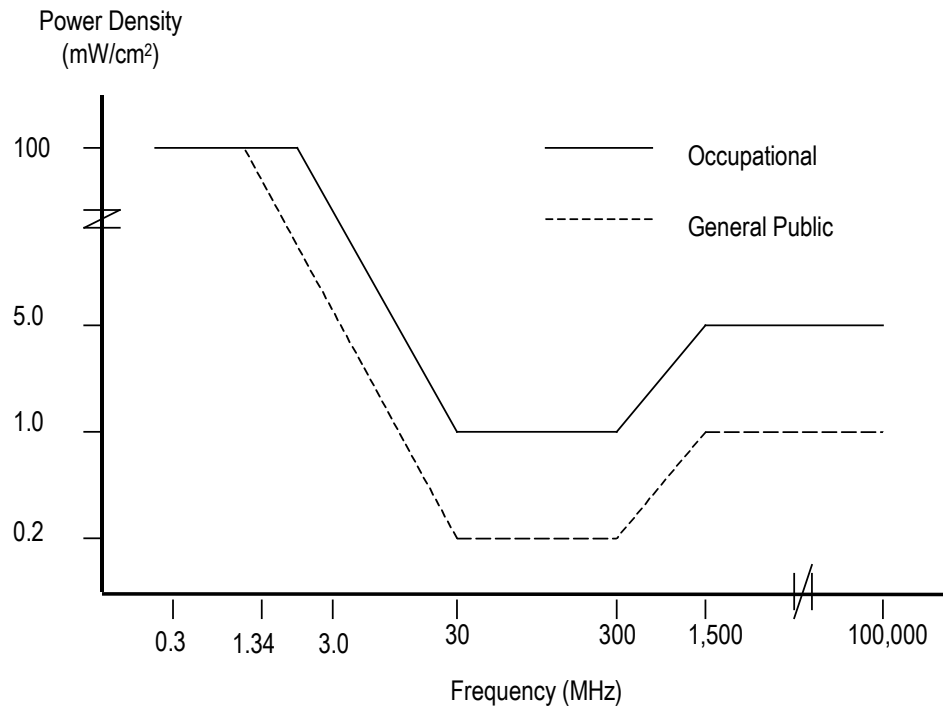
The specified continuous exposure MPE limits are based on known variation of human body susceptibility in different frequency ranges, and a Specific Absorption Rate (SAR) of 4 watts per kilogram, which is universally considered to accurately represent human capacity to dissipate incident RF energy (in the form of heat). The occupational MPE guidelines incorporate a safety factor of 10 or greater with respect to RF levels known to represent a health hazard, and an additional safety factor of five is applied to the MPE limits for general population exposure. Thus, the general population MPE limit has a built-in safety factor of more than 50. The limits were constructed to appropriately protect humans of both sexes and all ages and sizes and under all conditions – and continuous exposure at levels equal to or below the applicable MPE limits is considered to result in no adverse health effects or even health risk.

The reason for *two* tiers of MPE limits is based on an understanding and assumption that members of the general public are unlikely to have had appropriate RF safety training and may not be aware of the exposures they receive; occupational exposure in controlled environments, on the other hand, is assumed to involve individuals who have had such training, are aware of the exposures, and know how to maintain a safe personal work environment.

The FCC's RF exposure limits are expressed in two equivalent forms, using alternative units of field strength (expressed in volts per meter, or V/m), and power density (expressed in milliwatts per square centimeter, or mW/cm²). The table on the next page lists the FCC limits for both occupational and general population exposures, using the mW/cm² reference, for the different radio frequency ranges.

Frequency Range (F) (MHz)	Occupational Exposure (mW/cm ²)	General Public Exposure (mW/cm ²)
0.3 - 1.34	100	100
1.34 - 3.0	100	180 / F ²
3.0 - 30	900 / F ²	180 / F ²
30 - 300	1.0	0.2
300 - 1,500	F / 300	F / 1500
1,500 - 100,000	5.0	1.0

The diagram below provides a graphical illustration of both the FCC's occupational and general population MPE limits.



Because the FCC's RF exposure limits are frequency-shaped, the exact MPE limits applicable to the instant situation depend on the frequency range used by the systems of interest.

