

*Proposed Wireless
Telecommunications Facility*

Glastonbury

Dayton Road
Glastonbury, CT

Prepared for **Message Center Management**
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Hartford, CT 06105

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Visual Resource Evaluation

Message Center Management (MCM) 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 off Dayton Road ("Host Property") in the town of Glastonbury, 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 160-foot tall monopole designed to support up to five (5) 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, URS Corporation, the proposed Facility is located at approximately 310 feet above mean sea level (AMSL). Access to the proposed Facility would follow a new 12-foot wide gravel access road located within a 25-foot wide utility easement. The proposed access road and easement would extend from Dayton Road in a westerly direction to the proposed compound.

Site Description and Setting

Identified in the Town of Glastonbury land records as Map E14\Street 1680\Lot W0007, the Host Property includes approximately 39 acres of undeveloped and mostly wooded land. The proposed Facility would be located on the eastern portion of the Host Property, roughly 250 feet west of Dayton Road. Land use within the general vicinity of the Host Property is mainly comprised of undeveloped, forested land and low-density residential development. An existing natural gas utility easement bisects the Host Property in roughly an east/west direction. Segments of Route 17 and Route 160 traverse portions of the Study Area. In total, the Study Area contains roughly 53 linear miles of roadways.

The topography within the Study Area is characterized by the Connecticut River (in the western portion of the Study Area) and its associated river valley with gently rolling hills located to the east and west of the river and extended ridgelines located further to the east, nearly two miles from the proposed Facility. Ground elevations within the Study Area range from approximately two (2) feet AMSL to approximately to nearly 715 feet AMSL (near Clark Hill Road). 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 4,790 acres of the 8,042-acre study area (60%). 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 274 acres of surface water that includes portions of the Connecticut River and several small 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. Lastly, based on a review of available data published by the Connecticut Department of Transportation and discussions with municipal staff in Glastonbury, it was determined that a portion of Route 160 contained within the Study Area is a state-designated scenic roadway. This segment of Route 160 measures less than one mile in length.

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 August 4, 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, which was the proposed height at the time the balloon float was conducted. The height of the proposed Facility was subsequently lowered to 160 feet AGL. 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. 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 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:

Balloon Visible Photographs

1. View from Old Maids Lane adjacent to house #199.
2. View from Old Maids Lane adjacent to house #80.
3. View from Bluff Point Road adjacent to house #172.
4. View from Bluff Point Road adjacent to house #131.
5. View from Glastonbury Hunt Road cul-de-sac.
6. View from Dayton Road adjacent to house #271.

Balloon Non-Visible Photographs

7. View from Dayton Road adjacent to house #280.
8. View from Taylor Road adjacent to house #39.
9. View from Great Pond Road adjacent to house #293.
10. View from Belltown Road adjacent to house #168.
11. View from Crystal Ridge Road adjacent to house #73.
12. View from Glastonbury Hunt Lane adjacent to house #44.
13. View from Overlook Court at Route 17.
14. View from Great Pond Road at Route 17.
15. View from Route 17 adjacent to Ward-Shipman-Wells House.
16. View from Route 17 south of Hopewell Road.
17. View from Old South Cemetery.

Photographs of the balloon from the viewpoints 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 six (6) 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

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

the location of the balloon in the photographs and a proportional monopole image is simulated into the photographs. Since the height of the proposed Facility was reduced from 170 feet AGL to 160 feet AGL after the balloon float had been conducted (at 170 feet AGL), the photographic simulations were scaled down by 10 feet in order to reflect the currently proposed tower height. The simulations are contained in Attachment A.



CONCLUSIONS

Based on this analysis, areas from where the proposed 160-foot monopole would be visible above the tree canopy comprise approximately 123 acres, or less than two 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 Old Maids Lane and Glastonbury Hunt Road located to the southwest of the proposed Facility; Bluff Point Road located to the northwest; and a portion of Dayton Road southeast of the proposed Facility. Overall, year-round visibility is significantly minimized by the abundance of mature vegetative screening and intervening topography contained within the Study Area. VHB estimates that portions of approximately 50 residential properties may have at least partial year-round views of the proposed Facility. This includes approximately 29 residences along Bluff Point Road; seven (7) residences along Taylor Town Road, 10 residences along Old Maids Lane and four (4) residences located along Glastonbury Hunt Lane. No views are anticipated from the portion of Route 160 contained within the Study Area which is a state-designated scenic road.

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 55 additional acres and are generally located on the Host Property and its general vicinity. VHB estimates that limited seasonal views of the proposed Facility may be achieved from portions of approximately four (4) residential properties located along Dayton Road. Potential seasonal views from the areas depicted on the map would be largely obstructed by existing vegetation, even during "leaf-off" conditions.

