

*Proposed Wireless  
Telecommunications Tower  
Relocation*

1919 Boston Post Road  
(US Route 1)  
Guilford, Connecticut

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Prepared for Global Signal  
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## Visual Resource Evaluation

Global Signal seeks to relocate an existing 150-foot tall monopole tower located on property at 1919 Boston Post Road in the Town of the Guilford, Connecticut (“host property”). The relocated monopole (“Facility”) would be similar in height and design to the existing tower, but located approximately 700 feet to the northeast on the host property in order to accommodate future commercial development within this area. This Visual Resource Evaluation was conducted to approximate the visibility of the relocated Facility within a two-mile radius of the Site (“Study Area”).

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## Project Introduction

The proposed Facility includes the construction of a 150-foot tall monopole and associated ground equipment to be located within a fenced enclosure at the base of the tower. The proposed Facility would replace an existing 150-foot tall monopole tower currently located on the host property. The proposed project area is located at approximately 100 feet Above Mean Sea Level (AMSL). Access to the proposed Facility will be achieved via a parking area to be constructed in conjunction with the future commercial development of the host property.

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## Site Description and Setting

The host property includes approximately 26.24 acres of land and is identified in the Town of Guilford land records as Map 79/Lot 35 (see Photolog Documentation map contained in Attachment A). In addition to the existing telecommunications facility, the host property is currently occupied by a small single story commercial building and associated parking area located along US Route 1 and a self-storage facility located adjacent to the existing monopole. The majority of the host property is currently open and undeveloped. A photograph of the proposed project area is included in Attachment B. Land use within the general vicinity of the proposed Facility is mainly comprised of various small-scale commercial establishments located along US Route 1, highway infrastructure associated with Interstate 95 and medium-density residential parcels.

The topography in the Study Area is generally characterized by gently rolling hills that range in elevation from approximately 10 feet above mean sea level (AMSL) to approximately 240 feet AMSL. The tree cover within the Study Area consists mainly of mixed deciduous hardwood species. The tree canopy occupies approximately 5,595 acres of the 8,042-acre study area (70%). During the in-field activities associated with this analysis, an infrared 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. In total, the Study Area features approximately 65 acres of open water. In addition, the Study contains roughly 84 linear miles of roadways.



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## METHODOLOGY

To estimate the visibility associated with the proposed Facility, VHB incorporates 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 obtain locational and height representations, back check the initial computer model results and provide documentation from publicly accessible areas. Results of both activities are analyzed and incorporated into the final viewshed map. A description of the methodologies used in the analysis is provided below.

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### Visibility Analysis

Using ESRI’s ArcView® Spatial Analyst, a computer modeling tool, the areas from where the proposed 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, existing vegetation and any significant structures/objects that may act to obstruct potential views. Data incorporated in the model includes 7.5 minute digital elevation models (DEMs) and a digital forest layer for the project area. The DEMs were produced by the United States Geological Survey (USGS) in 1982 at a 30 meter resolution. The forest layer was derived through on-screen digitizing in ArcView® GIS from 2004 digital orthophotos with a 0.5 foot pixel resolution. For comparative purposes, VHB also calculated the areas of visibility for the existing site location.

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 was 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 these layers 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. A conservative tree canopy height of 50 feet is then used to prepare a preliminary viewshed map for use during the Study Area reconnaissance. The average height of the tree canopy is determined in the field using a hand-held infra-red laser range finder. The average tree canopy height is incorporated into the final viewshed map; in this case, 65 feet was identified as the average tree canopy height. 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. This analysis was conducted in 30-foot

increments from 150 feet down to 30 feet for the proposed relocated site and the results consolidated into a single thematic layer in order to determine the approximate amount of the tower structure that would be visible from any given location.

