

*Proposed Wireless
Telecommunications Facility*

Barkhamsted

44 Gavitt Road (Route 219)
Barkhamsted, CT

Prepared for



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August 2009

Visual Resource Evaluation

SBA Towers II, LLC seeks approval from the Connecticut Siting Council for a Certificate of Environmental Compatibility and Public Need to construct a wireless telecommunications facility ("Facility") to be located on property at 44 Gavitt Road ("Host Property") in the town of Barkhamsted, Connecticut. This Visual Resource Evaluation was conducted to approximate the visibility of the proposed Facility within a two-mile radius of the Site ("Study Area"). Attachment A contains a map that depicts the location of the proposed Facility and the limits of the Study Area.

Project Introduction

The proposed Facility includes the construction of a 170-foot tall monopole designed to support up to four antenna platforms with associated ground equipment to be located within a fenced enclosure at the base of the tower. Based on information provided by the project engineer, Clough Harbor Associates, LLP, the proposed Facility is located at approximately 1,136 feet above mean sea level (AMSL). Access to the proposed Facility would follow an existing dirt road currently located on the Host Property that extends in a northerly direction from Gavitt Road to the project area (to be improved to accommodate service vehicles).

Site Description and Setting

Identified in the Town of Barkhamsted land records as Map 26\Block 33\Lot 15A, the Host Property includes approximately 36 acres of undeveloped and mostly wooded land. The proposed Facility would be located on the northern portion of the Host Property, roughly 1,650 feet north of Gavitt Road. Land use within the general vicinity of the Host Property is mainly comprised of undeveloped, forested land and low-density residential. Segments of Route 179 and Route 219 traverse portions of the Study Area. In total, the Study Area contains roughly 36 linear miles of roadways.

The topography in the Study Area is generally characterized by rolling hills and several ridgelines that run north to south through the Study Area. Ground elevations within the Study Area range from approximately 525 feet AMSL to nearly 1,400 feet AMSL. The tree cover within the Study Area consists mainly of mixed deciduous hardwood species interspersed with stands of mature evergreen species. The tree canopy occupies approximately 7,260 acres of the 8,042-acre study area (90%). During the in-field activities associated with this analysis, an infra-red laser range finder was used to accurately determine the average tree canopy height throughout the Study Area. Numerous trees were selected for measurement and the average tree canopy established, in this case 65 feet. Lastly, the Study Area features approximately 32 acres of surface water that includes a small portion of the Barkhamsted Reservoir and several unnamed ponds.



METHODOLOGY

In order to better represent the visibility associated with the Facility, VHB has developed a two-fold approach utilizing both a predictive computer model and in-field analysis. The predictive model is employed to assess potential visibility throughout the entire Study Area, including private property and/or otherwise inaccessible areas for field verification. A balloon float and Study Area drive-through reconnaissance are also conducted to provide a height and locational representation, back checking of the computer model and photographic documentation from publicly accessible areas. Results of the balloon float are analyzed and incorporated into the final viewshed map. A description of the methodologies used in the analysis is provided below.

Visibility Analysis

Using ESRI's ArcView® Spatial Analyst, a computer modeling tool, the areas from where the top of the Facility is expected to be visible are calculated. This is based on information entered into the computer model, including Facility height, its ground elevation, the surrounding topography and existing vegetation. Data incorporated into the predictive model includes a digital elevation model (DEM) and a digital forest layer for the Study Area. The DEM was derived from the Connecticut LiDAR-based digital elevation data. The LiDAR data was produced by the University Of Connecticut Center for Land Use Education and Research (CLEAR) in 2007 and has a horizontal resolution of 10 feet. In order to create the forest layer, digital aerial photographs of the Study Area are incorporated into the computer model. The mature trees and woodland areas depicted on the aerial photos are manually traced in ArcView® GIS and then converted into a geographic data layer. The aerial photographs were produced in 2006 and have a pixel resolution of one foot.