Attachment A

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

PHOTOGRAPHIC DOCUMENTATION

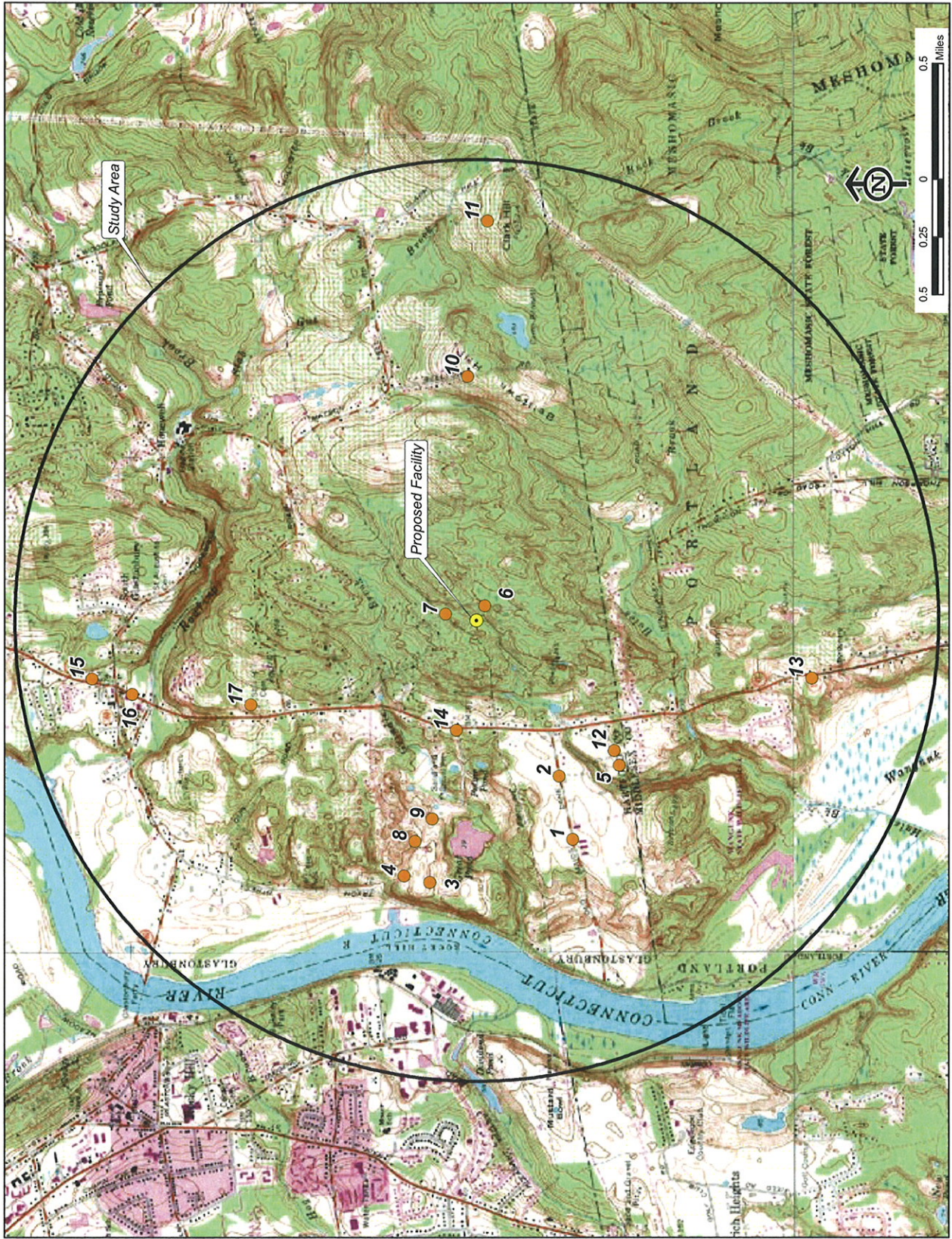


PROPOSED PROJECT AREA

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PHOTOLOG MAP



PHOTOGRAPHIC DOCUMENTATION



VIEW 1

PHOTO TAKEN FROM OLD MAIDS LANE ADJACENT TO HOUSE# 199, LOOKING NORTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.10 MILES +/-

PHOTOGRAPHIC SIMULATION



VIEW 1

PHOTO TAKEN FROM OLD MAIDS LANE ADJACENT TO HOUSE# 199, LOOKING NORTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.10 MILES +/-

PHOTOGRAPHIC DOCUMENTATION



VIEW 2

PHOTO TAKEN FROM OLD MAIDS LANE ADJACENT TO HOUSE# 80, LOOKING NORTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.71 MILE +/-

PHOTOGRAPHIC SIMULATION

VIEW 2



PHOTO TAKEN FROM OLD MAIDS LANE ADJACENT TO HOUSE# 80, LOOKING NORTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.71 MILE +/-

VIEW 3



PHOTO TAKEN FROM BLUFF POINT ROAD ADJACENT TO HOUSE# 172, LOOKING SOUTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.17 MILES +/-

PHOTOGRAPHIC SIMULATION

VIEW 3



PHOTO TAKEN FROM BLUFF POINT ROAD ADJACENT TO HOUSE# 172, LOOKING SOUTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.17 MILES +/-