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 among other categories. This layer is useful in identifying potential visual impacts to any sensitive receptors that may be located within the Study Area. As shown on the attached viewshed map, portions of the Cockaponset State Forest and several large parcels owned by the Guilford Land Conservation Trust, Inc. are contained within Study Area. Lastly, based on a review of available data published by the Connecticut Department of Transportation and discussions with town staff in Guilford, it was determined that Route 77 which traverses the eastern portion of the Study Area is a state-designated scenic roadway.

A preliminary viewshed map (using topography and a conservative tree canopy height of 50 feet) is generated for use during the in-field activity in order to confirm that no significant land use changes have occurred since the 2004 aerial photographs used in this analysis were produced and to verify the results of the model in comparison to the balloon float. Information obtained during the reconnaissance is then incorporated into the final visibility map.

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## Balloon Float and Study Area Reconnaissance

On June 14, 2006 Vanasse Hangen Brustlin Inc., (VHB) conducted a “balloon float” at the proposed Facility in order to evaluate the potential viewshed within the Study Area. The balloon float consisted of raising and maintaining an approximate three-foot diameter, helium-filled weather balloon at the proposed site location at a height of 150 feet. During the balloon float, weather conditions were mostly sunny. The temperature was approximately 75 degrees Fahrenheit with calm winds.

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## Photographic Documentation

Once the balloon was secured at a height of 150 feet, 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 and refine the results of the preliminary viewshed map and to verify where the balloon was, and was not, visible above and/or through the tree canopy. The balloon was photographed from a number of different vantage points to document the actual view towards the proposed Facility. The locations and orientations of the photos are described below:

1. View from Boston Post Road (US Route 1) at Joan Drive, looking southeast.

2. View from Boston Post Road (US Route 1), looking northwest.
3. View from Boston Post Road (US Route 1) south of Interstate 95, looking northwest.
4. View from Boston Post Road (US Route 1) north of Interstate 95, looking northeast.
5. View from River Road at Guilford Land Trust Car Pull-Off area, looking northwest.

Photographs of the balloon from the view points listed above were taken with a Nikon Digital Camera COOLPIX 5700, which has a lens focal length equivalent to a 35 mm camera with a 38 to 115 mm zoom. "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."<sup>1</sup> The optical zoom lens for the Nikon COOLPIX was set at a range of 50 mm to 70 mm for the purposes of this Visual Resource Evaluation.

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.

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## Photographic Simulation

Photographic Simulations were generated for the five locations identified above. 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.



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## CONCLUSIONS

Based on this analysis, areas from where the relocated 150-foot monopole would be visible above the tree canopy comprise approximately 51 acres; less than one percent of the 8,042 acre Study Area. Of this total, approximately 16 acres of visibility occurs on the host property which is mostly open and undeveloped. In comparison, the existing 150-foot tall monopole is currently visible from roughly 54 acres within the Study Area. As depicted on the viewshed map, year-round visibility for both the existing site location and the proposed relocation is largely confined to the US Route 1 transportation corridor with the exception of several smaller areas of visibility located to the north/northwest of the host property. This is consistent with observations made in the field during the conduct of the balloon float as little

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

difference in visibility between the existing monopole and the relocated Facility was identified. Generally, the proposed Facility will be visible from those locations that currently feature views of the existing monopole. Given the physical separation between the two locations (approximately 700 feet) and their respective placement on the host property, views of the existing monopole will extend slightly further to the north of the host property while views of the proposed Facility will extend slightly further to the south. VHB estimates that approximately two residences within the Study Area will have year round views of the proposed monopole. These properties are located along US Route 1 adjacent to the proposed Facility within closer proximity to the existing site location. No views are anticipated from Route 77, a state-designated scenic roadway, or from within Cockaponset State Forest. The viewshed map also depicts several additional areas where seasonal (i.e. during "leaf off" conditions) views through the trees are anticipated. These areas comprise approximately 45 additional acres and are mainly located to the northeast and southwest of the host property. Based on observations made in the field during the the balloon float, VHB anticipates that approximately 10 residences will have limited seasonal views of the proposed Facility. These properties area located along Peddlers Road, Copper Hill Drive and Dowd Court within approximately ¼ mile of the proposed Facility.

