Using LiDAR to Visualize Viewshed Conservation

The Mount Vernon Viewshed In Prince George's County

The Maryland-National Capital Park and Planning Commission
Planning Department, Prince George's County, Maryland

ESRI Mid-Atlantic User Conference
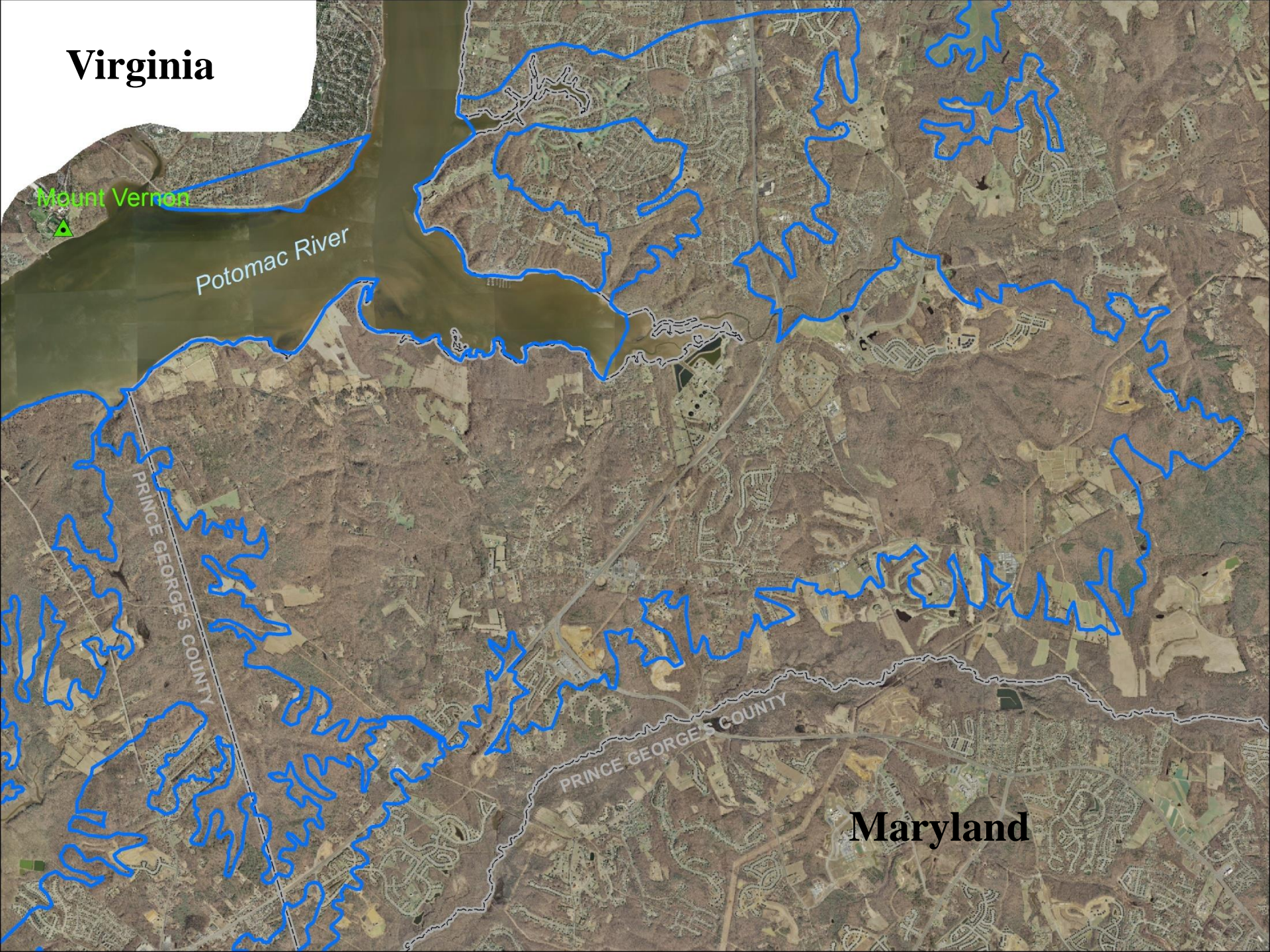**December 2, 2014**