Once the data are entered, a series of constraints are applied to the computer model to achieve an estimate of where the Facility will be visible. Initially, only topography is used as a visual constraint; the tree canopy is omitted to evaluate all areas of potential visibility without any vegetative screening. Although this is an overly conservative prediction, the initial omission of this layer provides a reference for comparison once the tree canopy is established and also assists in the evaluation of potential seasonal visibility of the proposed Facility. An estimated tree canopy height of 50 feet is initially utilized to prepare a preliminary viewshed map for use during the Study Area reconnaissance. The average height of the tree canopy, in this case 65 feet, is determined in the field using a hand-held infra-red laser range finder. The forested areas within the Study Area were then overlaid on the DEM with a height of 65 feet added and the visibility calculated. The forested areas are then extracted from the areas of visibility, with the assumption that a person standing among the trees will not be able to view the Facility beyond a distance of approximately 500 feet. Depending on the density of the vegetation in these areas, it is assumed that some locations

within this range will provide visibility of at least portions of the Facility based on where one is standing.

Also included on the map is a data layer, obtained from the Connecticut State Department of Environmental Protection (CTDEP), which depicts various land and water resources such as state parks and forests, recreational facilities, dedicated open space and CTDEP boat launches and other categories. This layer is useful in identifying potential visual impacts to any sensitive receptors that may be located within the Study Area. It was also determined that portions of the Tunxis Trail, part of the Connecticut Blue Blaze trail system, are contained within the western half of the Study Area. Lastly, based on a review of available data published by the Connecticut Department of Transportation and discussions with municipal staff in Barkhamsted, it was determined that there are currently no state- or locally-designated scenic roadways within the Study Area.

The preliminary viewshed map (using topography and a conservative tree canopy height of 50 feet) is used during the in-field activity to assist in determining if significant land use changes have occurred since the aerial photographs used in this analysis were produced and to compare the results of the computer model with observations of the balloon float. Information obtained during the reconnaissance is then incorporated into the final visibility map.

Balloon Float and Study Area Reconnaissance

On July 28, 2009 Vanasse Hangen Brustlin Inc., (VHB) conducted a balloon float at the proposed Facility location to further evaluate the potential viewshed within the Study Area. The balloon float consisted of raising and maintaining an approximate four-foot diameter, helium-filled weather balloon at the proposed site location at a height of 170 feet. Once the balloon was secured, VHB staff conducted a drive-by reconnaissance along the roads located within the Study Area with an emphasis on nearby residential areas and other potential sensitive receptors in order to evaluate the results of the preliminary viewshed map and to document where the balloon was, and was not, visible above and/or through the tree canopy. As part of the in-field activities, VHB staff also hiked portions of the Tunxis Trail in order to identify and document areas of potential visibility along the trail. During the balloon float, the temperature was approximately 85 degrees Fahrenheit with calm wind conditions and sunny skies.

Photographic Documentation

During the balloon float, VHB personnel drove the public road system and hiked portions of the Tunxis Trail within the Study Area to inventory those areas where the balloon was and was not visible. The balloon was photographed from several vantage points to document the actual view towards the proposed Facility. Several locations where the balloon was not visible are also included in order to provide documentation from select areas. The locations of the photos are described below:

1. View from Legeyt Road adjacent to house #21.
2. View from Legeyt Road.
3. View from Shannon Drive adjacent to house #6.
4. View from South Road at Laurel Lane.
5. View from Route 219 at Route 179.
6. View from Route 219 adjacent to house #93.
7. View from Case Street adjacent to house #131.
8. View from Hayes Road.
9. View from Tunxis Trail at summit of Pine Mountain.

Photographs of the balloon from the view points listed above were taken with a Nikon D-80 digital camera body and Nikon 18 to 135 mm zoom lens. For the purposes of this report, the lens was set to 50mm. "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."¹

The locations of the photographic points are recorded in the field using a hand-held GPS receiver and are subsequently plotted on the maps contained in the attachments to this document.