The most appropriate method of determining RF compliance is to calculate the RF power density attributable to a particular system and compare that to the MPE limit applicable to the operating frequency in question. The result is usually expressed as a percentage of the MPE limit.

For potential exposure from multiple systems, the respective percentages of the MPE limits are added, and the total percentage compared to 100 (percent of the limit). If the result is less than 100, the total exposure is in compliance; if it is more than 100, exposure mitigation measures are necessary to achieve compliance.

Note that the FCC “categorically excludes” all “non-building-mounted” wireless antenna operations whose mounting heights are more than 10 meters (32.8 feet) from the routine requirement to demonstrate compliance with the MPE limit, because such operations “are deemed, individually and cumulatively, to have no significant effect on the human environment”. The categorical exclusion also applies to *all* point-to-point antenna operations, regardless of the type of structure they’re mounted on. Note that the FCC considers any facility qualifying for the categorical exclusion to be automatically in compliance.

FCC References on RF Compliance

47 CFR, FCC Rules and Regulations, Part 1 (Practice and Procedure), Section 1.1310 (Radiofrequency radiation exposure limits).

FCC Second Memorandum Opinion and Order and Notice of Proposed Rulemaking (FCC 97-303), *In the Matter of Procedures for Reviewing Requests for Relief From State and Local Regulations Pursuant to Section 332(c)(7)(B)(v) of the Communications Act of 1934 (WT Docket 97-192), Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation (ET Docket 93-62), and Petition for Rulemaking of the Cellular Telecommunications Industry Association Concerning Amendment of the Commission's Rules to Preempt State and Local Regulation of Commercial Mobile Radio Service Transmitting Facilities*, released August 25, 1997.

FCC First Memorandum Opinion and Order, ET Docket 93-62, *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, released December 24, 1996.

FCC Report and Order, ET Docket 93-62, *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, released August 1, 1996.

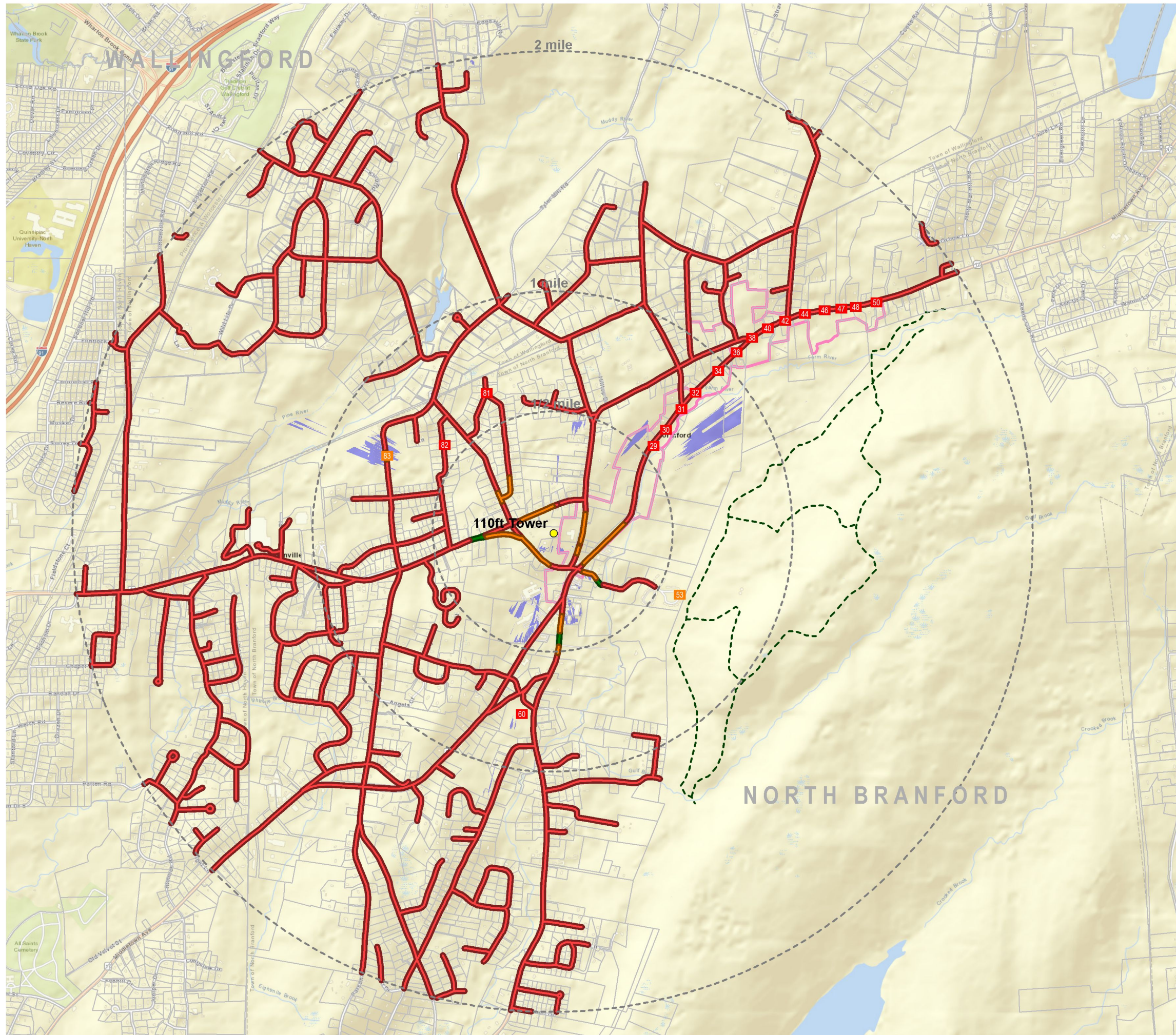
FCC Office of Engineering and Technology (OET) Bulletin 65, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields”, Edition 97-01, August 1997.

