Visual Resource Evaluation Report

Proposed Wireless Telecommunications Facility

Brass Mountain
Route 63
Goshen, Connecticut

Prepared for verizon wireless

Prepared by **VHB/Vanasse Hangen Brustlin, Inc.**
54 Tuttle Place
Middletown, CT 06457

April 2007

Visual Resource Evaluation

Cellco Partnership (dba Verizon Wireless) seeks approval from the Connecticut Siting Council for a Certificate of Environmental Compatibility and Public Need for the construction of a wireless telecommunications facility ("Facility") to be located on property off Route 63 in the Town of Goshen, Connecticut (identified herein as the "host property"). This Visual Resource Evaluation was conducted to evaluate the visibility of the proposed Facility within a two-mile radius ("Study Area").

Project Introduction

The proposed Facility includes a 150-foot tall "Stealth" tower/tree, or "monopine" with associated ground equipment at its base, all to be situated within a fence-enclosed compound area. Simulated branches attached to the tower structure would extend the proposed monopine to a total height of 157 feet above ground level (AGL). Based on information provided the project Engineer, NatComm, LLC, the proposed project area is located at approximately 1,599 feet Above Mean Sea Level (AMSL). Access to the Facility would generally follow an existing path located on the host property that extends to the site area in an easterly direction from Route 63. The existing path would be improved to accommodate service vehicles.

Site Description and Setting

Identified in the Goshen Tax Assessors records as Map 6/ Block 12/ Lot 8, the "host property" consists of approximately 233 acres of mostly wooded, undeveloped land. A photograph of the proposed project area is included in Attachment A. Attachment A also contains a map that depicts the location of the proposed Facility and the limits of the Study Area. Land use within the general vicinity of the proposed Facility and host property is comprised of large tracts of undeveloped woodlands, overhead electrical utility infrastructure and low-density residential parcels. Segments of Route 4 and Route 63, important regional state numbered routes, traverse the Study Area. In total, the Study Area features approximately 32 linear miles of roadways.

The topography within the Study Area is characterized by rolling hills and steep ridgelines. Ground elevations within the Study Area range from approximately 1,250 feet AMSL to approximately 1,600 feet AMSL. The Study Area contains approximately 282 acres of surface water, dominated in large measure by Tyler Lake and West Side Pond. The tree cover within the Study Area consists mainly of mixed deciduous hardwood species interspersed with stands of mature evergreens. The tree canopy occupies approximately 6,282 acres of the 8,042-acre study area (78%). 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 was determined to be 65 feet.

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METHODOLOGY

In order to better represent the visibility associated with the Facility, VHB uses a two-fold approach incorporating 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.

Visibility Analysis

Using ESRI's ArcView® Spatial Analyst, a computer modeling tool, the areas from which 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 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.

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 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. As a final step, the forested areas are 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 approximate 35-foot increments and the results consolidated into a single thematic layer. This provides an estimate of the approximate amount of the tower structure that would be visible among those areas where year-round views are anticipated.

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 parks and forests, recreational facilities, dedicated open space, 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. Lastly, based on both a review of published information and discussions with municipal officials in Goshen, there are no state and/or locally designated scenic roadways located within the Study Area.

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 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.

Balloon Float and Study Area Reconnaissance

On April 11, 2007 Vanasse Hangen Brustlin Inc., (VHB) conducted a "balloon float" at the proposed Facility site 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 157 feet. Once the balloon was secured at a height of 157 feet, VHB personnel drove the public road system in the Study Area to inventory those locations where the balloon was visible. During the balloon float, the temperature was approximately 50 degrees Fahrenheit with calm wind conditions and clear skies.

Photographic Documentation

Once the balloon was secured at a height of 157 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 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 several vantage points in order to document the actual view towards the proposed Facility. The locations and orientations of the photos are described below:

1. View from Route 63 south of Hill House Road.
2. View from Howe Road south of Hill House Road.
3. View from 5 ½ Mile Road south of Hill House Road.
4. View from 5 ½ Mile Road.
5. View from 5 ½ Mile Road north of Hill House Road.

6. View from Hill House Road adjacent to house #18.
7. View from West Side Road adjacent to house #378.
8. View from Bartholomew Hill Road adjacent to house #315.
9. View from Bartholomew Hill Road east of Sucker Brook Road.
10. View from Sucker Brook Road adjacent to house #39
11. View from West Side Road adjacent to house #157.
12. View from West Side Road.
13. View from Route 4 east of West Street.
14. View from West Side Road at School Hill Road.
15. View from School Hill Road adjacent to house #173.
16. View from Tyler Heights adjacent to house #15.

Photographs 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.[1]" 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.

Photographic Simulation

A photographic simulation was generated for each of the sixteen representative locations where the balloon was visible during the balloon float. The photographic simulations represent a scaled depiction of the proposed Facility from these locations. The height of the Facility is determined based on the location of the balloon in the photograph and a proportional monopine image is simulated into the photographs. The simulations are contained in Attachment A.

CONCLUSIONS

Based on this analysis, areas from where the proposed 157-foot tall Facility would be visible above the tree canopy comprise approximately 243 acres, or roughly 3 percent of the 8,042-acre Study Area. As depicted on the viewshed map (provided in attachment B), much of the visibility associated with the proposed Facility occurs over open water on Tyler Lake and West Side Pond. Visibility over these water bodies accounts for approximately 140 acres of the 243 acre total (approximately 58%). Other areas of year-round visibility are located to the

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

northwest, west and southwest of the proposed facility as Brass Mountain serves to significantly minimize the potential for year-round views from eastern portions of the Study Area with the exception of several isolated areas.

Areas of year-round visibility are depicted on open, undeveloped fields on Beech Hill and Lucas Hill to the north. VHB estimates that approximately 35 residential properties will have at least partial year-round views of the proposed Facility from select portions of these properties. These include three residences along Hill House Road; one residence located off Howe Road; three residences located along 5 ½ Mile Road; 14 residences located along West Side Road; one residence located along Bartholomew Hill Road and; two residences located along Sucker Brook Road; one residence located along School Hill Road and approximately 10 residences located within the Tyler Lake Heights area nearly two miles to the southwest.