Virginia

Mount Vernon

Potomac River

PRINCE GEORGE'S COUNTY

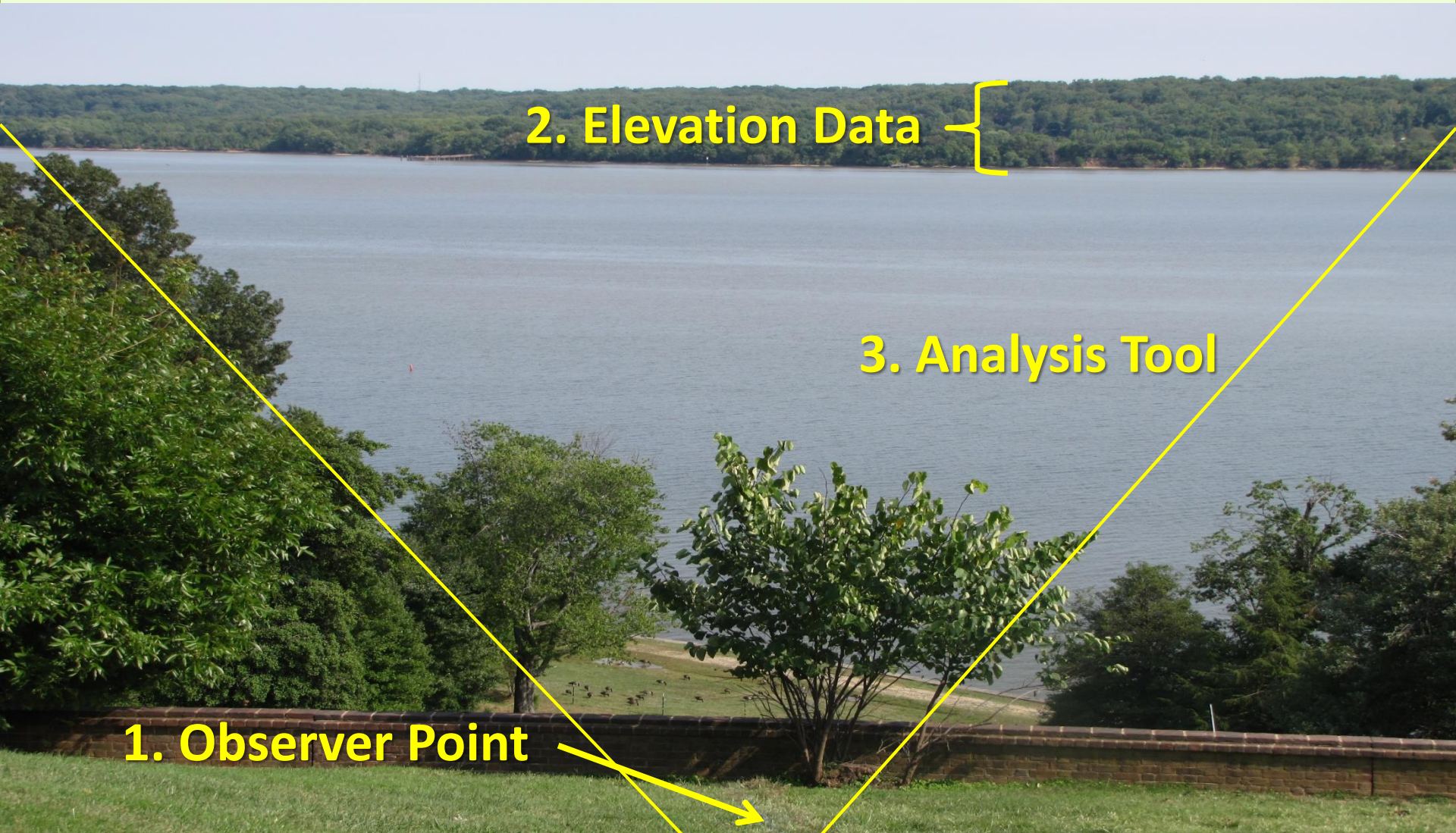PRINCE