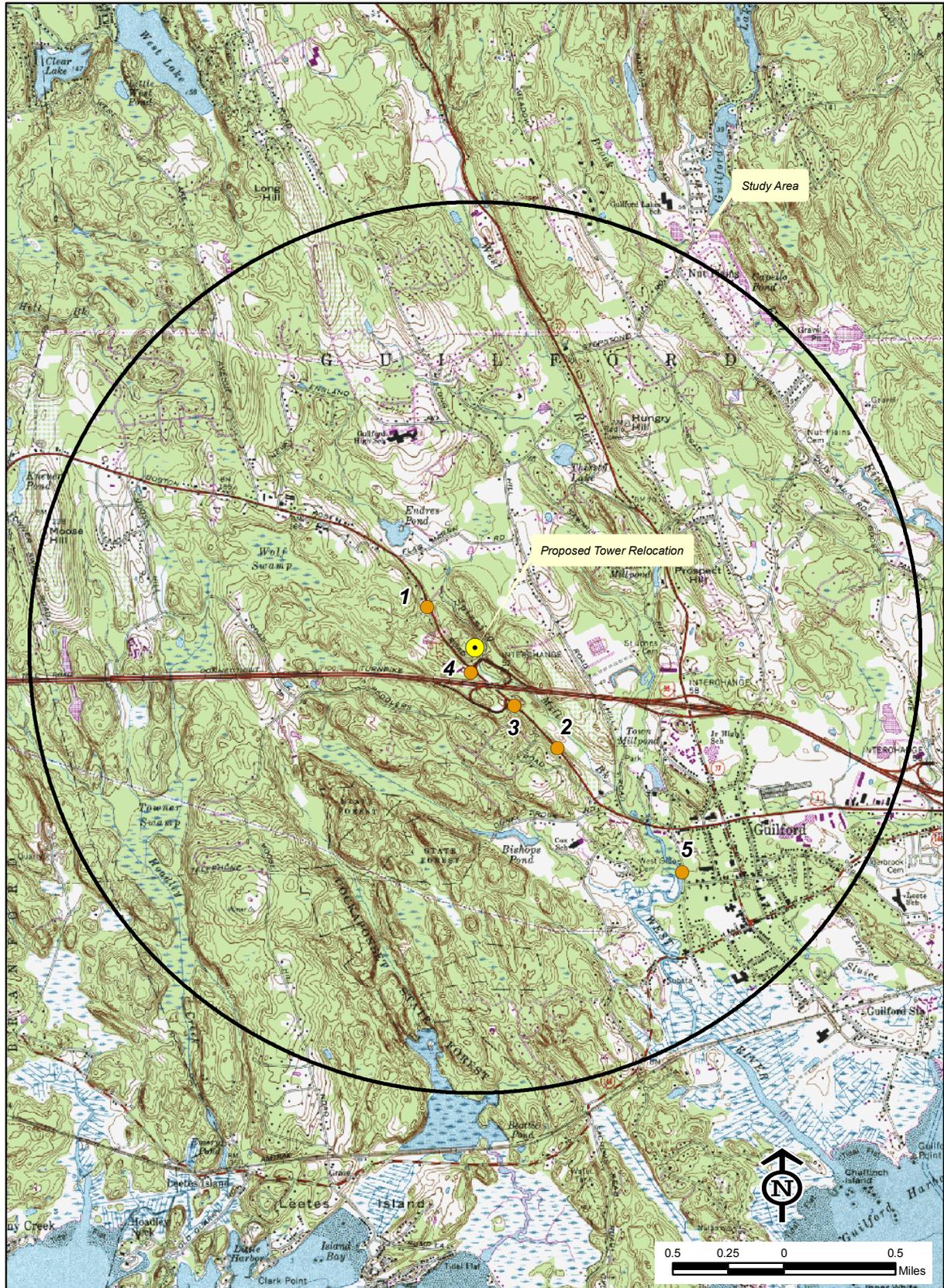
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## Attachment A