FCC Office of Engineering and Technology (OET) Bulletin 56, “Questions and Answers About Biological Effects and Potential Hazards of RF Radiation”, edition 4, August 1999.

Appendix B. SUMMARY of EXPERT QUALIFICATIONS

Daniel J. Collins, Chief Technical Officer, Pinnacle Telecom Group, LLC

<p>Synopsis:</p>	<ul style="list-style-type: none"> • 40+ years of experience in all aspects of wireless system engineering, related regulation, and RF exposure • Has performed or led RF exposure compliance assessments on more than 20,000 antenna sites since the latest FCC regulations went into effect in 1997 • Has provided testimony as an RF compliance expert more than 1,500 times since 1997 • Have been accepted as an FCC compliance expert in New York, New Jersey, Connecticut, Pennsylvania and more than 40 other states, as well as by the FCC
<p>Education:</p>	<ul style="list-style-type: none"> • B.E.E., City College of New York (Sch. Of Eng.), 1971 • M.B.A., 1982, Fairleigh Dickinson University, 1982 • Bronx High School of Science, 1966
<p>Current Responsibilities:</p>	<ul style="list-style-type: none"> • Leads all PTG staff work involving RF safety and FCC compliance, microwave and satellite system engineering, and consulting on wireless technology and regulation
<p>Prior Experience:</p>	<ul style="list-style-type: none"> • Edwards & Kelcey, VP – RF Engineering and Chief Information Technology Officer, 1996-99 • Bellcore (a Bell Labs offshoot after AT&T's 1984 divestiture), Executive Director – Regulation and Public Policy, 1983-96 • AT&T (Corp. HQ), Division Manager – RF Engineering, and Director – Radio Spectrum Management, 1977-83 • AT&T Long Lines, Group Supervisor – Microwave Radio System Design, 1972-77
<p>Specific RF Safety / Compliance Experience:</p>	<ul style="list-style-type: none"> • Involved in RF exposure matters since 1972 • Have had lead corporate responsibility for RF safety and compliance at AT&T, Bellcore, Edwards & Kelcey, and PTG • While at AT&T, helped develop the mathematical models for calculating RF exposure levels • Have been relied on for compliance by all major wireless carriers, as well as by the federal government, several state and local governments, equipment manufacturers, system integrators, and other consulting / engineering firms
<p>Other Background:</p>	<ul style="list-style-type: none"> • Author, <i>Microwave System Engineering</i> (AT&T, 1974) • Co-author and executive editor, <i>A Guide to New Technologies and Services</i> (Bellcore, 1993) • National Spectrum Management Association (NSMA) – former three-term President and Chairman of the Board of Directors; was founding member, twice-elected Vice President, long-time member of the Board, and was named an NSMA Fellow in 1991 • Have published more than 35 articles in industry magazines