Photographic Simulation

Photographic Simulations were generated for the three locations identified above where the balloon was visible. The Photographic Simulations represent a scaled depiction of the proposed monopole from these locations. The height of the Facility is determined based on the location of the balloon in the photographs and a proportional monopole image is simulated into the photographs. The simulations are contained in Attachment A.

¹ Warren, Bruce. *Photography*, West Publishing Company, Eagan, MN, c. 1993, (page 70).



CONCLUSIONS

Based on this analysis, areas from where the proposed 170-foot monopole would be visible above the tree canopy comprise approximately 13 acres, or less than one half of one percent of the 8,042- acre Study Area. As depicted on the attached viewshed map (included as Attachment B), year-round visibility associated with the proposed Facility is generally comprised of small, isolated areas that are somewhat spread out among several locations within the Study Area. Specifically, these areas include select portions of Legeyt Road located to the northeast of the proposed Facility; Shannon Drive located to the southwest; and several smaller areas located on private/and or otherwise inaccessible properties to the south, southeast and southwest. Overall, year round visibility is significantly minimized by the abundance of mature vegetative screening and intervening topography contained within the Study Area. In total, VHB estimates that at least partial year-round views of the proposed Facility may be achieved from select portions of approximately four residential properties within the Study Area. These include two properties located along Legeyt Road; one property located along Shannon Drive; and one property located along Case Road (Barkhamsted). No views are anticipated from the Tunxis Trail which is located between one and two miles to the west of the proposed Facility.

The viewshed map also depicts additional areas where seasonal (i.e. during “leaf off” conditions) views through the trees are anticipated. These areas comprise approximately 15 additional acres and are generally located on the Host Property and adjacent to several areas where year-round visibility is anticipated. Potential seasonal views from the areas depicted on the map would be largely obstructed by existing vegetation, even during “leaf-off” conditions. In total, VHB anticipates that approximately two additional residences could achieve seasonal views of the proposed Facility from select portions of their respective properties. These residences are located along Gavitt Road and Case Road (Barkhamsted).

Attachment A

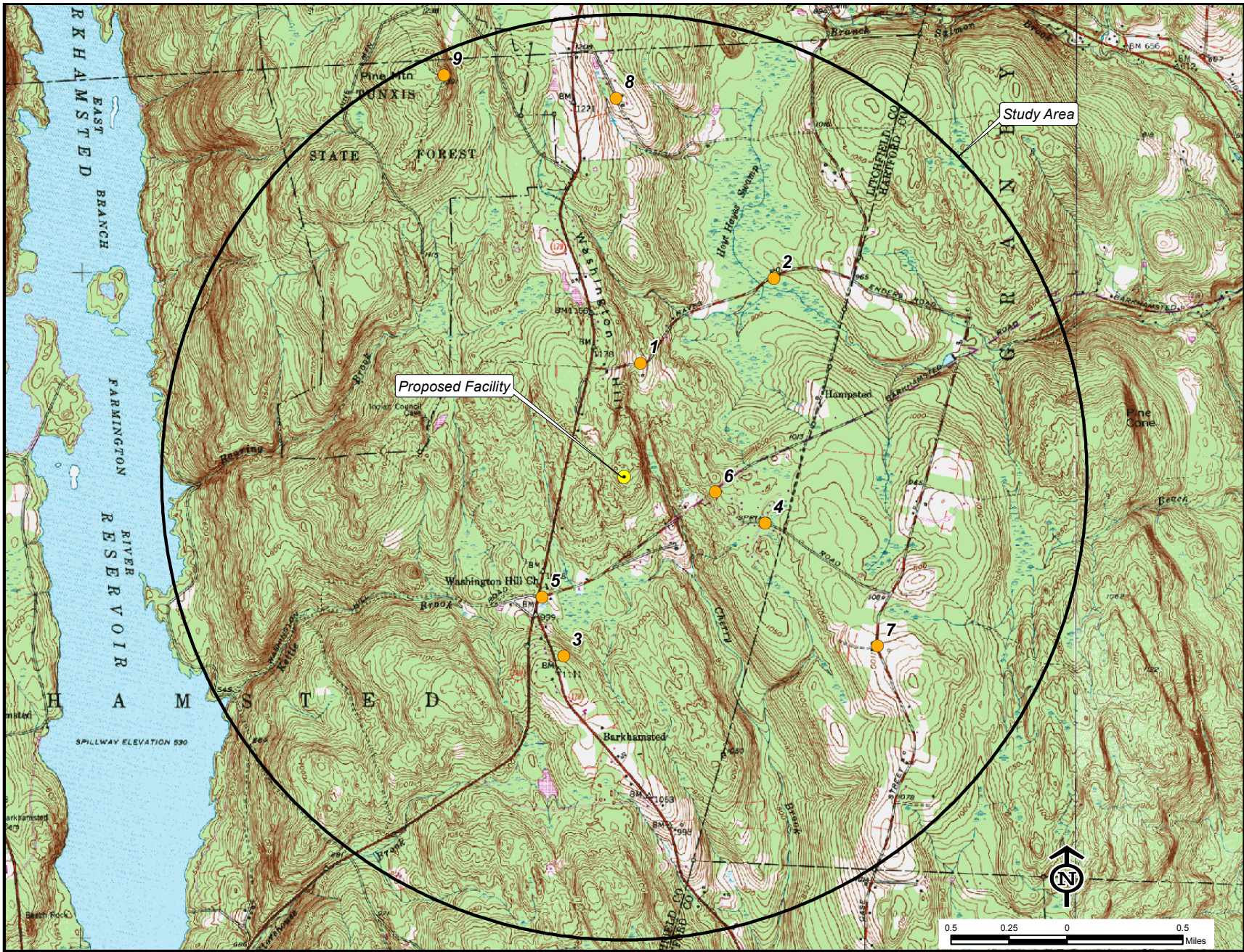
Photolog Documentation Map, Project Area Photograph, Balloon Float Photographs and Photographic Simulations