# Photolog Documentation Map, Balloon Float Photographs and Photographic Simulations

# Photolog Documentation

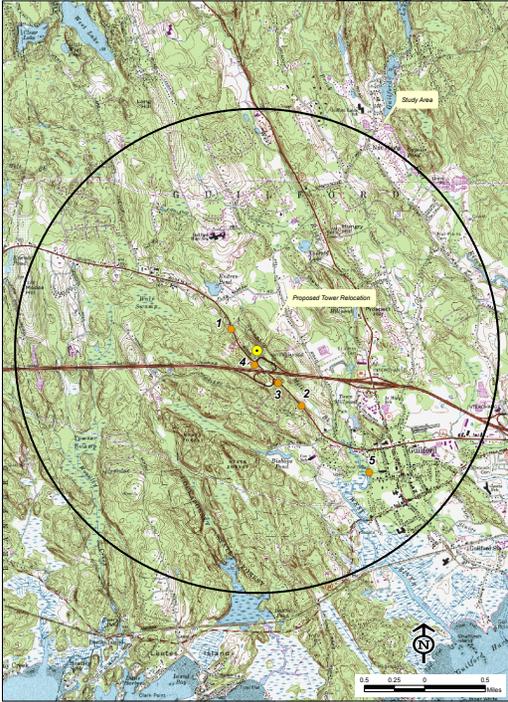
Town of  
Guilford  
Connecticut



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# Photographic Documentation and Simulation *View 1*

Town of  
**Guilford**  
Connecticut



1919 Boston Post Road  
Guildford, CT

Replacement Monopole  
with 5 carriers

**PHOTO TAKEN FROM BOSTON POST ROAD (US ROUTE 1) AT JOAN DRIVE, LOOKING SOUTHEAST (EXISTING TOWER IS ALSO IN PHOTO)**

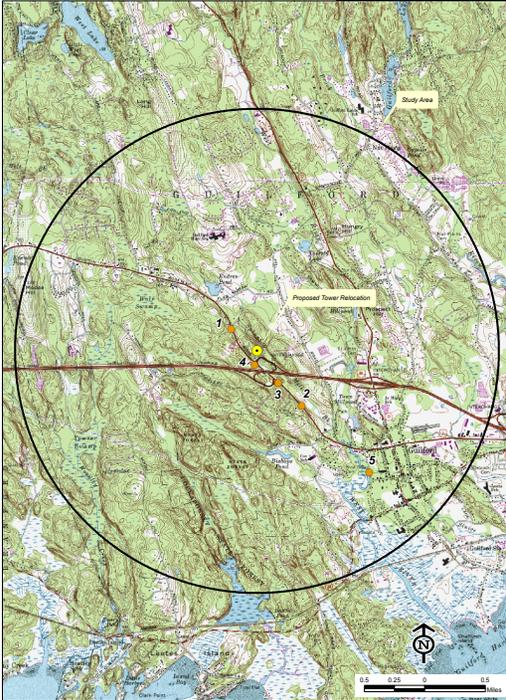
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.29 MILE +/-

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# Photographic Documentation and Simulation *View 2*