LEGEND

Land Cover Viewshed Area (110ft Tower)
(Includes existing vegetation and structures)

Scenic Resources

Northford Center Historic District
-- Trail

Photo Locations/Balloon Visibility
(see Figure A2 for locations within 1/2 mile radius)

Balloon not visible
Balloon seasonally visible through trees
Balloon visible above trees

Note: Viewshed areas are not definitive. Viewshed mapping provides a general understanding of where the proposed project is theoretically visible based on regional topographic, forest and building cover data sources.

The "Land Cover" condition viewshed area includes the screening effect of intervening vegetation and buildings. The location and height of vegetated areas and buildings is based on 2016 Lidar data acquired from Connecticut DEEP.

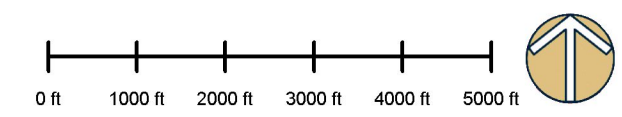
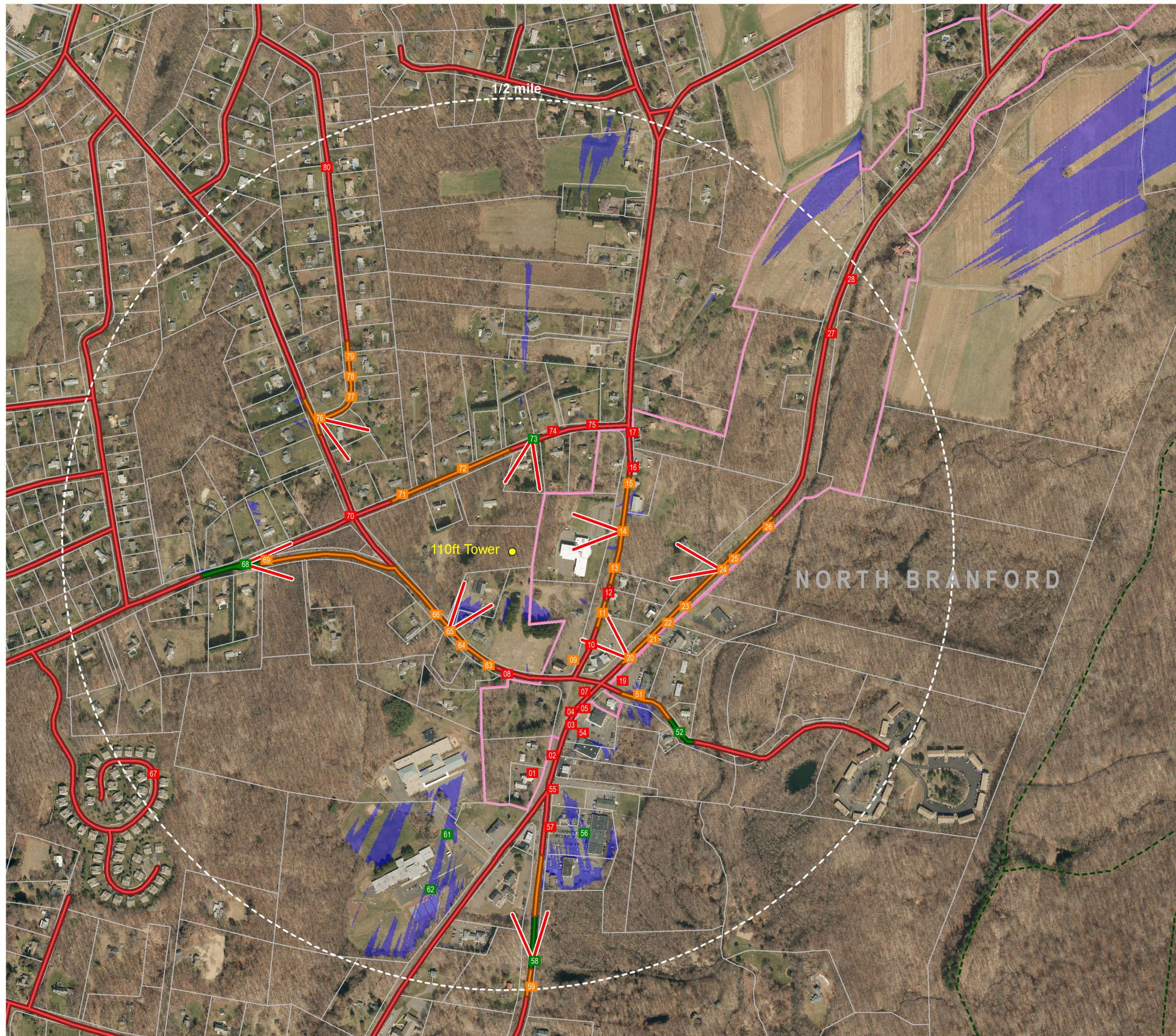