GEORGE'S COUNTY

Maryland

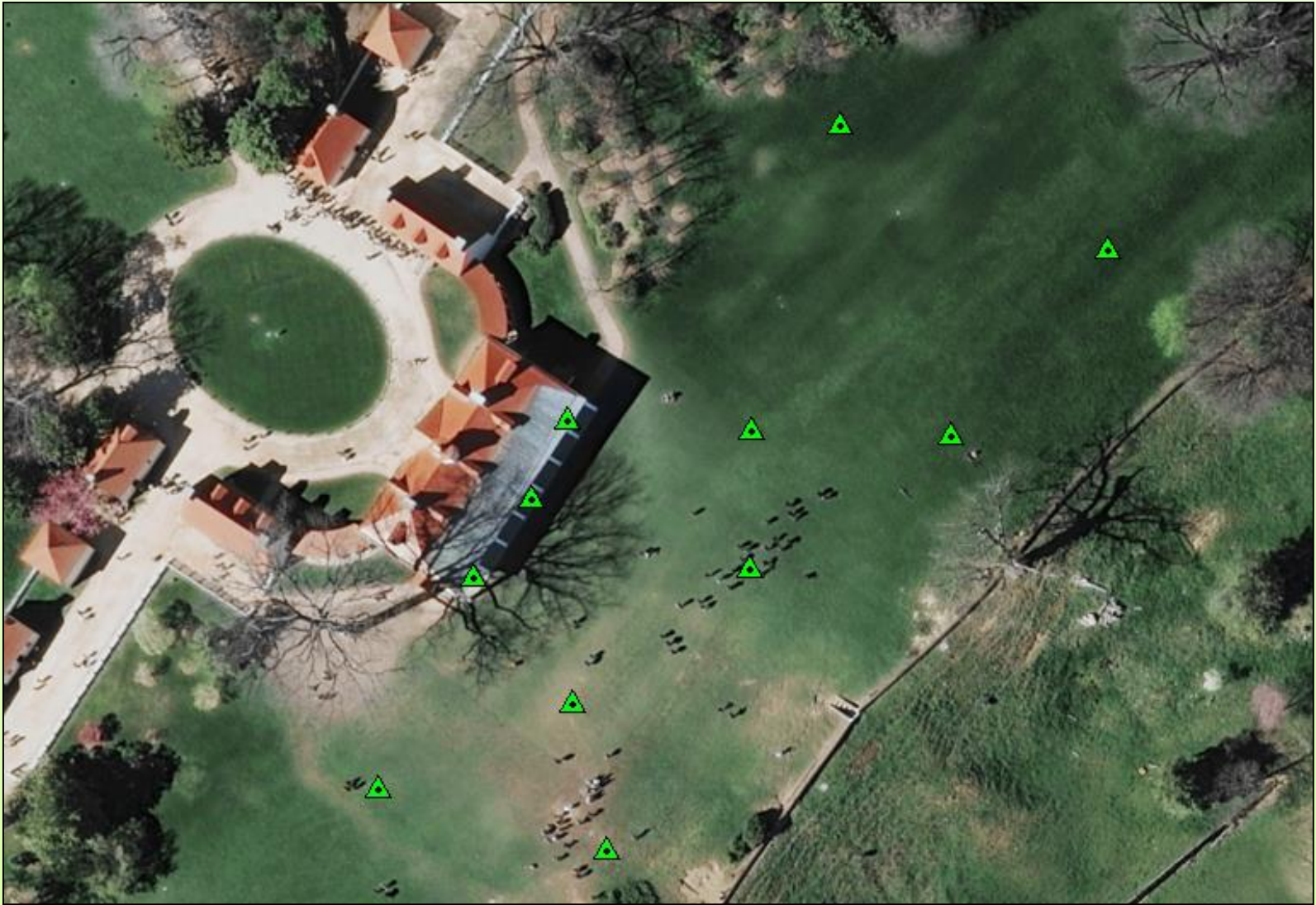# Analyzing a Viewshed: What do you need?