While some areas of year-round visibility occur within the general vicinity of the proposed Facility, the majority of the areas where year-round views are anticipated are located over one mile away from the site and as such would be characterized as distant views. This is particularly true for the views from portions of 5 ½ Mile Road, West Side Road and the Tyler Lake area where cleared fields and/or open water could yield views of the proposed Facility. However, the topographic relief and extensive tree canopy contained within the Study Area act to effectively minimize the potential visual effects of the proposed Facility.

In addition, the design of the proposed Facility (a monopine) serves to further minimize the visual effects of the structure; particularly given the physical setting of the site and its general vicinity which is heavily forested and contains stands of mature evergreen trees. The viewshed map also depicts several additional areas where seasonal (i.e. during "leaf off" conditions) views are anticipated. These areas comprise approximately 93 acres and include select portions of Route 63, Hill House Road and West Side Road. VHB estimates that seasonal views of the proposed Facility could be achieved from approximately 6 additional properties within the Study Area.

Attachment A

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

Photographic Documentation

Town of
Goshen
Connecticut

PHOTO TAKEN OF PROPOSED SITE AREA

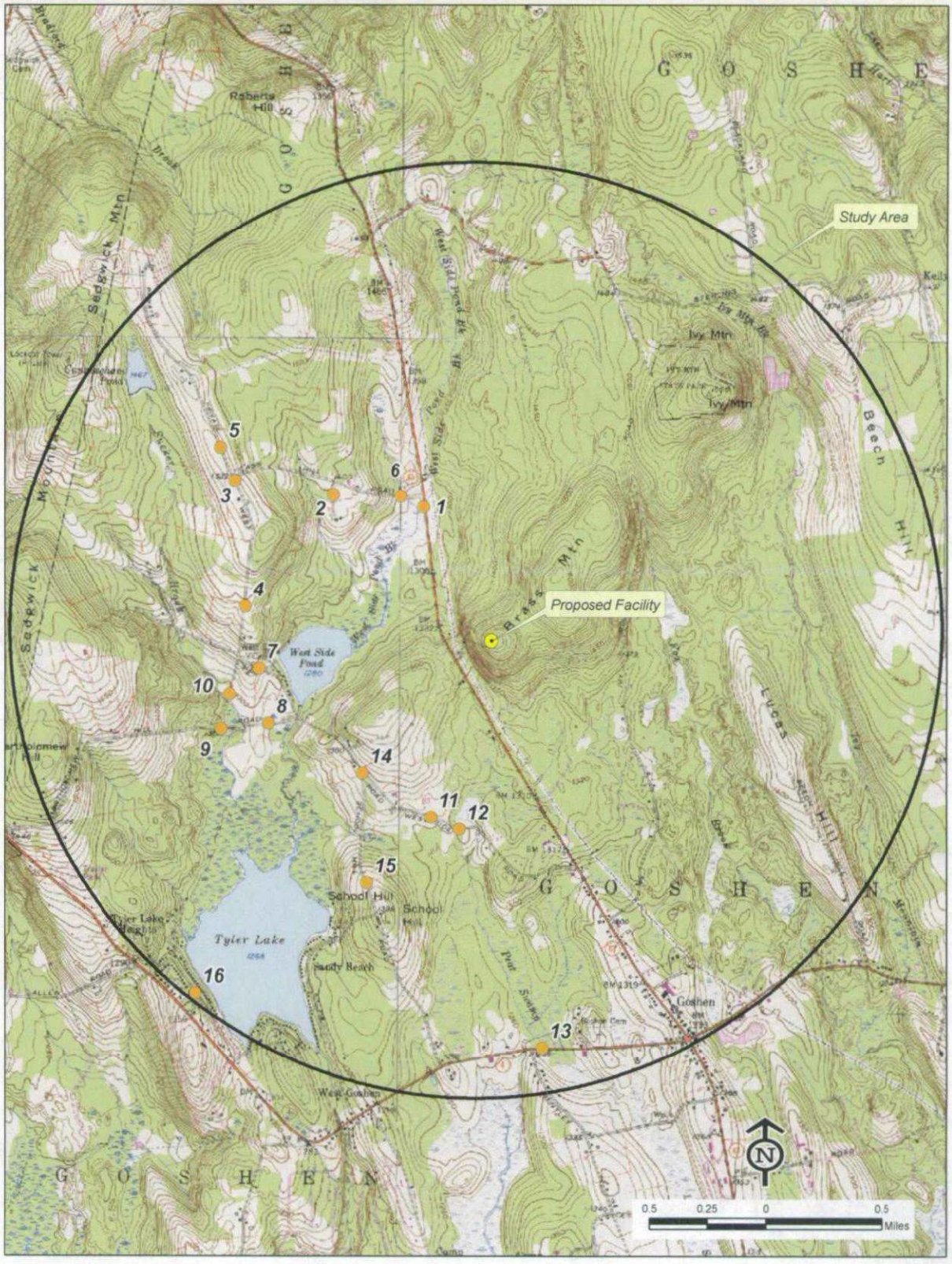
Brass Mountain
Route 63
Goshen, CT

Monopole installation
with 3 carriers

Vanasse Hangen Brustlin, Inc.

Photolog Documentation

Town of
Goshen
Connecticut



Photographic Documentation and Simulation *View 1*

Town of
Goshen
Connecticut

Brass Mountain
Route 63
Goshen, CT

Monopine installation

PHOTO TAKEN FROM ROUTE 63 SOUTH OF HILL HOUSE ROAD, LOOKING SOUTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.65 MILE +/-

VHB Vanasse Hangen Brustlin, Inc.