Figure A1
LAND COVER VIEWSHED MAP - 2 MILE RADIUS
Revised Tower Location



LEGEND

Land Cover Viewshed Area (110ft Tower)
(Includes existing vegetation and structures)

Scenic Resources

Northford Center Historic District
-- Trail

Photo Locations/Balloon Visibility

Balloon not visible
Balloon seasonally visible through trees
Balloon visible above trees

V Photo Simulation

Note: Viewshed areas are not definitive. Viewshed mapping provides a general understanding of where the proposed project is theoretically visible based on regional topographic, forest and building cover data sources.

The "Land Cover" condition viewshed area includes the screening effect of intervening vegetation and buildings. The location and height of vegetated areas and buildings is based on 2016 Lidar data acquired from Connecticut DEEP.

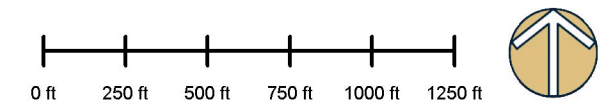


Figure A2
LAND COVER VIEWSHED MAP - 1/2 MILE RADIUS
Revised Tower Location

REMOTE FIELD REVIEW



CT SITING COUNCIL DOCKET NO. 507
RESPONSE TO INTERROGATORY 30
CT021
222 CLINTONVILLE ROAD
NORTHFORD, CONNECTICUT

PREPARED FOR:



PREPARED BY:

ALL-POINTS TECHNOLOGY CORPORATION, P.C.
567 Vauxhall Street Extension – Suite 311
Waterford, CT 06385