2. Elevation Data

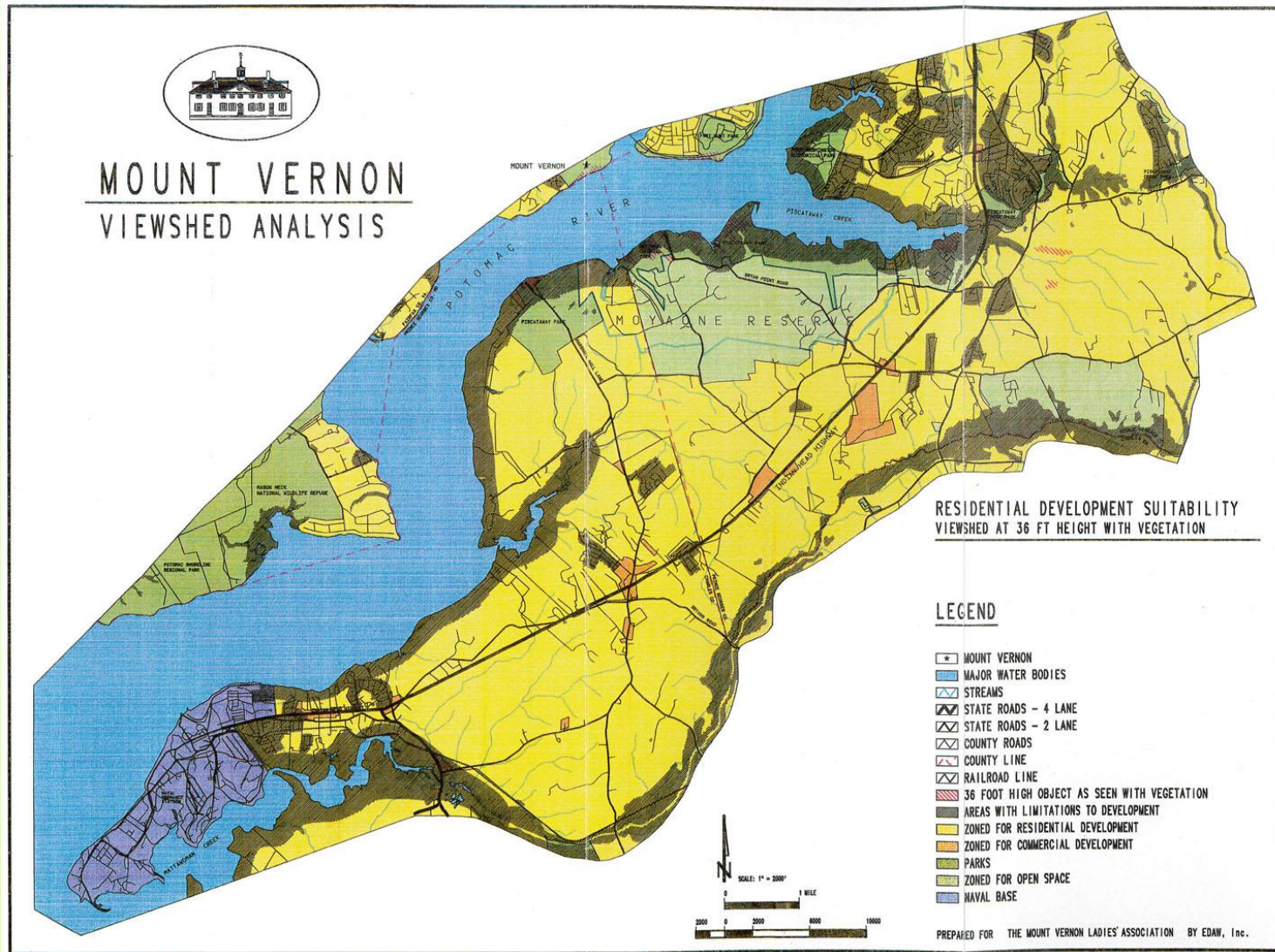**3. Analysis Tool**

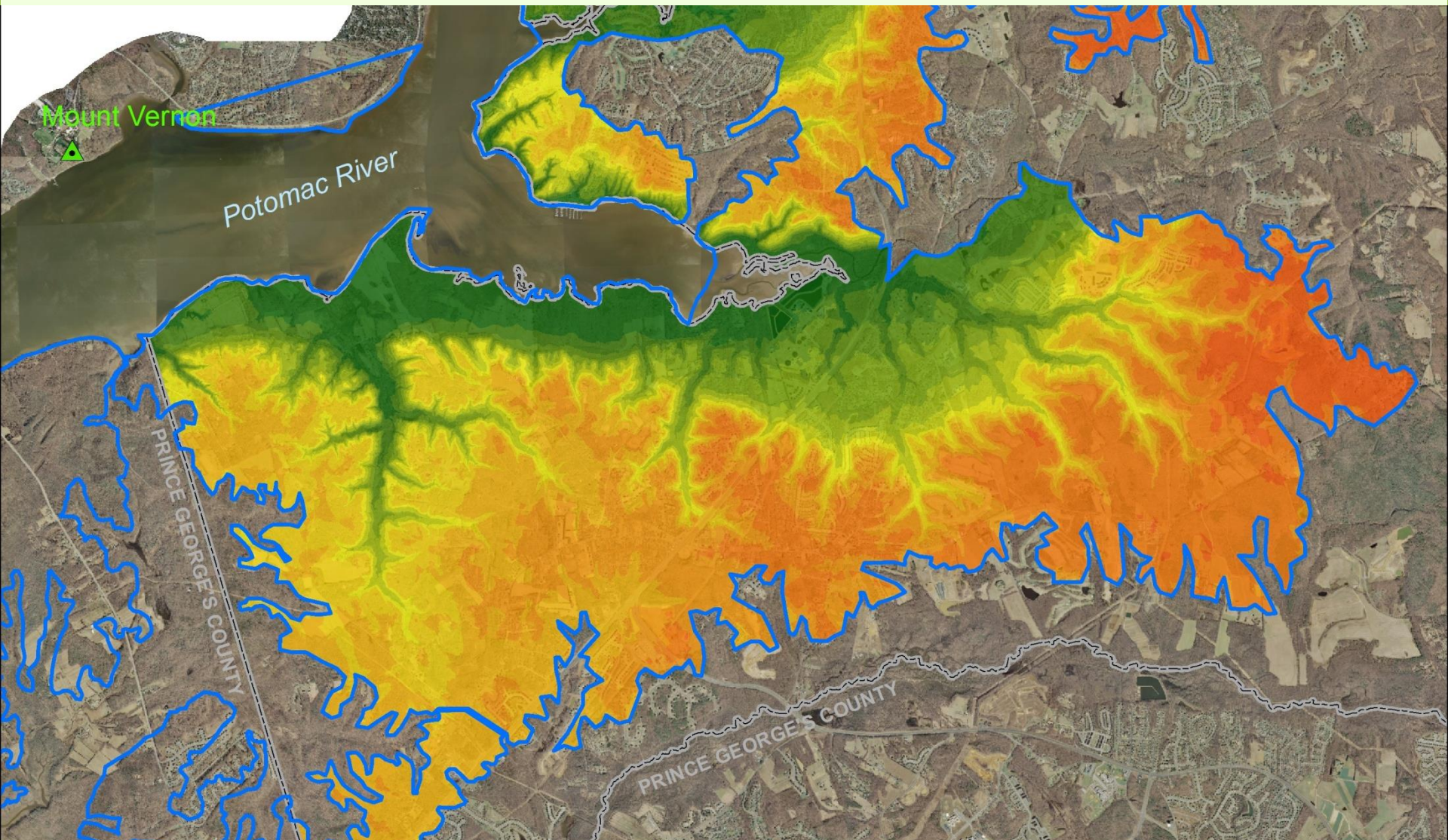**1. Observer Point**

Observer Points

It is possible to input multiple points for detailed analysis results

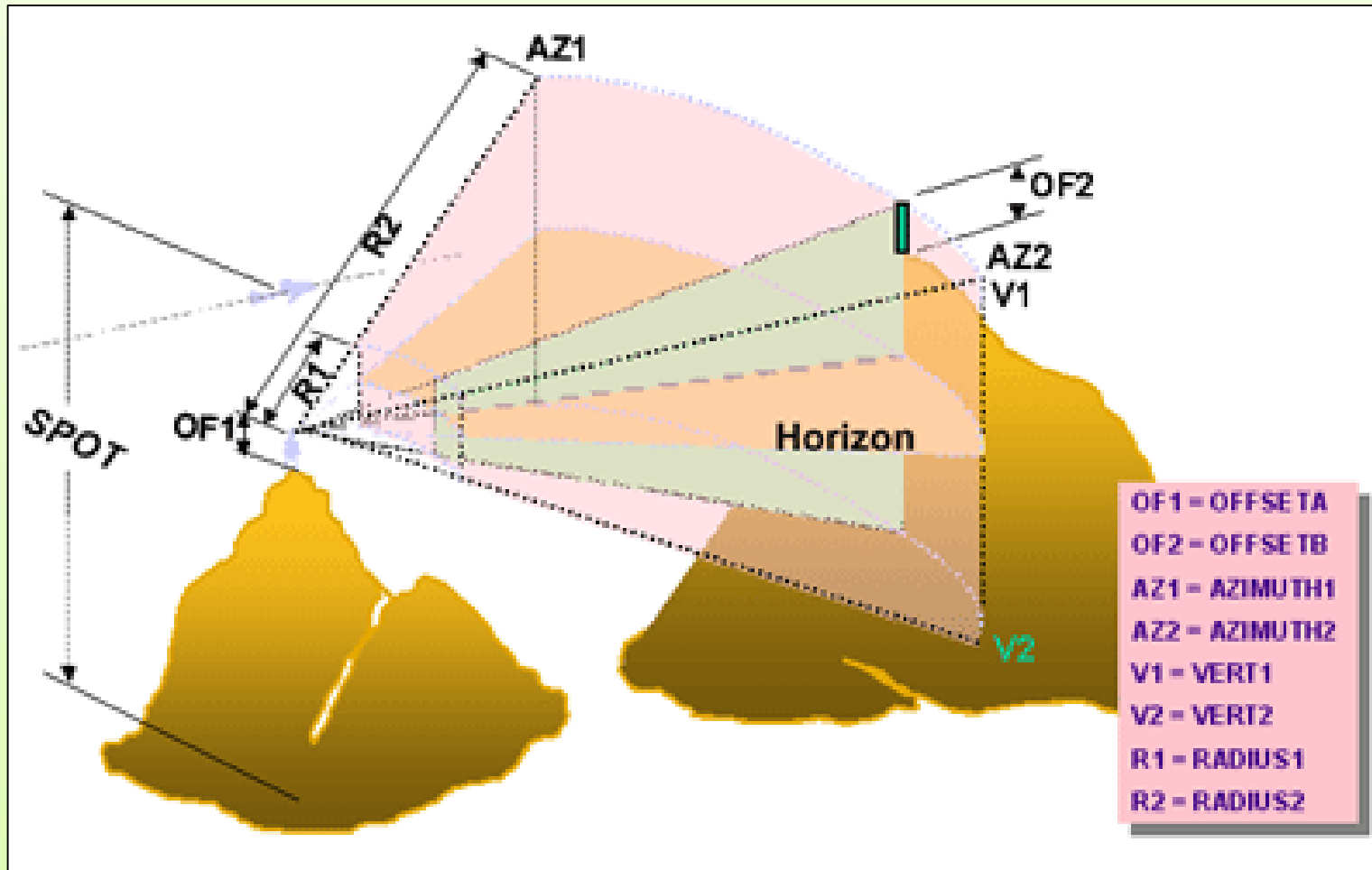# Previous Viewshed Analysis

Based on 10' contours from 1989 USGS Topo maps

DEM Surface Elevation Data

Mount Vernon

Potomac River

PRINCE GEORGE'S COUNTY

PRINCE GEORGE'S COUNTY

Generated from LiDAR flown in 2009 -- 4 foot resolution.

ESRI ArcGIS Viewshed Tool

The Viewshed tool can determine areas visible from an observation point that are a certain distance above the landscape using the OFFSETB setting.

Viewshed Tool Settings

Table

Observer_Pt

	OBJECTID *	SHAPE *	LOCATION	OFFSETB	Z	SPOT	OFFSETA
	1	Point	Mt Vernon	36	135.39120	127.39120	8
	2	Point	Mt. Vernon Porch N	36	134.92955	126.92955	8
	3	Point	Mt. Vernon Porch S	36	134.53985	126.53985	8
	4	Point	Lawn NW	36	126.7648	120.7648	6
	5	Point	Lawn NE	36	122.00048	116.00048	6
	6	Point	Lawn N	36	126.22002	120.22002	6
	7	Point	Lawn E	36	123.93594	117.93594	6
	8	Point	Lawn Center	36	123.84203	117.84203	6
	9	Point	Lawn S	36	125.48926	119.48926	6
	10	Point	Lawn Center S	36	128.99933	122.99933	6
	11	Point	Lawn Center N	36	128.89488	122.89488	6

