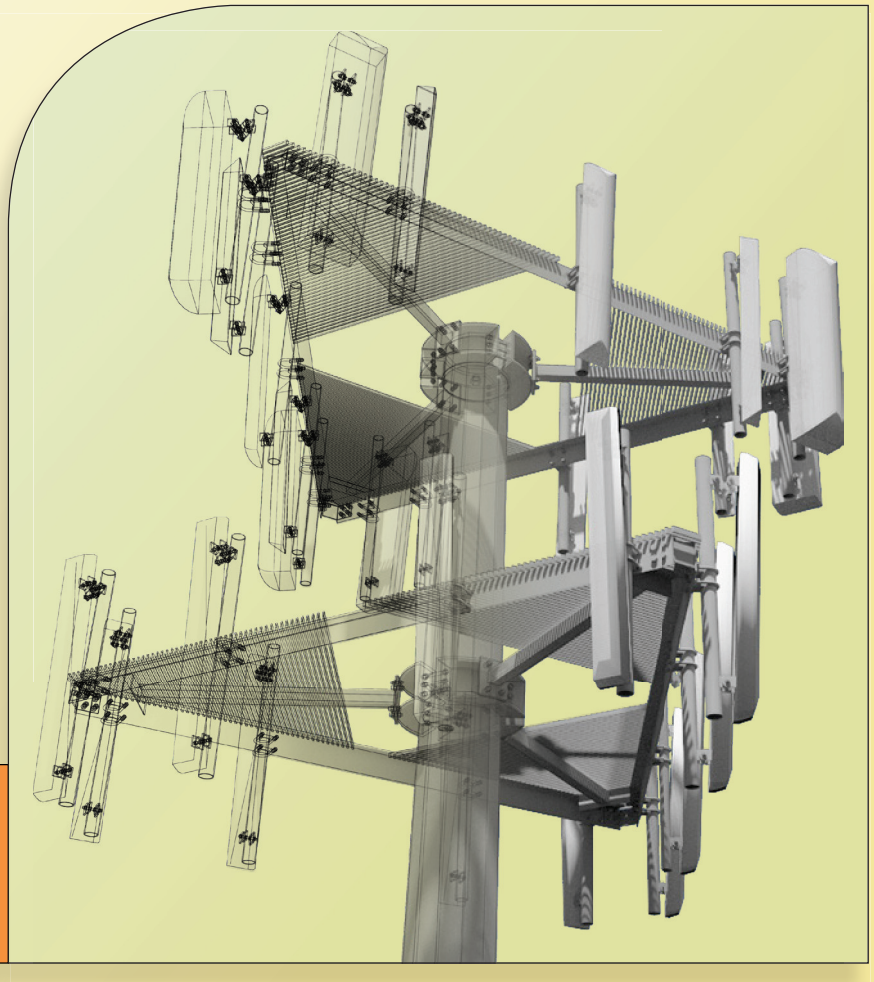
ATTACHMENT 5 Part I

Visibility Analysis

NEW MILFORD
SITE NUMBER: CT4067
KENT ROAD
NEW MILFORD, CT



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New Cingular Wireless PCS, LLC dba AT&T

ALL-POINTS
TECHNOLOGY CORPORATION

Project Introduction

New Cingular Wireless PCS, LLC, d/b/a AT&T is pursuing a Certificate of Environmental Compatibility and Public Need ("Certificate") from the Connecticut Siting Council ("Council") for the construction, maintenance and operation of a wireless communications facility ("Facility") on property off Kent Road in New Milford, Connecticut (identified herein as the "host Property").

The proposed Facility would be located in the southwest corner of the host Property, which consists of a 168.5-acre property owned by FirstLight Hydro Generating Company and identified in New Milford Assessor records as Map 83, Lot 4. The Facility would include a 150-foot tall monopole tower. AT&T would install a total of twelve (12) panel-type antennas with a center line of 146 feet above ground level ("AGL"). Supporting ground equipment would be housed within a 12-foot by 20-foot free-standing equipment shelter located near the base of the monopole. The entire Facility would be enclosed within a fenced, gravel-base compound measuring approximately 75 feet by 75 feet. The Facility would be located at a ground elevation of 366.5 feet Above Mean Sea Level ("AMSL"). Access to the Facility would be gained via an existing dirt road and a proposed 12-foot wide gravel-base extension to the northwest. Both the tower and compound are designed to accommodate multiple carriers and municipal emergency service providers, should the need arise.