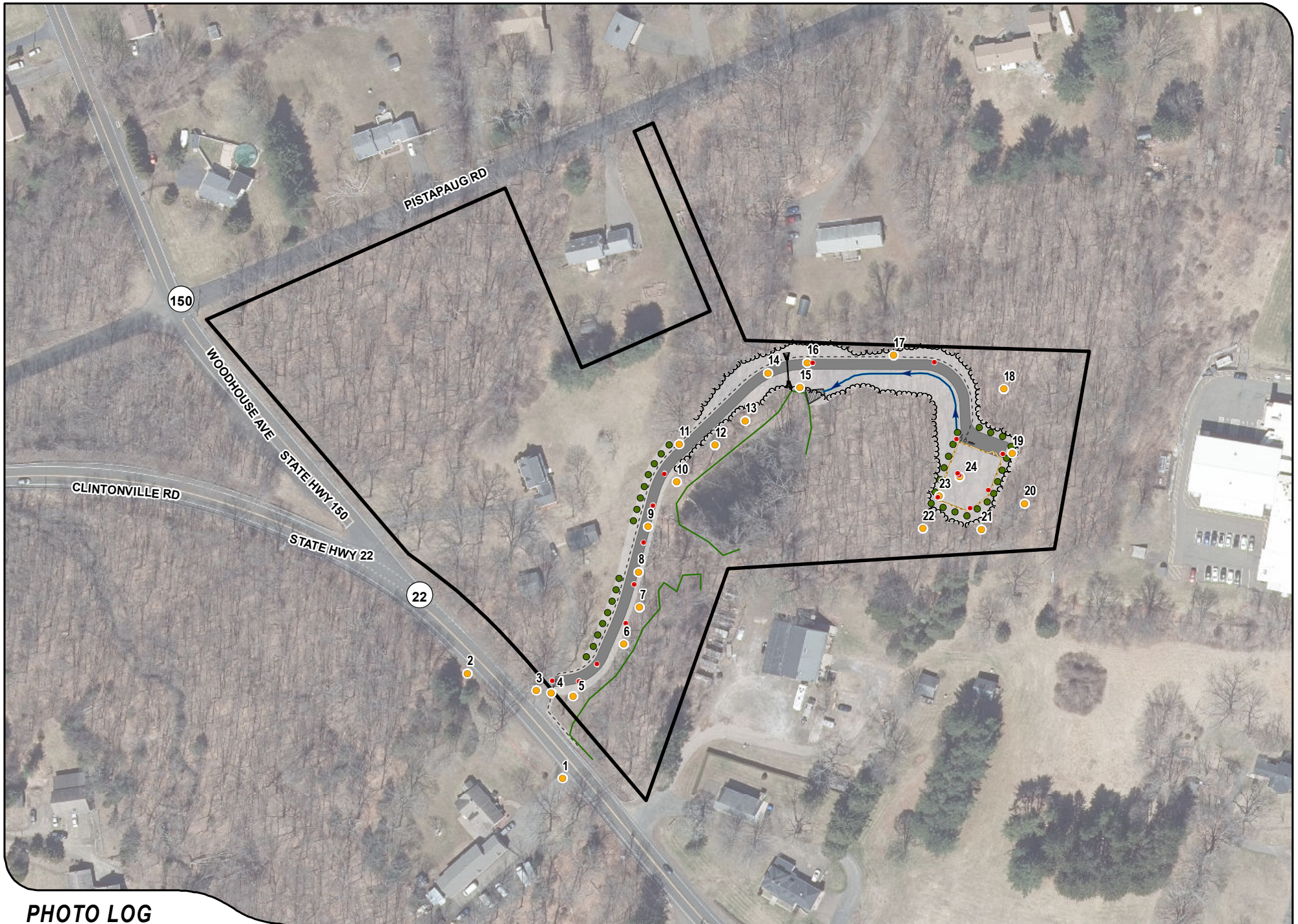
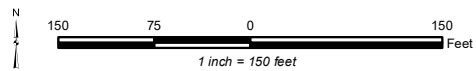


PHOTO LOG

- Photo Locations
- Photo Markers
- Site
- Limit Of Disturbance
- Relocated Access Road
- Stormwater Riprap
- Fenced Compound
- Underground Elec/Telco
- Utility Equipment
- Stormwater Drainage
- Stormwater Swale
- Treeline
- Landscape Screening
- Delineated Wetland Boundary





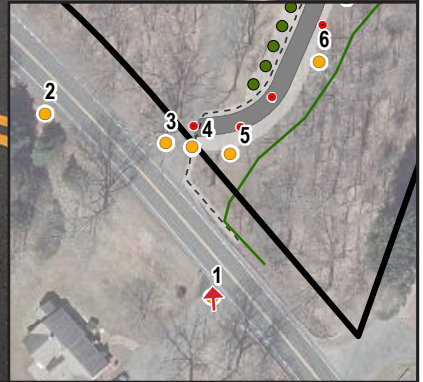
EXISTING ACCESS FROM CLINTONVILLE ROAD (ROUTE 22)