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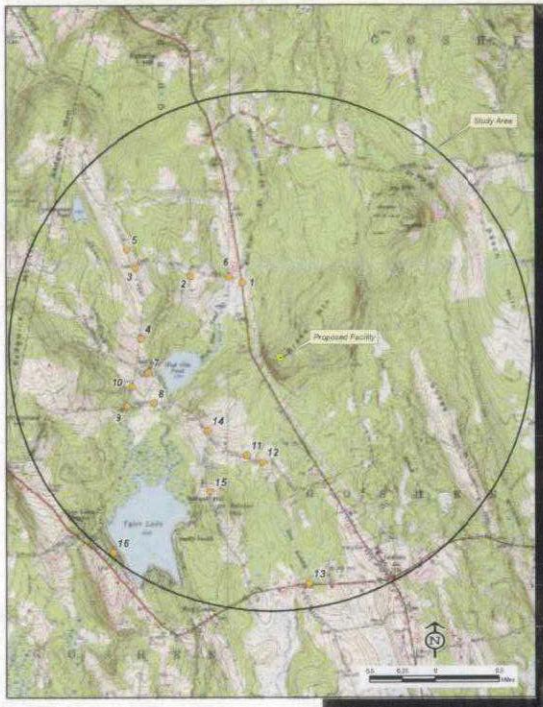
Photographic Documentation and Simulation *View 2*

Town of
Goshen
Connecticut



Brass Mountain
Route 63
Goshen, CT

Monopine installation

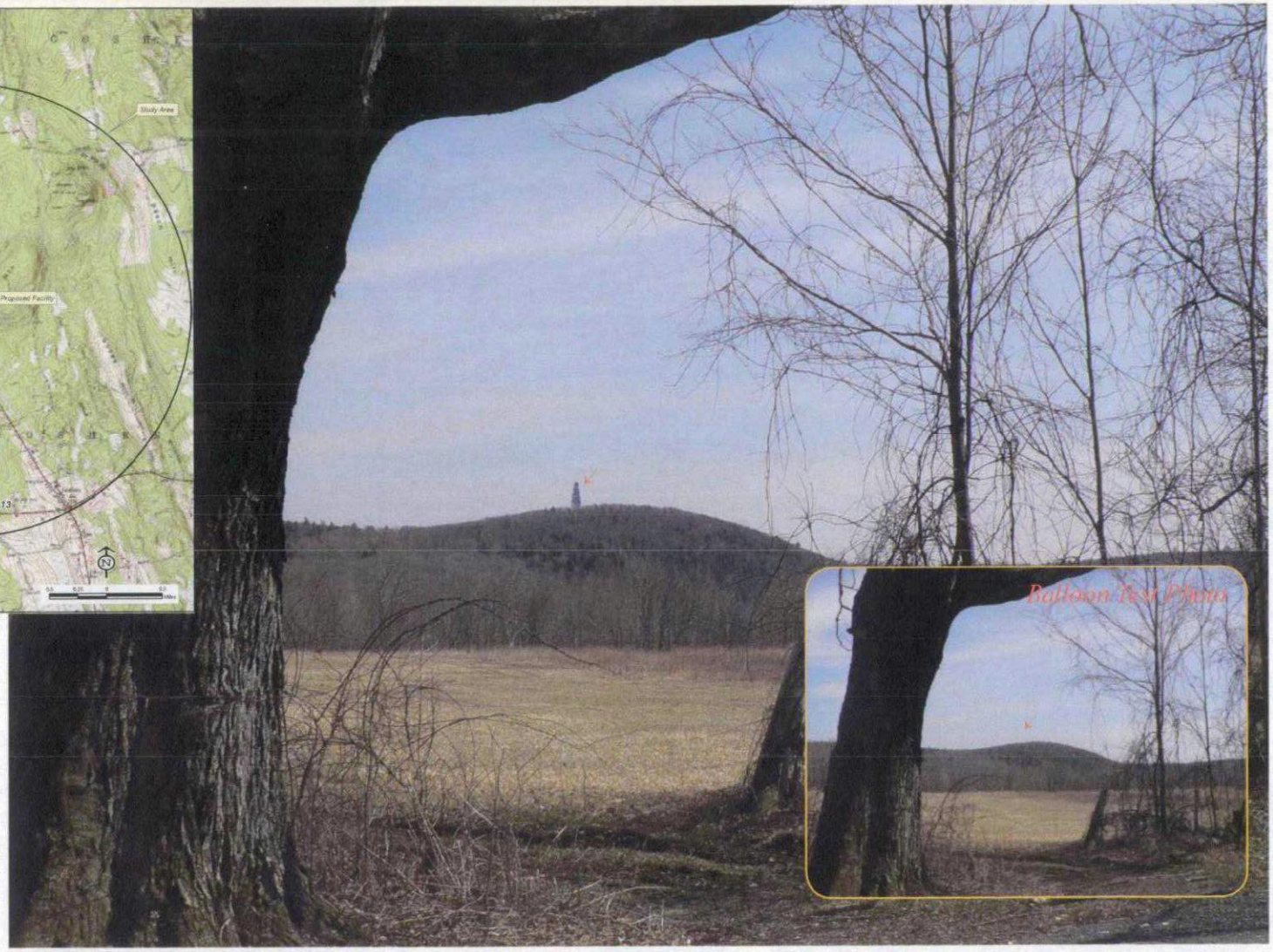


PHOTO TAKEN FROM HOWE ROAD SOUTH OF HILL HOUSE ROAD, LOOKING SOUTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.83 MILE +/-

Vanasse Hangen Brustlin, Inc.