At the request of AT&T, All-Points Technology Corporation, P.C. ("APT") prepared this Visibility Analysis to evaluate potential views associated with the Facility from within a two-mile radius ("Study Area"). In addition to the Town of New Milford, portions of the adjoining municipalities of Sherman and Kent are also included within the Study Area.

Site Description and Setting

The host Property is primarily undeveloped forested land. A north-south oriented canal that diverts water from the Housatonic River bisects the host Property. Cedar Hill Pond, a dam, a gatehouse and a penstock are located in the southern portion of the host Property. Water from the pond supplies the Bulls Bridge Hydroelectric Station, located on a separate parcel to the south across Route 7, and discharges to the adjacent Housatonic River. Land use within the vicinity of the host Property is generally rural in nature, heavily wooded and hilly. Residential development occurs within 0.5 mile to the southeast.

The topography within the Study Area is characterized by rolling hills and steep ridgelines with ground elevations that range from approximately 230 feet AMSL to nearly 1,230 feet AMSL. The tree cover within the Study Area (mixed deciduous hardwoods interspersed with stands of mature evergreens) occupies approximately 5,720 acres of the 8,042-acre study area (71%). The average tree canopy is estimated to be approximately 65 feet.

METHODOLOGY

APT used the combination of a predictive computer model and in-field analysis to evaluate the visibility associated with the proposed Facility. The predictive model provides an assessment of potential visibility throughout the entire Study Area, including private properties and other areas inaccessible for direct observations. A balloon float was also conducted to field verify results of the model, inventory visible and nonvisible locations, and to provide photographic documentation from publicly accessible areas. A description of the procedures used in the analysis is provided below.

Preliminary Computer Modeling

Two computer modeling tools are used to calculate those areas from which at least the top of the proposed Facility is estimated to be visible: IDRISI image analysis program (developed by Clark Labs, Clark University) and ArcGIS®, developed by Environmental Systems Research Institute, Inc. Project- and Study Area-specific data were incorporated into the computer model, including the Site location, Facility height and ground elevation, as well as the surrounding topography and existing vegetation which are two primary features that can block direct lines of sight. Information used in the model included LiDAR[1]-based digital elevation data and customized land use data layers developed specifically for this analysis. The LiDAR-based Digital Elevation Model ("DEM") represents topographic information for the state of Connecticut that was derived through the spatial interpolation of airborne LiDAR-based data collected in the year 2000 and has a horizontal resolution of ten (10) feet. In addition, multiple land use data layers were created from the Natural Resources Conservation Service (through the USDA) aerial photography (1-meter resolution, flown in 2006, 2008, 2010 and 2012) using IDRISI image processing tools. The IDRISI tools implement light reflective classes defined by statistical analysis of individual pixels, which are then grouped based on common reflective values such that distinctions can be made automatically between deciduous and coniferous tree species, as well as grassland, impervious surface areas, water and other distinct land use features. This information is manually cross-checked with the recent USGS topographic land characteristics to quality assure the imaging analysis.

Once the data layers were entered, image processing tools were applied and overlaid onto USGS topographic base maps and aerial photographs to achieve an estimate of locations where the Facility might be visible. First, only the topography data layer (DEM) was incorporated to evaluate potential visibility with no intervening vegetative screening. The initial omission of the forest cover data layer results in an excessive over-prediction, but provides an opportunity to identify and evaluate those areas with potentially direct sight lines toward the Facility.

Eliminating the tree canopy altogether as performed in the preliminary analysis exaggerates areas of visibility because it assumes unobstructed sight lines everywhere but in those locations where intervening topography rises above the height of the proposed Facility. However, using this technique not only allows for an initial identification of direct sight lines, but also to gain some insight regarding seasonal views when the

[1] LiDAR is an acronym for Light Detection and Ranging. It is a technology that utilized lasers to determine the distance to an object or surface. LiDAR is similar to radar, but incorporates laser pulses rather than sound waves. It measures the time delay between transmission and reflection of the laser pulse.

leaves are not on the trees[2]. This preliminary mapping is especially useful during the in-field activities (described below) to further evaluate "leaf-off" scenarios. A purposely low average tree canopy height of 50 feet was incorporated into the forest data layer and added to the DEM for a second iteration of the visibility maps, thus providing a conservative assessment of intervening vegetation for use during the in-field activities to compare the outcomes of the initial computer modeling with direct observations of the balloon float.

Additional data was reviewed and incorporated into the visibility analysis, including protected private and public open space, parks, recreational facilities, hiking trails, schools, and historic districts. The Appalachian Trail traverses the ridgeline located in the western portion of the Study Area. The northernmost portion of the Housatonic Range Trail extends into the southern portion of the Study Area. No additional Connecticut blue-blazed trails are located within the Study Area. Based on a review of publicly-available information, no designated state scenic roads exist within the Study Area.