Town of  
**Guilford**  
Connecticut



1919 Boston Post Road  
Guildford, CT

Replacement Monopole  
with 5 carriers



*Balloon Test Photo*

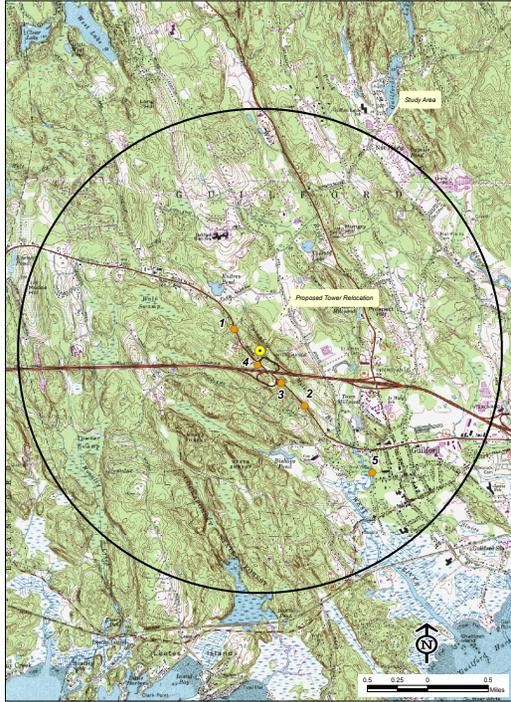
**PHOTO TAKEN FROM BOSTON POST ROAD (ROUTE 1), LOOKING NORTHWEST**  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.58 MILE +/-

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# Photographic Documentation and Simulation *View 3*

Town of  
**Guilford**  
Connecticut



1919 Boston Post Road  
Guildford, CT

Replacement Monopole  
with 5 carriers

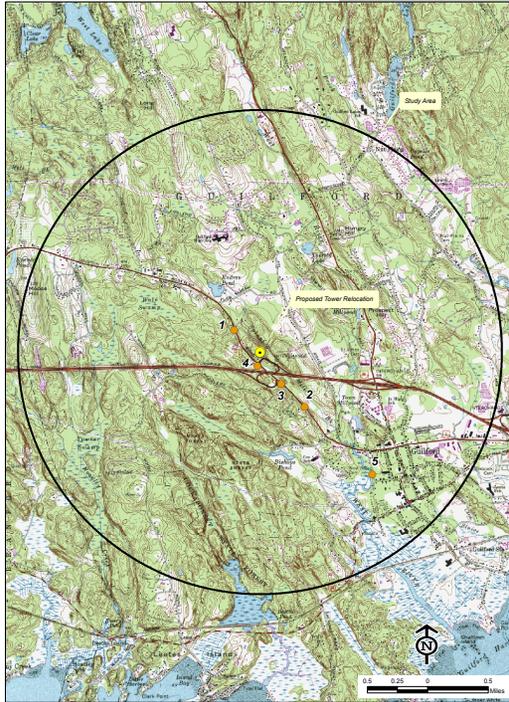
**PHOTO TAKEN FROM BOSTON POST ROAD (US ROUTE 1) SOUTH OF INTERSTATE 95, LOOKING NORTHWEST**  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.31 MILE +/-

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# Photographic Documentation and Simulation *View 4*

Town of  
**Guilford**  
Connecticut



*Balloon Test Photo*

1919 Boston Post Road  
Guilford, CT

Replacement Monopole  
with 5 carriers

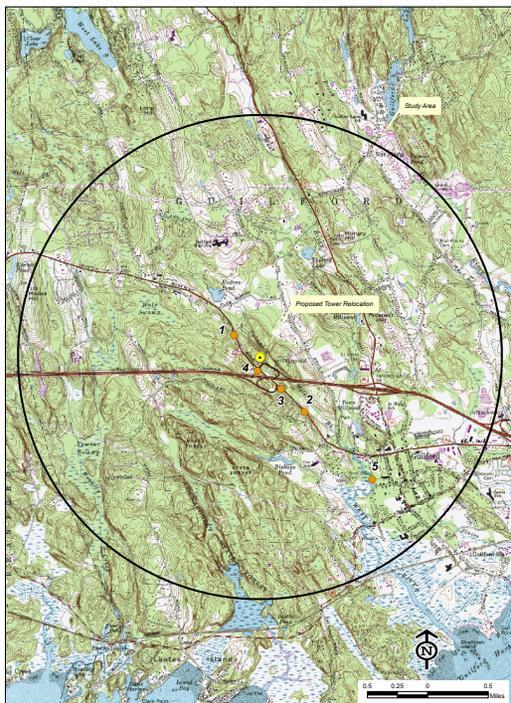
**PHOTO TAKEN FROM BOSTON POST ROAD (US ROUTE 1) NORTH OF INTERSTATE 95, LOOKING NORTHEAST  
(EXISTING TOWER IS VISIBLE LOOKING FURTHER WEST)**