PHOTOGRAPHIC DOCUMENTATION

VIEW 4



PHOTO TAKEN FROM BLUFF POINT ROAD ADJACENT TO HOUSE# 131, LOOKING SOUTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.16 MILES +/-

PHOTOGRAPHIC SIMULATION

VIEW 4



PHOTO TAKEN FROM BLUFF POINT ROAD ADJACENT TO HOUSE# 131, LOOKING SOUTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.16 MILES +/-

VIEW 5



PHOTO TAKEN FROM END OF GLASTONBURY HUNT ROAD CUL-DE-SAC, LOOKING NORTHEAST.
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.91 MILE +/-

PHOTOGRAPHIC SIMULATION

VIEW 5



PHOTO TAKEN FROM END OF GLASTONBURY HUNT ROAD CUL-DE-SAC, LOOKING NORTHEAST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.91 MILE +/-

PHOTOGRAPHIC SIMULATION

VIEW 6



PHOTO TAKEN FROM DAYTON ROAD ADJACENT TO HOUSE# 271, LOOKING WEST
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.06 MILE +/-



PHOTOGRAPHIC DOCUMENTATION

VIEW 7



PHOTO TAKEN FROM DAYTON ROAD ADJACENT TO HOUSE# 280, LOOKING SOUTHWEST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.12 MILE +/-



PHOTOGRAPHIC DOCUMENTATION

VIEW 8



PHOTO TAKEN FROM TAYLOR ROAD ADJACENT TO HOUSE# 39, LOOKING SOUTHWEST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.05 MILES +/-

PHOTOGRAPHIC DOCUMENTATION

VIEW 9



PHOTO TAKEN FROM GREAT POND ROAD ADJACENT TO HOUSE# 293, LOOKING SOUTHEAST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.90 MILE +/-



PHOTOGRAPHIC DOCUMENTATION

VIEW 10



PHOTO TAKEN FROM BELLTOWN ROAD ADJACENT TO HOUSE# 168, LOOKING WEST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.05 MILES +/-

VIEW 11



PHOTO TAKEN FROM CRYSTAL RIDGE ROAD ADJACENT TO HOUSE# 73, LOOKING NORTHWEST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.72 MILES +/-



VIEW 12



PHOTO TAKEN FROM GLASTONBURY HUNT LANE ADJACENT TO HOUSE# 44, LOOKING NORTHEAST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.80 MILE +/-

PHOTOGRAPHIC DOCUMENTATION

VIEW 13



PHOTO TAKEN FROM OVERLOOK COURT AT ROUTE 17, LOOKING NORTHEAST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.48 MILES +/-

VIEW 14



PHOTO TAKEN FROM GREAT POND ROAD AT ROUTE 17, LOOKING SOUTHEAST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.47 MILE +/-

PHOTOGRAPHIC DOCUMENTATION



VIEW 15

PHOTO TAKEN FROM ROUTE 17 ACROSS FROM THE WARD-SHIPMAN-WELLS HOUSE, LOOKING SOUTHEAST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 0.12 MILE +/-

PHOTOGRAPHIC DOCUMENTATION

VIEW 16



PHOTO TAKEN FROM ROUTE 17 SOUTH OF HOPEWELL ROAD, LOOKING SOUTHEAST - BALLOON IS NOT VISIBLE
DISTANCE FROM THE PHOTOGRAPH LOCATION TO SITE IS 1.53 MILES +/-

Attachment B

Viewshed Map

Viewshed Analysis
Proposed MCM
Telecommunications Facility
Glastonbury
Dayton Road
Glastonbury, Connecticut

NOTE:
 - Viewshed analysis conducted using ESRI's Spatial Analyst.
 - Proposed Facility height is 160 feet.
 - Existing tree canopy height estimated at 65 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 Glastonbury (1992) and Middle Haddam (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 September, 2009

Legend

- | | |
|--------------------------------------------------------------|-------------------------------------|
| Proposed Monopine Location | CT DEP Protected Properties (2007) |
| Photographs - August 4, 2009 | State Forest |
| Balloon is not visible | State Park |
| Balloon visible above trees | DEP Owned Waterbody |
| Seasonal Visibility (Approximately 55 acres) | State Park Scenic Reserve |
| Year-Round Visibility (Approximately 123 acres) | Historic Preserve |
| Protected Municipal and Private Open Space Properties (1997) | Natural Area Preserve |
| Cemetery | Fish Hatchery |
| Preservation | Flood Control |
| Conservation | Other |
| Existing Preserved Open Space | State Park Trail |
| Recreation | Water Access |
| General Recreation | Wildlife Area |
| School | Wildlife Sanctuary |
| Uncategorized | Federal Protected Properties (1997) |
| | South Glastonbury Historic District |
| | CT DEP Boat Launches (1994) |
| | Scenic Road (State and Local) |
| | Town Line |