In-Field Activities

To supplement and substantiate the results of the computer modeling efforts, APT completed in-field verification activities consisting of a balloon float, vehicular and pedestrian reconnaissance, and photo-documentation.

Balloon Float and Field Reconnaissance

A balloon float was conducted on June 20, 2013. The balloon float consisted of raising an approximately four-foot diameter, helium-filled balloon tethered to a height of 150 feet AGL at the proposed Facility location. Once the balloon was secured at the proposed Facility height, a Study Area reconnaissance was performed by driving along the local and State roads and locations where the balloon could be seen above/through the tree mast and canopy were inventoried. Visual observations from the reconnaissance were also used to evaluate the results of the preliminary visibility mapping and identify any discrepancies in the initial modeling. Weather conditions on the day of the balloon float included partly sunny skies with a temperature of approximately 85 degrees Fahrenheit and calm winds (less than 6 mph).

During the balloon float, several trees were randomly surveyed using a hand-held infrared laser range finder and Suunto clinometer to ascertain their heights. Numerous locations were selected to obtain tree canopy heights, including along roadways, wooded lots, and high- and low-lying areas to provide for the irregularities associated with different land characteristics and uses found within the Study Area. The average canopy height was developed based on measurements and comparative observations, in this case approximately 65 feet AGL. Throughout Connecticut, the tree canopy height varies from about 55 feet to in excess of 80 feet (where eastern white pine becomes a dominant component of the forest type, average tree heights may be even slightly higher). This general uniformity is most likely the result of historic state-wide clear cutting of forests to produce charcoal and fuelwood, not only for home use, but also for the local brick,

[2] Visibility varies seasonally with increased, albeit obstructed, views occurring during "leaf-off" conditions. Each individual Study Area includes mature vegetation with a unique composition and density of woodlands, with mast or pole timber and branching providing the majority of screening in leafless conditions. Because tree spacing, dimensions and branching patterns as well as the understory differ greatly over even small areas, creating an accurate Study Area-specific "leaf-off" tree density data layer covering a two-mile radius becomes unmanageable. Considering that a given Study Area has its own discrete forest characteristics, modeling for seasonal variations of visibility is problematic and, in our experience, even when incorporating conservative constraints into the model, the results tend to over-predict visibility in "leaf-off" conditions.

brass, and iron industries from the late 1800s to early 1900s[3]. Approximately 69% of Connecticut's forests are characterized as mature[4].

Information obtained during the balloon float was subsequently incorporated into the computer model to refine the visibility map.

Photographic Documentation

During the balloon float, a field reconnaissance was completed by driving the public roads within the Study Area and recording observations, including photo-documentation, of those areas where the balloon was and was not visible. Photographs were obtained from several vantage points to document the view towards the proposed Facility. At each photo location, the geographic coordinates of the camera's position were logged using global positioning system ("GPS") equipment technology.

Photographs were taken with a Nikon D-3000 digital camera body and Nikon 18 to 135 millimeter ("mm") zoom lens, with the lens set to 50 mm.

> *"The lens that most closely approximates the view of the unaided human eye is known as the normal focal-length lens. For the 35 mm camera format, which gives a 24x36 mm image, the normal focal length is about 50 mm.[5]"*

The table below summarizes characteristics of the photographs presented in the attachment to this report including a description of each location, view orientation, the distance from where the photo was taken relative to the proposed Facility, and whether the balloon was visible or not.

Photo No.	Location	View Orientation	Distance to Facility	Visibility
1	Kent Road	Southeast	± 0.48 Mile	Year-round
2	Kent Road	Northeast	± 0.09 Mile	Year-round
3	Kent Road	North	± 0.10 Mile	Year-round
4	Adjacent to #67 Grove Road	Northwest	± 0.14 Mile	Year-round
5	Adjacent to #53 Grove Road	Northwest	± 0.33 Mile	Year-round
6	Long River Road	Northeast	± 1.06 Miles	Year-round
7	Merwinsville – Brown Forge Road	Northwest	± 1.25 Miles	Not Visible

Final Visibility Mapping

Field data and observations were incorporated into the mapping data layers, including the photo locations, areas that experienced land use changes since the 2012 aerial photo flight, and those places where the initial model was found to either under or over-predict visibility.

[3] Ward, J.S., Worthley, T.E. Forest Regeneration Handbook. A guide for forest owners, harvesting practitioners, and public officials. The Connecticut Agricultural Experiment Station and University of Connecticut, Cooperative Extension. Pg. 5.
[4] USDA Resource Bulletin NE-160, 2004.
[5] Warren, Bruce. Photography, West Publishing Company, Eagan, MN, c. 1993, (page 70).

