

# **ATTACHMENT 3**



## PRELIMINARY VISUAL ASSESSMENT

To: Ms. Alexandria Carter  
Verizon Wireless

Date: April 5, 2104

Re: Plymouth West Relo  
55 Keagan Road  
Plymouth, Connecticut

From: Michael Libertine

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Cellco Partnership (d/b/a “Verizon Wireless”) has identified a potential site candidate location for development of a new wireless telecommunications facility (“Facility”) at 55 Keagan Road in Plymouth, Connecticut (the “host Property”). The proposed Facility would consist of a 140-foot tall monopole.

At the request of Verizon Wireless, All-Points Technology Corporation, P.C. (“APT”) prepared preliminary viewshed mapping to evaluate the potential visibility associated with the proposed Facility. To conduct this assessment, a predictive computer model was developed specifically for this project. The predictive model provides an initial estimate of potential visibility throughout a pre-defined Study Area, in this case a two-mile radius surrounding the proposed Facility location.

Two computer modeling tools were used to predict those areas where at least the top of the 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, its ground elevation and Facility height, as well as the surrounding topography and existing vegetation, which are the primary features that can block direct lines of sight. For purposes of this preliminary evaluation, a conservative average tree canopy height of 50 feet was incorporated.

Information used in the model included LiDAR<sup>1</sup>-based digital elevation data and customized land use data layers developed specifically for this analysis. The LiDAR-based Digital Elevation Model 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 (one-foot resolution, flown in 2012) using IDRISI image processing tools. The IDRISI tools develop 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, surface water and other distinct land use features. This information

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<sup>1</sup> 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.

is manually cross-checked with the recent USGS topographic land characteristics to quality assure the imaging analysis.

With these data inputs, the model is then queried to determine where the top of the Facility can be seen from any point(s) within the Study Area, given the intervening existing topography and vegetation. The results of the preliminary analysis are depicted on the attached map and are intended to provide a representation of those areas where portions of the Facility may potentially be visible to the human eye without the aid of magnification, based on a viewer eye-height of 5 feet above the ground and the combination of intervening topography and tree canopy (year-round) and tree trunks (seasonally, when the leaves are off the deciduous trees), using an assumed, average tree height of 50 feet. The shaded areas of predicted visibility shown on the map denote locations from within the Study Area which the proposed Facility may potentially be visible year-round (in yellow) above the tree canopy and/or seasonally, through the trees (during "leaf-off" conditions; depicted in orange). The Facility however may not necessarily be visible from all locations within those shaded areas. It is important to note that the computer model cannot account for mass density, the height, diameter and branching variability of the trees, or the degradation of views that occur with distance. In addition, each point – or pixel - represents about one meter (3.28 feet) in area, and thus is not predicting visibility from all viewpoints through all possible obstacles. Although large portions of the predicted viewshed may theoretically offer visibility of the Facility, because of these unavoidable limitations the quality of those views may not be sufficient for the human eye to recognize the tower or discriminate it from other surrounding objects. Visibility also varies seasonally with increased, albeit obstructed, views occurring during "leaf-off" conditions. Beyond the density of woodlands found within the given Study Area, each individual tree has its own unique trunk, pole timber and branching pattern characteristics that provide varying degrees of screening in leafless conditions which cannot be adequately modeled. Thus, modeling for seasonal variations of visibility generally over-predicts the viewshed in "leaf-off" conditions, even when incorporating conservative constraints into the model (i.e., assuming each tree is simply a vertical pole of varying width, depending upon species, with no distinct branching pattern). Therefore, field verification remains a necessary component for cross-checking the model's initial results.

The preliminary viewshed mapping results indicate that visibility appears limited to areas within 0.25 mile west, 0.5 mile north and south, and upwards of a mile east of the proposed Facility location. The combination of dense tree cover and topography appears to limit the majority of visibility seasonally to those times of year when the leaves are off the deciduous trees. On a purely quantitative basis, areas from where the proposed Facility is predicted to be visible above the tree canopy year-round constitute approximately 48 acres. When the leaves are off the trees, seasonal views through the intervening pole timber and branches are anticipated to occur potentially over an additional 492± acres of land.