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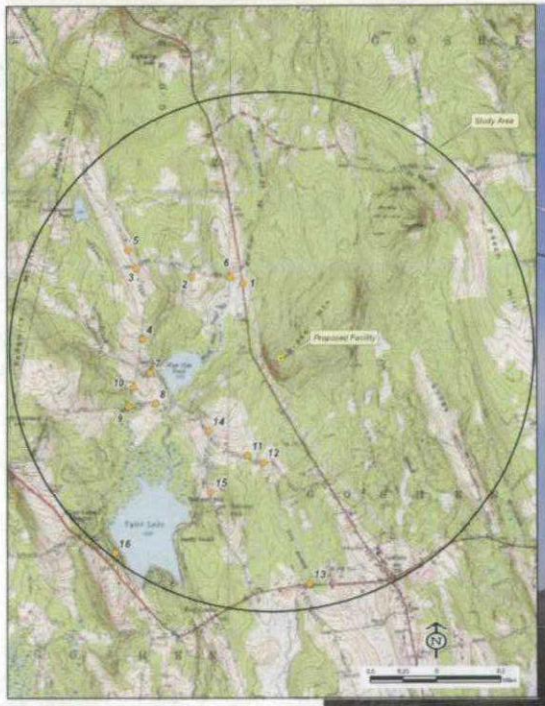
Photographic Documentation and Simulation *View 3*

Town of
Goshen
Connecticut



Brass Mountain
Route 63
Goshen, CT

Monopine installation

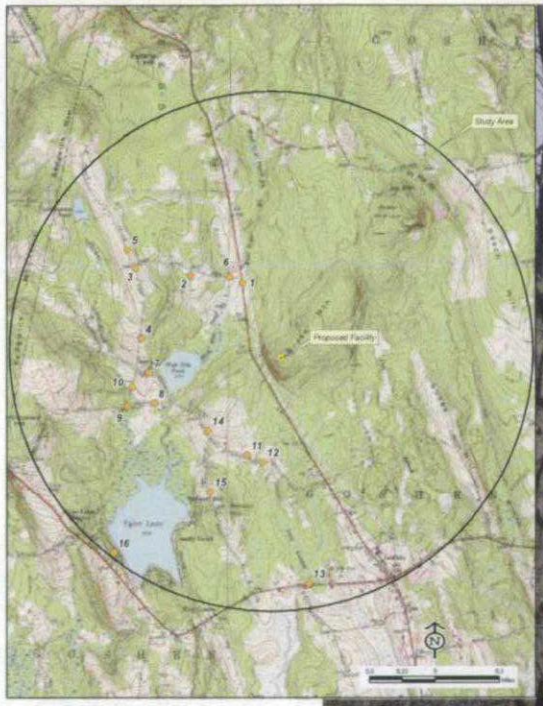
PHOTO TAKEN FROM 5 1/2 MILE ROAD SOUTH OF HILL HOUSE ROAD, LOOKING SOUTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 1.31 MILES +/-

VHB Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 4*

Town of
Goshen
Connecticut



Brass Mountain
Route 63
Goshen, CT

Monopine installation

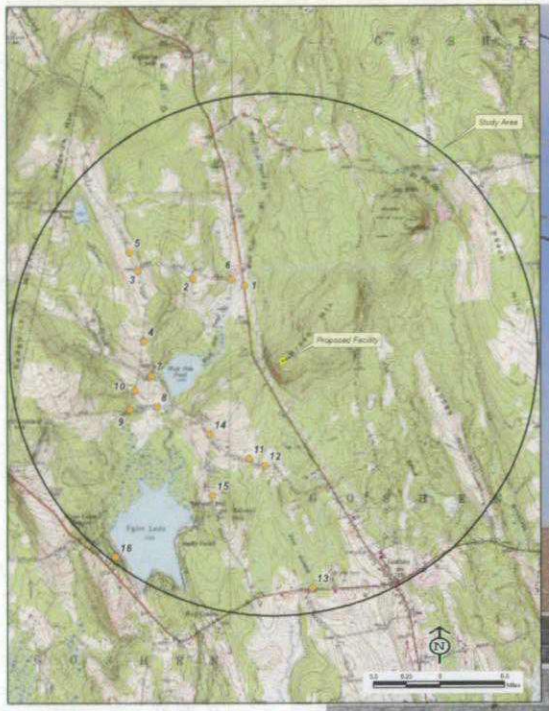
PHOTO TAKEN FROM 5 1/2 MILE ROAD, LOOKING SOUTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 1.09 MILES +/-

Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 5*

Town of
Goshen
Connecticut



Brass Mountain
Route 63
Goshen, CT

Monopine installation

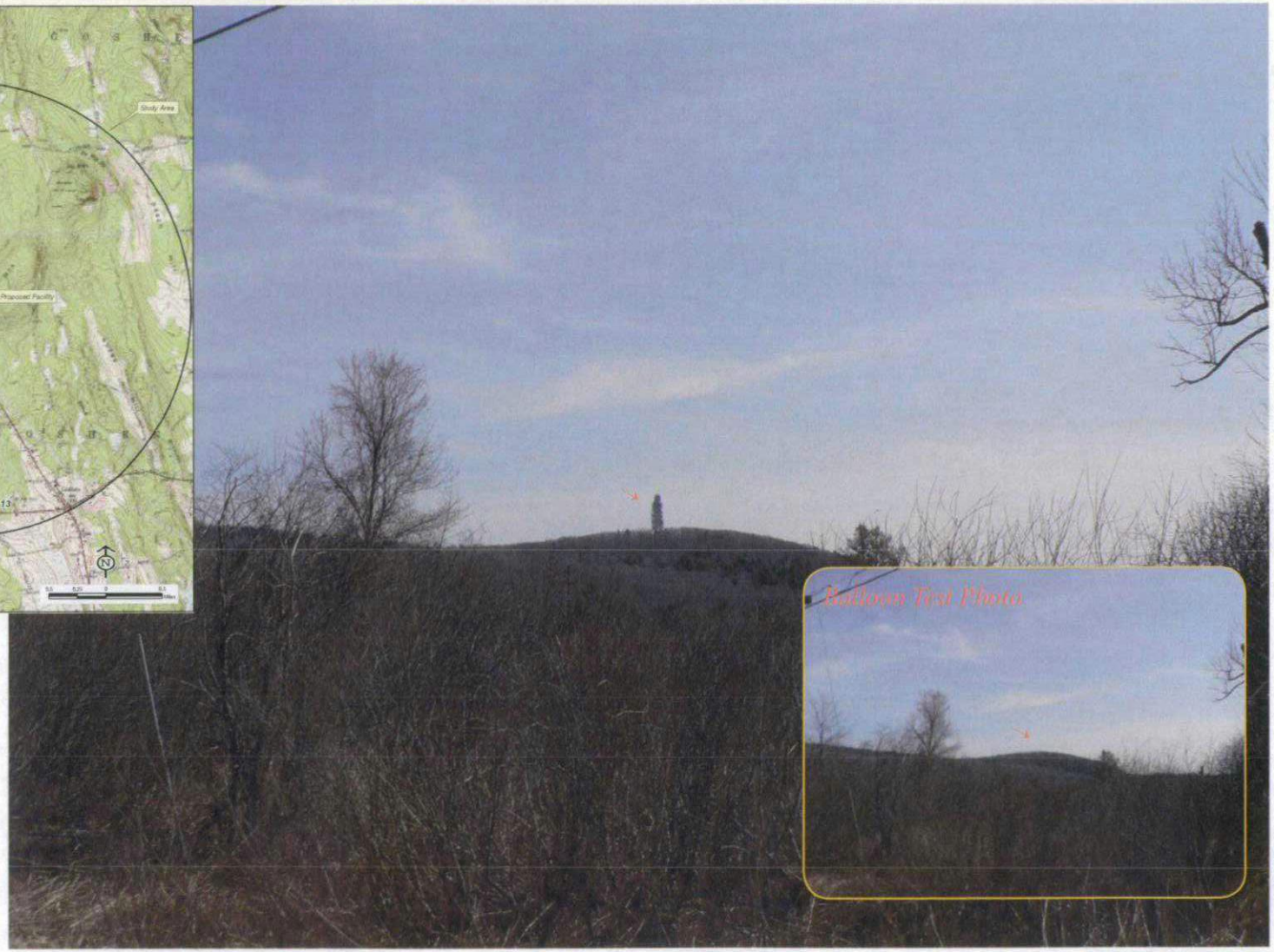
PHOTO TAKEN FROM 5 1/2 MILE ROAD NORTH OF HILL HOUSE ROAD, LOOKING SOUTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 1.45 MILES +/-

Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 6*

Town of
Goshen
Connecticut



Brass Mountain
Route 63
Goshen, CT

Monopine installation

PHOTO TAKEN FROM HILL HOUSE ROAD ADJACENT TO HOUSE #18, LOOKING SOUTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.74 MILE +/-

Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 7*

Town of
Goshen
Connecticut

Brass Mountain
Route 63
Goshen, CT

Monopine installation

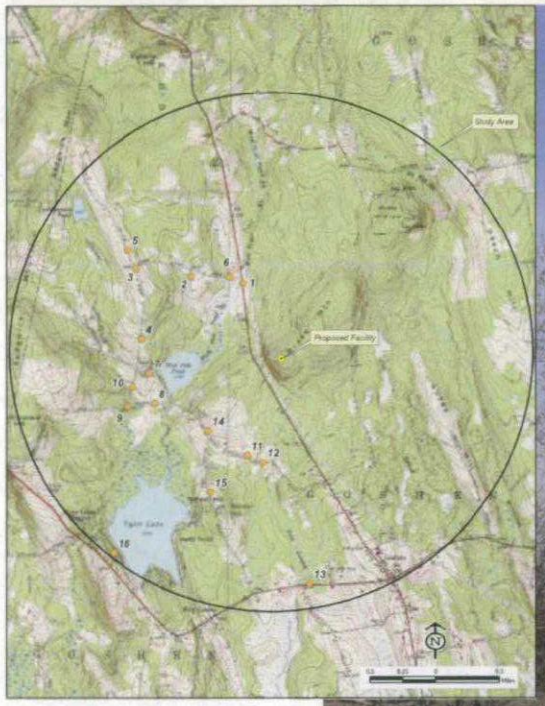
PHOTO TAKEN FROM WEST SIDE ROAD ADJACENT TO HOUSE #378, LOOKING NORTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.96 MILE +/-

VHB Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 8*

Town of
Goshen
Connecticut



Brass Mountain
Route 63
Goshen, CT

Monopine installation

PHOTO TAKEN FROM BARTHOLOMEW HILL ROAD ADJACENT TO HOUSE #315, LOOKING NORTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 1.04 MILES +/-

Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 9*

Town of
Goshen
Connecticut

Brass Mountain
Route 63
Goshen, CT

Monopine installation

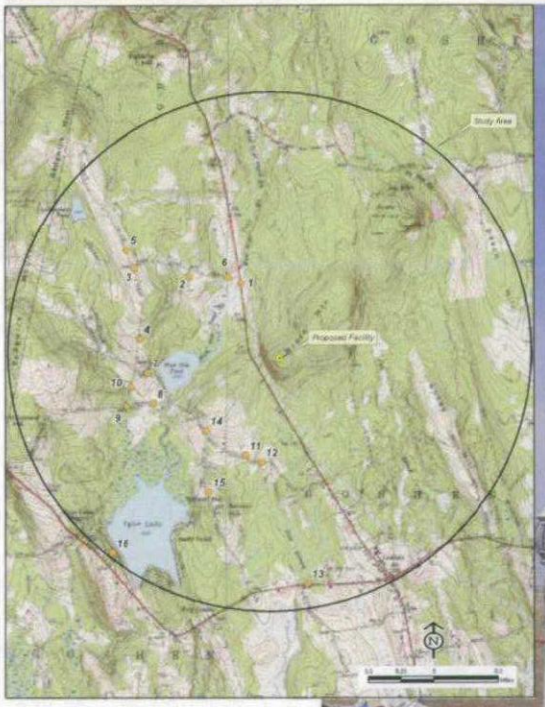
PHOTO TAKEN FROM BARTHOLOMEW HILL ROAD EAST OF SUCKER BROOK ROAD, LOOKING NORTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 1.24 MILES +/-