Driven by the Observer Point attribute table

Viewshed Analysis on DEM

MOUNT VERNON

VIEWSHED
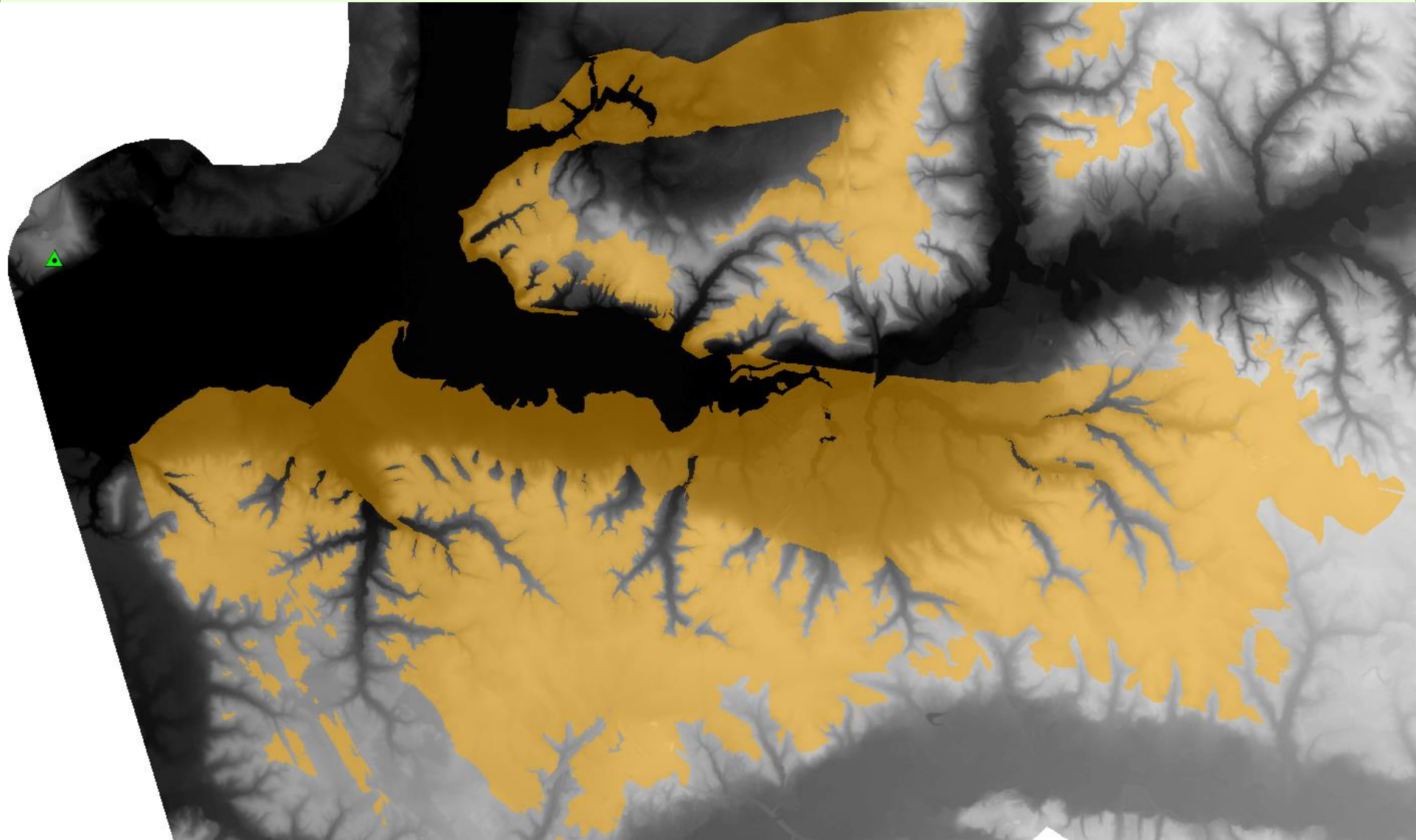HEIGHT
(OFFSETB)