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.11 MILE +/-

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# Photographic Documentation and Simulation *View 5*



1919 Boston Post Road  
Guilford, CT

Replacement Monopole  
with 5 carriers



**PHOTO TAKEN FROM RIVER ROAD AT GUILFORD LAND TRUST CAR PULL-OFF AREA, LOOKING NORTHWEST**  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 1.37 MILES +/-

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# Attachment B

## Photographic Documentation

### Proposed Project Area

# Photographic Documentation - Proposed Project Area

Town of  
**Guilford**  
Connecticut



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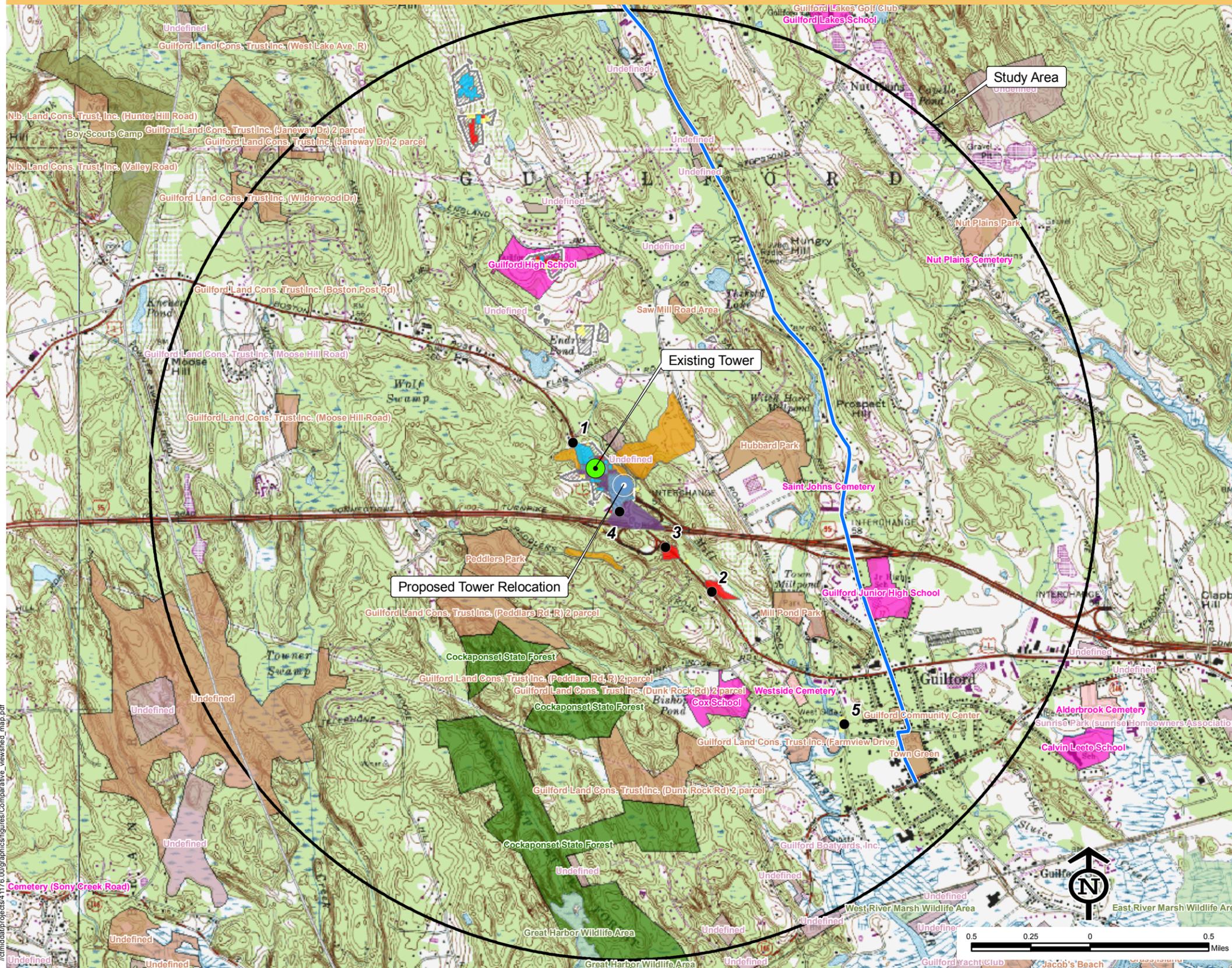
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# Attachment C