PROPOSED PROJECT AREA

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PHOTOLOG MAP



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VIEW 1



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PHOTO TAKEN FROM LEGEYT ROAD ADJACENT TO HOUSE# 21, LOOKING SOUTHWEST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.50 MILE +/-

VIEW 1



ct:\mddat\40999.27\graphics\FIGURES\40999.27_Photosim.indd

PHOTO TAKEN FROM LEGEYT ROAD ADJACENT TO HOUSE# 21, LOOKING SOUTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.50 MILE +/-

VIEW 2



ct:\mddat\40999.27\graphics\FIGURES\40999.27_Photosim.indd

PHOTO TAKEN FROM LEGEYT ROAD, LOOKING SOUTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.08 MILES +/-

VIEW 2



c:\m\dat\40999.27\graphics\FIGURES\40999.27_Photosim.indd

PHOTO TAKEN FROM LEGEYT ROAD, LOOKING SOUTHWEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.08 MILES +/-

VIEW 3



ct:\mddat\405999.27\graphics\FIGURES\405999.27_Photosim.indd

PHOTO TAKEN FROM SHANNON DRIVE ADJACENT TO HOUSE# 6, LOOKING NORTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.81 MILE +/-

VIEW 3



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PHOTO TAKEN FROM SHANNON DRIVE ADJACENT TO HOUSE# 6, LOOKING NORTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.81 MILE +/-

VIEW 4



PHOTO TAKEN FROM SOUTH ROAD AT LAUREL LANE, LOOKING NORTHWEST - BALLOON IS NOT VISIBLE

DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.63 MILE +/-

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VIEW 5



ct:\mddat\40999.27\graphics\FIGURES\40999.27_Photosim.indd

PHOTO TAKEN FROM ROUTE 219 AT ROUTE 179, LOOKING NORTHEAST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.62 MILE +/-