VHB Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 10*

Town of
Goshen
Connecticut



Brass Mountain
Route 63
Goshen, CT

Monopine installation

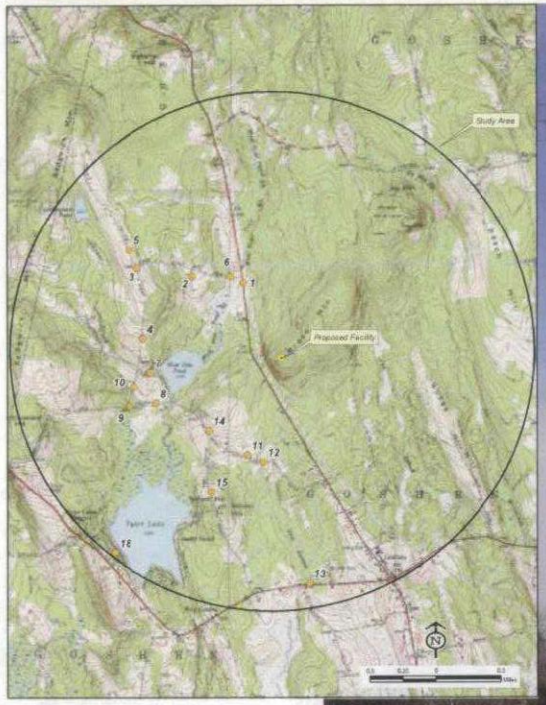
PHOTO TAKEN FROM SUCKER BROOK ROAD ADJACENT TO HOUSE #39, LOOKING NORTHEAST

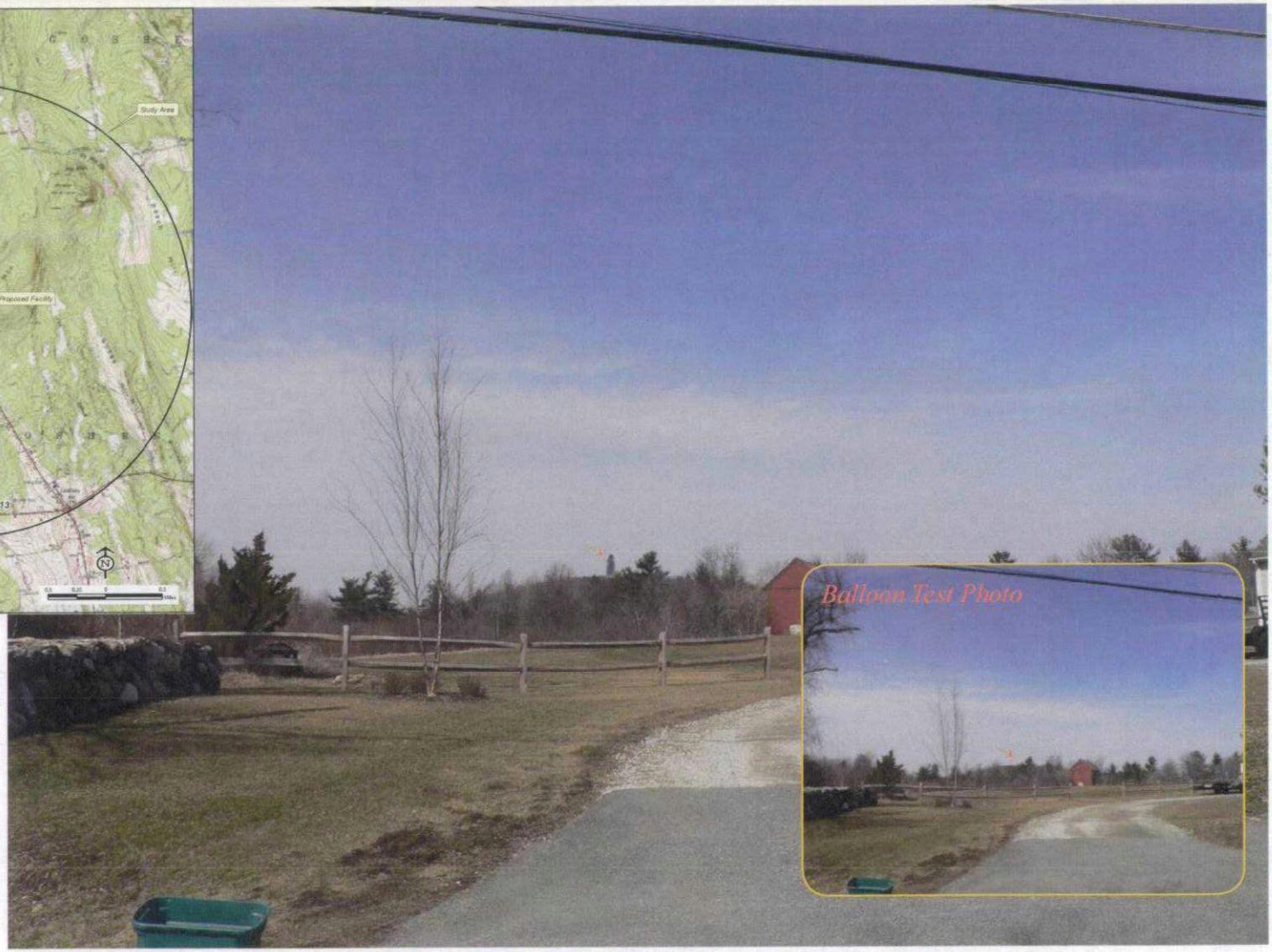
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 1.17 MILES +/-

VHB Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 11*

Town of
Goshen
Connecticut





Brass Mountain
Route 63
Goshen, CT

Monopine installation

PHOTO TAKEN FROM WEST SIDE ROAD ADJACENT TO HOUSE #157, LOOKING NORTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.80 MILE +/-

Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 12*

Town of
Goshen
Connecticut

Brass Mountain
Route 63
Goshen, CT

Monopine installation

PHOTO TAKEN FROM WEST SIDE ROAD, LOOKING NORTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.82 MILE +/-

Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 13*

Town of
Goshen
Connecticut

Brass Mountain
Route 63
Goshen, CT

Monopine installation

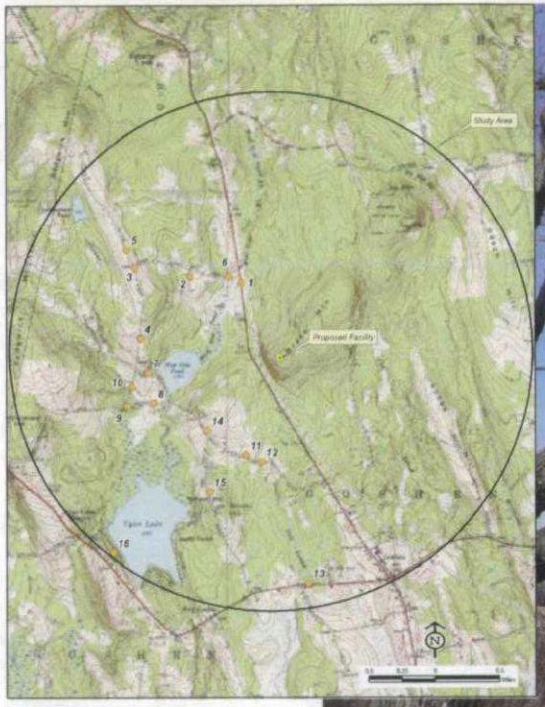
PHOTO TAKEN FROM ROUTE 4 EAST OF WEST STREET, LOOKING NORTH

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 1.75 MILES +/-

Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 14*

Town of
Goshen
Connecticut



Brass Mountain
Route 63
Goshen, CT

Monopine installation

PHOTO TAKEN FROM WEST SIDE ROAD AT SCHOOL HILL ROAD, LOOKING NORTHEAST

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

VHB Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 15*

Town of
Goshen
Connecticut

Brass Mountain
Route 63
Goshen, CT

Monopine installation

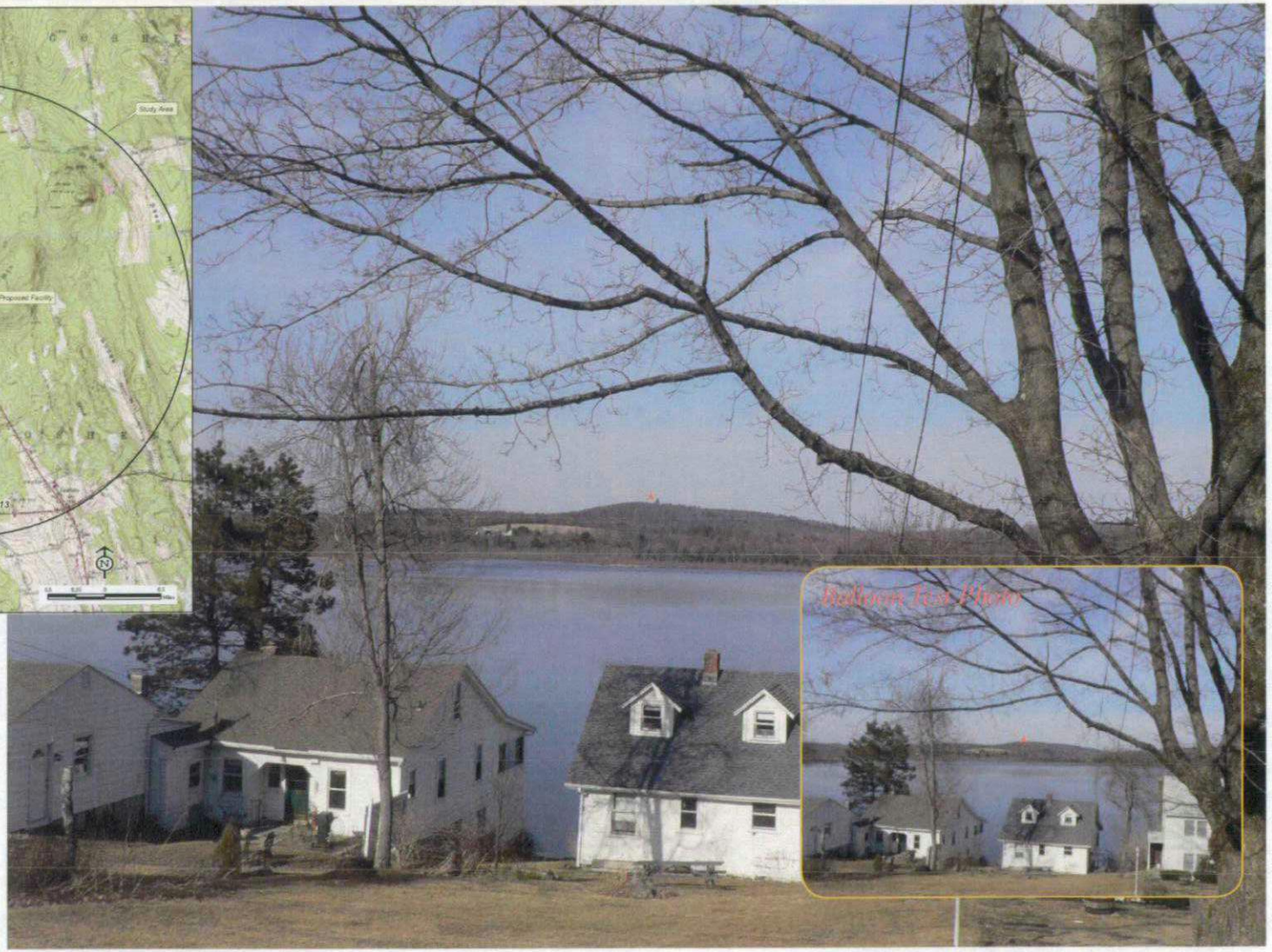
PHOTO TAKEN FROM SCHOOL HILL ROAD ADJACENT TO HOUSE #173, LOOKING NORTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 1.18 MILES +/-

VHB Vanasse Hangen Brustlin, Inc.