The map provides a basis for understanding the extent of visibility that may occur throughout the Study Area, but it does not qualitatively address any of those potential views. Note that the results of the computer model have not been field verified. The modest average tree height value of 50 feet used in

**ALL-POINTS TECHNOLOGY CORPORATION, P.C.**

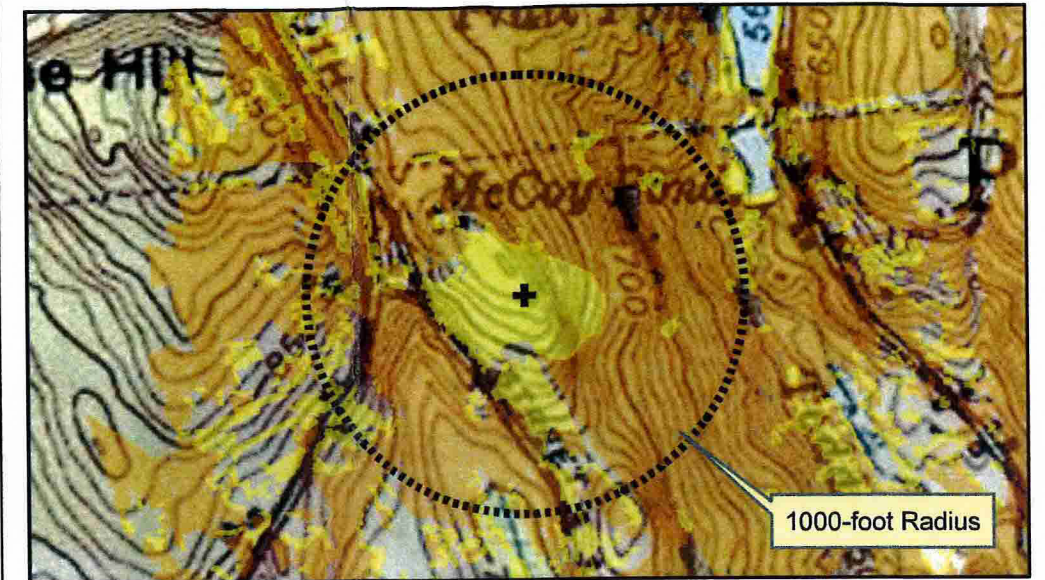
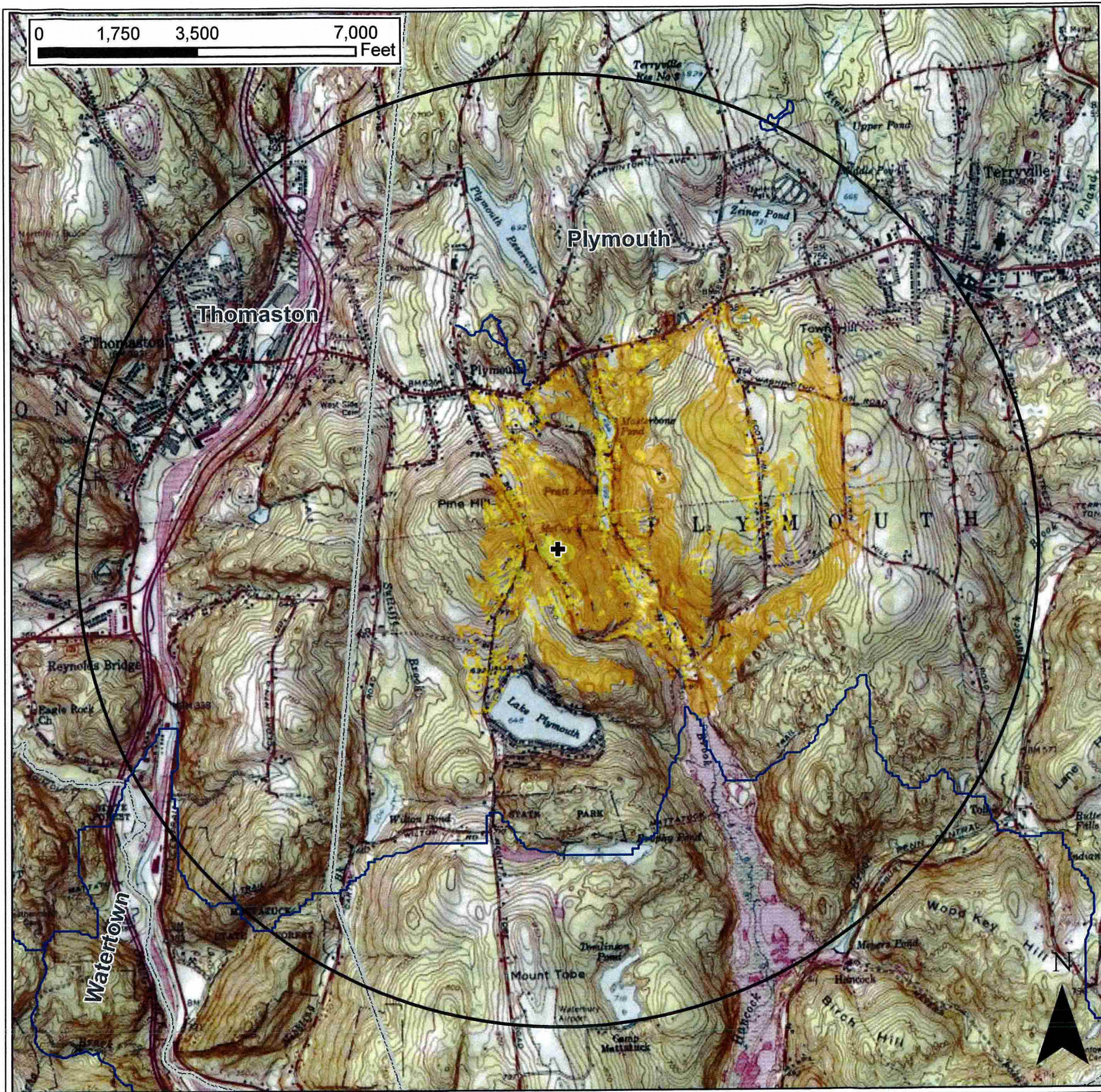
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this preliminary analysis combined with the variability in tree heights and branching patterns as well as the model's sensitivity result in the initial model being over-predictive of the Facility's viewshed.