PHOTO

1

DESCRIPTION

CLINTONVILLE ROAD LOOKING NORTHWEST



PHOTOGRAPHED ON 11/02/2021

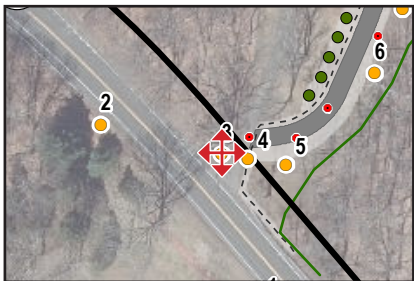


PHOTO

2

DESCRIPTION

CLINTONVILLE ROAD LOOKING EAST



PHOTO

3

DESCRIPTION

VIEW FROM START OF DRIVEWAY - FOUR CARDINAL POINTS

PHOTOGRAPHED ON 11/02/2021



PHOTOGRAPHED ON 11/02/2021

PHOTO

DESCRIPTION

4

START OF PROPOSED ACCESS DRIVE LOOKING NORTHEAST



PHOTOGRAPHED ON 11/02/2021

PHOTO

DESCRIPTION

5

PROPOSED ACCESS DRIVE LOOKING NORTHEAST



PHOTO

6

DESCRIPTION

VIEW FROM PROPOSED ACCESS DRIVE - FOUR CARDINAL POINTS

PHOTOGRAPHED ON 11/02/2021



PHOTO

7

DESCRIPTION

VIEW LOOKING EAST TOWARDS WETLAND



PHOTO

8A

DESCRIPTION

PROPOSED ACCESS DRIVE LOOKING NORTH



PHOTOGRAPHED ON 11/02/2021

PHOTO

DESCRIPTION

8B

PROPOSED ACCESS DRIVE LOOKING SOUTH



PROPOSED ACCESS DRIVE

PROPOSED ACCESS DRIVE

PHOTO

DESCRIPTION

9A

PROPOSED ACCESS DRIVE LOOKING NORTH

PHOTOGRAPHED ON 11/02/2021



PHOTOGRAPHED ON 11/02/2021

PHOTO

DESCRIPTION

10

VIEW LOOKING SOUTHEAST TOWARDS WETLAND/POND



PROPOSED ACCESS DRIVE

PHOTO

DESCRIPTION

11

PROPOSED ACCESS DRIVE LOOKING NORTHEAST

PHOTOGRAPHED ON 11/02/2021



PROPOSED ACCESS DRIVE (BEYOND)

PHOTO

12

DESCRIPTION

SOUTH OF PROPOSED ACCESS DRIVE LOOKING NORTH

PHOTOGRAPHED ON 11/02/2021



PROPOSED ACCESS DRIVE (BEYOND)

PHOTO

DESCRIPTION

13

SOUTH OF PROPOSED ACCESS DRIVE LOOKING NORTH

PHOTOGRAPHED ON 11/02/2021



PHOTO

DESCRIPTION

14

PROPOSED ACCESS DRIVE LOOKING SOUTHWEST



PHOTO

15

DESCRIPTION

LOOKING SOUTHWEST TOWARDS WETLAND



PHOTO

16

DESCRIPTION

PROPOSED ACCESS DRIVE LOOKING EAST



PHOTO

DESCRIPTION

16A

PROPOSED ACCESS DRIVE LOOKING NORTH TOWARDS ADJACENT PROPERTY



PHOTO

DESCRIPTION

17

PROPOSED ACCESS DRIVE LOOKING EAST

PHOTOGRAPHED ON 11/02/2021



PHOTOGRAPHED ON 11/02/21

PHOTO

DESCRIPTION

18

LOOKING SOUTH TOWARDS PROPOSED TOWER



PHOTOGRAPHED ON 11/02/21

PHOTO

DESCRIPTION

19

LOOKING WEST TOWARDS PROPOSED TOWER



PHOTO

DESCRIPTION

20

LOOKING WEST TOWARDS PROPOSED TOWER

PHOTOGRAPHED ON 11/10/2021



PHOTO

20A

DESCRIPTION

LOOKING EAST TOWARDS ADJACENT PROPERTY

PHOTOGRAPHED ON 11/02/2021



PHOTOGRAPHED ON 11/02/2021

PHOTO

21

DESCRIPTION

LOOKING SOUTH TOWARDS ADJACENT PROPERTY



PHOTO

DESCRIPTION

22

LOOKING NORTH TOWARDS PROPOSED TOWER



PHOTO

23

DESCRIPTION

LOOKING SOUTHEAST



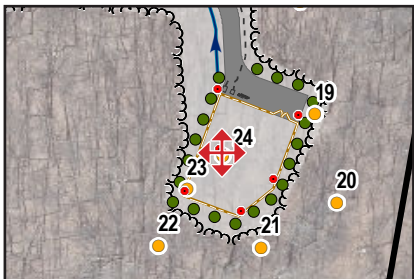
PHOTOGRAPHED ON 11/02/2021

PHOTO

DESCRIPTION

23A

LOOKING SOUTHWEST TOWARDS ADJACENT PROPERTY



PHOTO

25

DESCRIPTION

VIEW FROM PROPOSED TOWER CENTER - FOUR CARDINAL POINTS

PHOTOGRAPHED ON 11/02/2021