The revised average tree canopy height data layer (using 65 feet AGL) was merged with the DEM and added to the base ground elevations. As a final step, forested areas were extracted from areas of potential visibility, assuming that a person standing within a forest would not be able to view the Facility from beyond a certain distance due to the presence of intervening tree mast and/or understory. APT elected to use a distance of 500 feet for this analysis. Each location is dependent on the specific density and composition of the surrounding woodlands, and it is understood that some locations within this distance could provide visibility of at least portions of the Facility at any time of the year. In "leaf-on" conditions, this distance may be overly conservative as the deciduous vegetation would substantially hinder direct views in many cases at close range. However, even in "leaf off" conditions when views expand, tree mast can still serve to block lines of sight, even at distances less than 500 feet. For purposes of this analysis, it was reasoned that contiguous forested land beyond 500 feet of the Facility would consist of light-impenetrable trees of a uniform height.

Once the additional data was integrated into the model, APT re-calculated the visibility of the Facility from within the Study Area to produce the final visibility map.

Photographic Simulations

Photo simulations of the proposed Facility were generated for the corresponding photographs where the balloon was visible above the tree canopy during the in-field activities. The photo simulations portray scaled renderings of the Facility from these locations. Using field data, site plan information and 3-dimension (3D) modeling software, spatially referenced models of the site area and Facility were generated and merged. The geographic coordinates obtained in the field for the photograph locations were incorporated into the model to produce virtual camera positions within the spatial 3D model. Corresponding photo simulations were then created using a combination of renderings generated in the 3D model and photo-rendering software programs[6].

A photolog map (depicting the photo locations), photo-documentation and the simulations are presented in the attachment at the end of this report. The photographs of the balloon are included to provide visual reference points for the location, height and proportion of the proposed Facility relative to the scene.

As stated earlier, APT has elected to use a 50 mm focal length whenever possible; however, there are occasions when the use of a wider-angle lens setting is preferred. For presentation purposes in this report, the photographs are produced in an approximate 7" by 10.5" format. When viewing in this format size, we believe it is important to provide the largest representational image while maintaining an accurate relation of sizes between objects within the frame of the photograph.

[6] As a final step, the accuracy and scale of select simulations are tested against photographs of existing Facilities with recorded camera position, focal length, photo location, and Facility location.

Visibility Analysis Results

Results of this analysis are graphically displayed on the visibility analysis maps provided in the attachment at the end of this report. Those shaded areas of predicted visibility shown on the maps represent locations from which the proposed Facility may be visible year-round (in yellow) or seasonally (in orange), when the leaves are off the deciduous trees.

The results of the visibility analysis indicate that year-round visibility associated with the proposed Facility would be restricted to a small geographic footprint (62± acres) in the immediate area of the site and extend generally northwest along the Route 7 corridor for a total distance of approximately 0.75 mile. Select locations along Grove Street to the southeast within approximately 0.3 mile of the host Property may achieve partial views of the Facility year-round. Additionally, a few isolated, open locations along the Appalachian Trail, where vistas to the east occur, may also experience views of the Facility.