VIEW 6



ct:\mddat\40999.27\graphics\FIGURES\40999.27_Photosim.indd

PHOTO TAKEN FROM ROUTE 219 ADJACENT TO HOUSE# 93, LOOKING NORTHWEST - BALLOON IS NOT VISIBLE

DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.40 MILE +/-

VIEW 7



ct:\mddat\40999.27\graphics\FIGURES\40999.27_Photosim.indd

**PHOTO TAKEN FROM CASE STREET (GRANBY) ADJACENT TO HOUSE# 131, LOOKING NORTHWEST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.30 MILES +/-**

VIEW 8



cm:\data\40999.27\graphics\FIGURES\40999.27_Photosim.indd

PHOTO TAKEN FROM HAYES ROAD, LOOKING SOUTH - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.63 MILES +/-

VIEW 9



cm:\data\40999.27\graphics\FIGURES\40999.27_Photosim.indd

PHOTO TAKEN FROM TUNXIS TRAIL AT SUMMIT OF PINE MOUNTAIN, LOOKING SOUTHEAST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.90 MILES +/-

Attachment B

Viewshed Map

Viewshed Analysis
Proposed SBA Towers, Inc.
Telecommunications Facility
Barkhamsted
44 Gavitt Road
Barkhamsted, Connecticut

NOTE:
 - Viewshed analysis conducted using ESRI's Spatial Analyst.
 - Proposed Facility height is 170 feet.
 - Existing tree canopy height estimated at 50 feet.
 - Study Area is comprised of a two-mile radius surrounding the proposed facility and includes 8,042 acres of land.