Our preliminary results are being field-verified with balloon and crane test information to supplement and fine tune the results of the preliminary computer modeling. Visual observations of these events are used to evaluate the results of the preliminary viewshed mapping and identify any discrepancies in the initial modeling. APT will also prepare photographic simulations from several vantage points to depict scaled renderings of the proposed Facility. This information will be included in an application to the Connecticut Siting Council for a Certificate of Environmental Compatibility and Public Need.

Attachment



**Preliminary Viewshed Map – Topo Base**

Proposed Wireless Telecommunications Facility  
 CT1412030 - 55 Keegan Road, Plymouth, CT

This Visibility Analysis map relies solely on computer modeling and interpretation of aerial photographs and topographic maps. The information presented herein has not been field verified.

**NOTES**

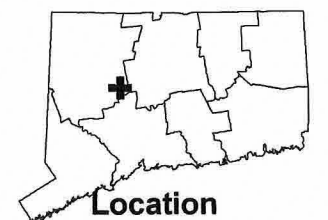
- Viewshed analysis conducted using Clark University's IDRISI.
- Areas of potential visibility are calculated based on facility location and height, Study Area topography, and Study Area vegetation.
- Proposed facility height is 140 feet AGL.
- Forest canopy height is 50 feet AGL
- Study area encompasses a two-mile radius and includes 8,042 acres of land.

**DATA SOURCES**

- Digital elevation model (DEM) derived from 10-foot contours obtained from official CT DEEP and CLEAR sources.
- Forest areas are generated with IDRISI (Clark University) image processing from 2012 NRCS/NAIP digital orthophotos with 1-foot pixel resolution.
- Municipal Open Space, State Recreation Areas, Trails, County Recreation Areas, and Town Boundary data obtained from CT DEEP.

**Legend**

- + Proposed Tower
- Trails
- Orange Predicted Seasonal Visibility (492 Ac.)
- Yellow Predicted Year-Round Visibility (48 Ac.)
- Towns
- 2-Mile Study Area



**Location**