## Viewshed Map

# Comparative Viewshed Map Existing Tower Location and Proposed Tower Relocation

Town of Guilford Connecticut



## Proposed Tower Relocation 1919 Boston Post Road Guilford, Connecticut

### NOTE:

- Viewshed analysis conducted using ESRI's Spatial Analyst.
- Existing Facility and Proposed Facility height is 150 feet.
- Existing tree canopy height estimated at 65 feet.

### DATA SOURCES:

- 7.5 minute digital elevation model (DEM) with 30 meter resolution produced by the USGS, 1982
- Forest areas derived from 2004 digital orthophotos with 0.5-foot pixel resolution; digitized by VHB, 2006
- Base map comprised of Branford and Guilford USGS Quadrangle Maps
- Protected properties data layer provided CTDEP, 2003
- Scenic Roads layer derived from available State and Local listings.

Map Compiled July, 2006

### Legend

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>Existing Tower Location (Includes area of visibility approximately 500 feet around facility)</li> <li>Proposed Tower Relocation (Includes area of visibility approximately 500 feet around facility)</li> <li>Photos - June 14, 2006</li> <li>Balloon visible above the trees</li> <li>Existing Tower Year Round Visibility (Approximately 54 Acres)</li> <li>Anticipated Proposed Tower Relocation Seasonal Visibility (Approximately 45 Acres)</li> </ul> | <ul style="list-style-type: none"> <li>Protected Properties (Municipal)</li> <li>Cemetery</li> <li>Preservation</li> <li>Conservation</li> <li>Existing Preserved Open Space</li> <li>Recreation</li> <li>General Recreation</li> <li>School</li> <li>Uncategorized</li> </ul>  |
| <ul style="list-style-type: none"> <li>Tree Line View - 5 Acres</li> <li>Upper 25% - 10 Acres</li> <li>50% - 10 Acres</li> <li>75% - 16 Acres</li> <li>Entire Facility Visible - 10 Acres</li> </ul>   | <ul style="list-style-type: none"> <li>Protected Properties (CT DEP)</li> <li>State Forest</li> <li>State Park</li> <li>DEP Owned Waterbody</li> <li>State Park Scenic Reserve</li> <li>Historic Preserve</li> <li>Natural Area Preserve</li> <li>Fish Hatchery</li> <li>Flood Control</li> <li>Other</li> <li>State Park Trail</li> <li>Water Access</li> <li>Wildlife Area</li> <li>Wildlife Sanctuary</li> </ul> |
- Approx. % of Tower Relocation Visible (Year-Round)**
- Total Proposed Tower Relocation Year-Round Visibility Approximately 51 Acres**
- DEP Boat Launches
  - Scenic Road (State and Local)
  - Town Line
  - Protected Properties (Federal)

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