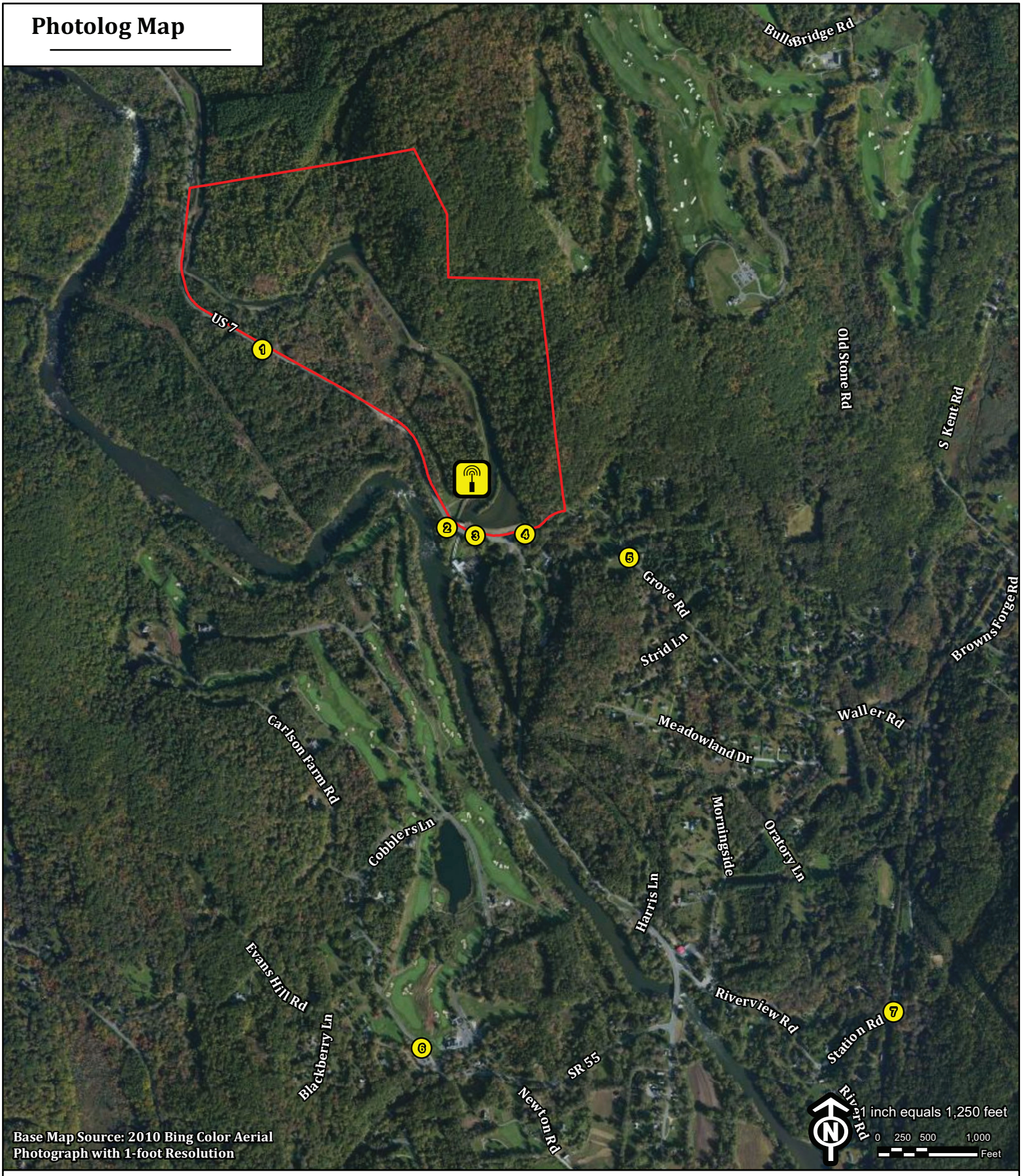
An additional 140± acres of seasonal visibility is predicted to occur primarily to the south, extending down Route 7 and across the Housatonic River, including portions of the Club at River Oaks golf course. Views from within the majority of this area adjacent to the Housatonic River are anticipated to be similar to that represented in Photograph 6; that is, the Facility would not eclipse the hillside behind it. However, access to the golf course and housing community is restricted and APT did not gain access to confirm the character of the views from all locations within this development. Some outlying higher elevations, at distance of 1.5 miles away and beyond, may have limited, distant views of the Facility, again nestled into the hills serving as a backdrop from these perspectives.

Proximity to Schools and Commercial Child Day Care Centers

No schools or commercial child day care facilities are located within 250 feet of the host property. The nearest school and Day Care facility (Kent Center School/Community Nursery School) are located approximately 4.4 miles to the north on Bridge Street in Kent, Connecticut. No views of the proposed Facility would be achieved from this location.

ATTACHMENTS

Photolog Map



Legend

- Proposed Tower Location
- Photo Point (PP)
- Subject Parcel

Proposed AT&T Wireless Communications Facility
Kent Road (Map 83 Lot 4)
New Milford, Connecticut

Monday, July 29, 2013

at&t

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DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
1	**KENT ROAD**	**SOUTHEAST**	**+/- 0.48 MILE**	**YEAR ROUND**

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SIMULATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
1	**KENT ROAD**	**SOUTHEAST**	**+/- 0.48 MILE**	**YEAR ROUND**

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DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
2	**KENT ROAD**	**NORTHEAST**	**+/- 0.09 MILE**	**YEAR ROUND**

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SIMULATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
2	**KENT ROAD**	**NORTHEAST**	**+/- 0.09 MILE**	**YEAR ROUND**

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DOCUMENTATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
3	**KENT ROAD**	**NORTH**	**+/- 0.10 MILE**	**YEAR ROUND**

SIMULATION

PHOTO	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
3	**KENT ROAD**	**NORTH**	**+/- 0.10 MILE**	**YEAR ROUND**

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