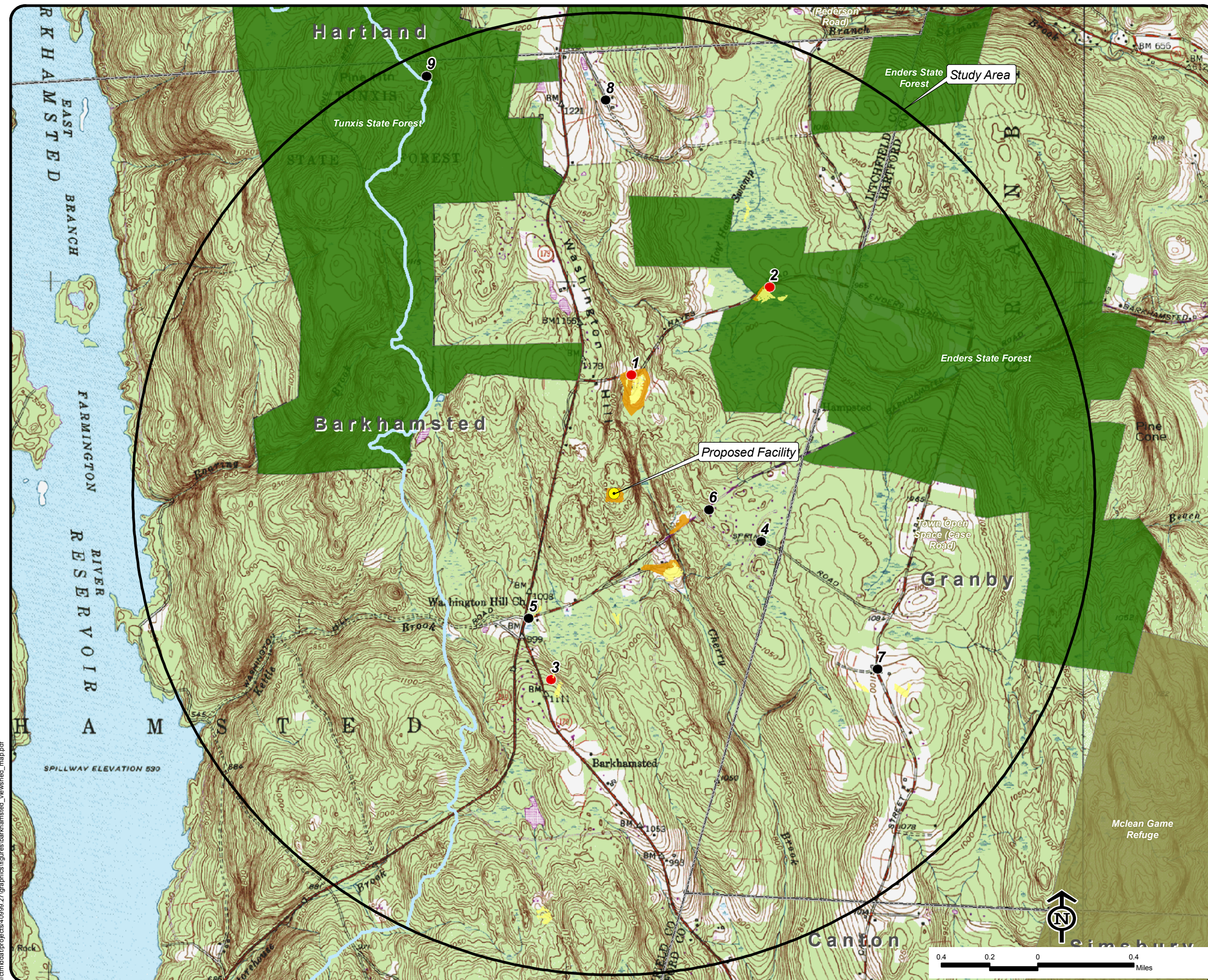
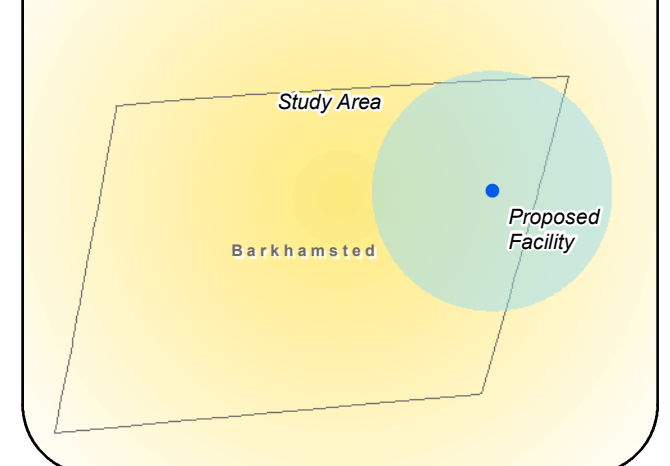
DATA SOURCES:
 - Digital elevation model (DEM) derived from Connecticut LiDAR-based Digital Elevation Data (collected in 2000) with a 10-foot spatial resolution produced by the University of Connecticut and the Center for Land Use Education and Research (CLEAR); 2007
 - Forest areas derived from 2006 digital orthophotos with 1-foot pixel resolution; digitized by VHB, 2009
 - Base map comprised of New Hartford (1984) and Teriffville (1984) USGS Quadrangle Maps
 - Protected municipal and private open space properties and federal protected properties and data layers provided by CT DEP, 1997
 - Protected CT DEP properties data layer provided by CTDEP, May 2007
 - CT DEP boat launches data layer provided by CT DEP, 1994
 - Scenic Roads layer derived from available State and Local listings.

Map Compiled August, 2009

Legend

- Proposed Site Location
- Photographs - July 28, 2009
- Balloon is not visible
- Balloon visible above trees
- Seasonal Visibility (Approximately 15 acres)
- Year-Round Visibility (Approximately 13 acres)
- Protected Municipal and Private Open Space Properties (1997)
- CT DEP Protected Properties (2007)
- State Forest
- State Park
- DEP Owned Waterbody
- State Park Scenic Reserve
- Historic Preserve
- Natural Area Preserve
- Fish Hatchery
- Flood Control
- Other
- State Park Trail
- Water Access
- Wildlife Area
- Wildlife Sanctuary
- Federal Protected Properties (1997)
- CT DEP Boat Launches (1994)
- Scenic Road (State and Local)
- Tunxis Trail (CT Blue Blaze)
- Town Line

Inset Map
Town of Barkhamsted



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