Photographic Documentation and Simulation *View 16*

Town of
Goshen
Connecticut



Brass Mountain
Route 63
Goshen, CT

Monopine installation

PHOTO TAKEN FROM TYLER HEIGHTS ADJACENT TO HOUSE #15, LOOKING NORTHEAST

DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 1.97 MILES +/-

Vanasse Hangen Brustlin, Inc.

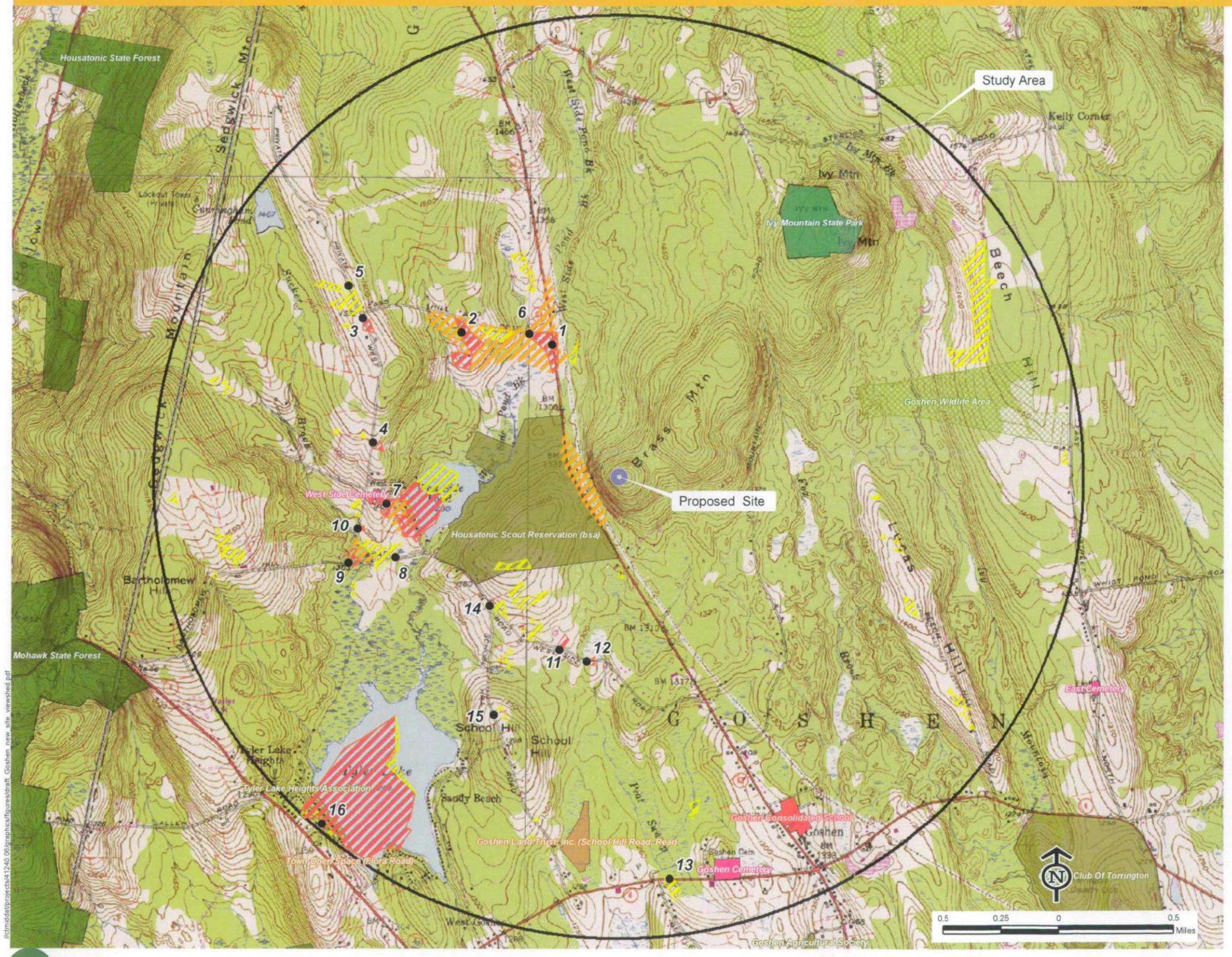
Attachment B

Viewshed Map

Viewshed Map

Topography and Forest Cover as Constraints

Town of Goshen Connecticut



Proposed Verizon Wireless Telecommunications Facility
Brass Mountain
Route 63
Goshen, Connecticut

NOTE:
- Viewshed analysis conducted using ESRI's Spatial Analyst.
- Proposed Facility height is 157 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 West Torrington, South Canaan, Cornwall, and Norfolk USGS Quadrangle Maps
- Protected properties data layer provided CTDEP, 2003
- Scenic Roads layer derived from available State and Local listings.

Map Compiled April 2007

Legend

Proposed Monopine Location (Includes area of visibility approximately 500 feet around facility)

Photographs - April 11, 2007
- Balloon visible above trees

Anticipated Seasonal Visibility (93 Acres)

Approximate % of Tower Visible (Year-Round)
- Tree Line View to Upper 25% - 94 Acres
- 50% - 148 Acres
- Entire Facility Visible - 1 Acre

Total Year-Round Visibility Approximately 243 Acres

Protected Properties (Municipal)
- Cemetery
- Preservation
- Conservation
- Existing Preserved Open Space
- Recreation
- General Recreation
- School
- Uncategorized

Protected Properties (CT DEP)
- 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

- DEP Boat Launches
- Scenic Road (State and Local)
- Town Line
- Protected Properties (Federal)