GROUND
ELEVATION

POTOMAC

PRINCE GEORGE'S COUNTY
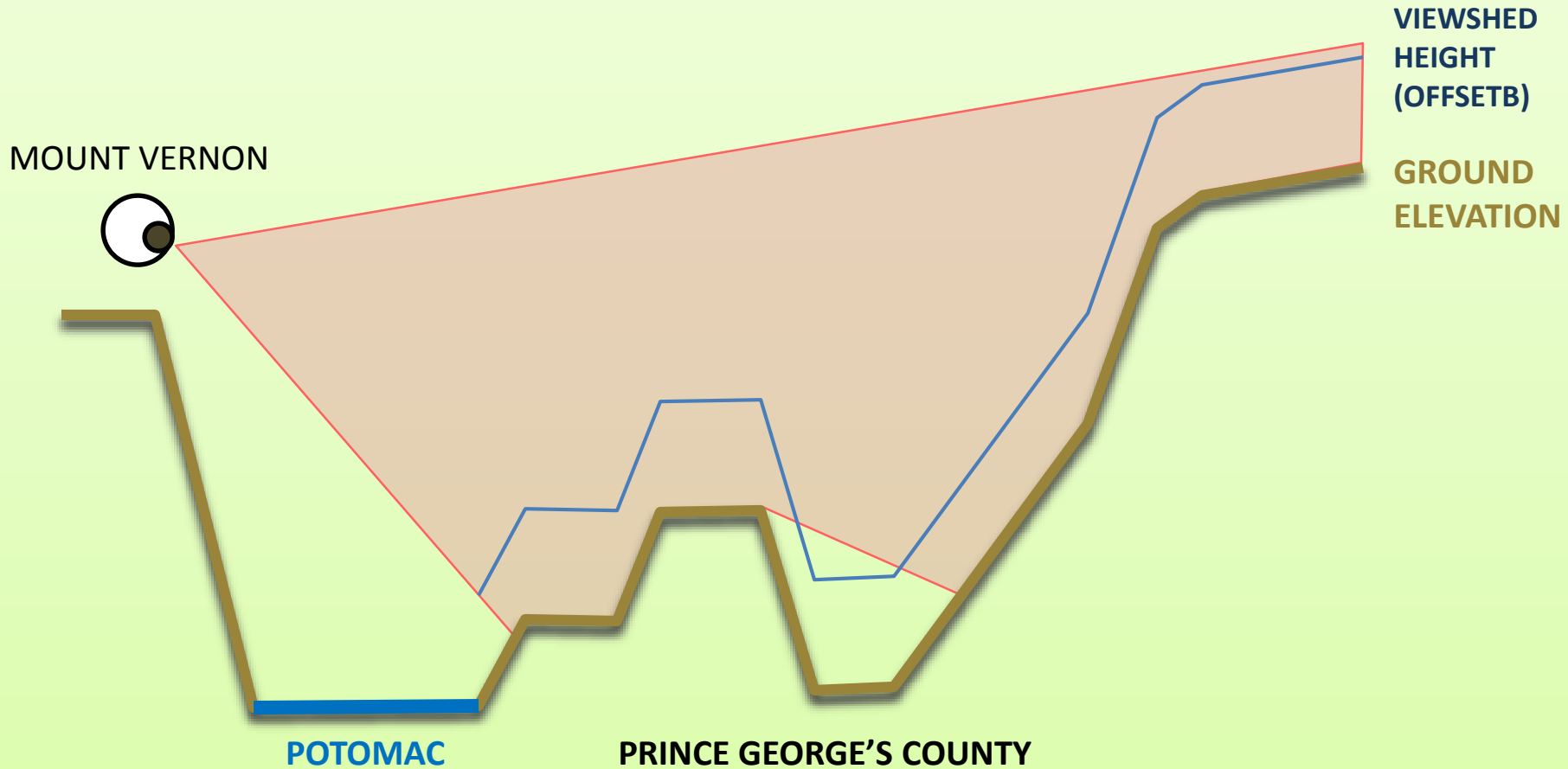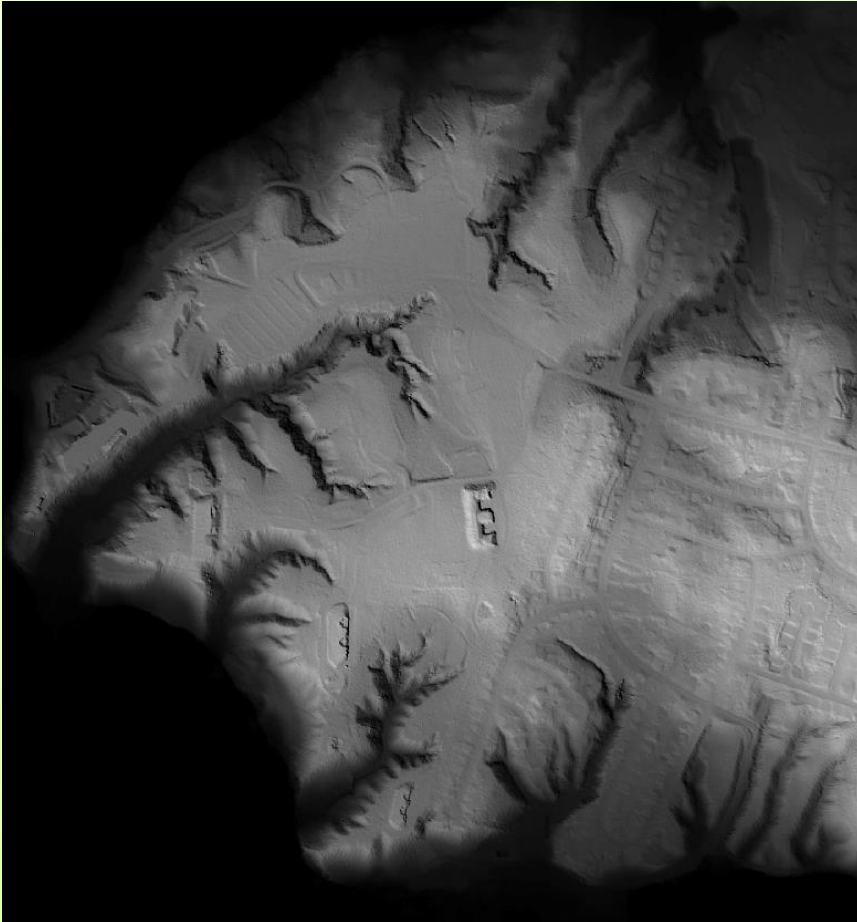
Viewshed Tool Results

■ = Visible from Mount Vernon   Light Areas = Higher elevations, Dark Areas = Lower elevations.
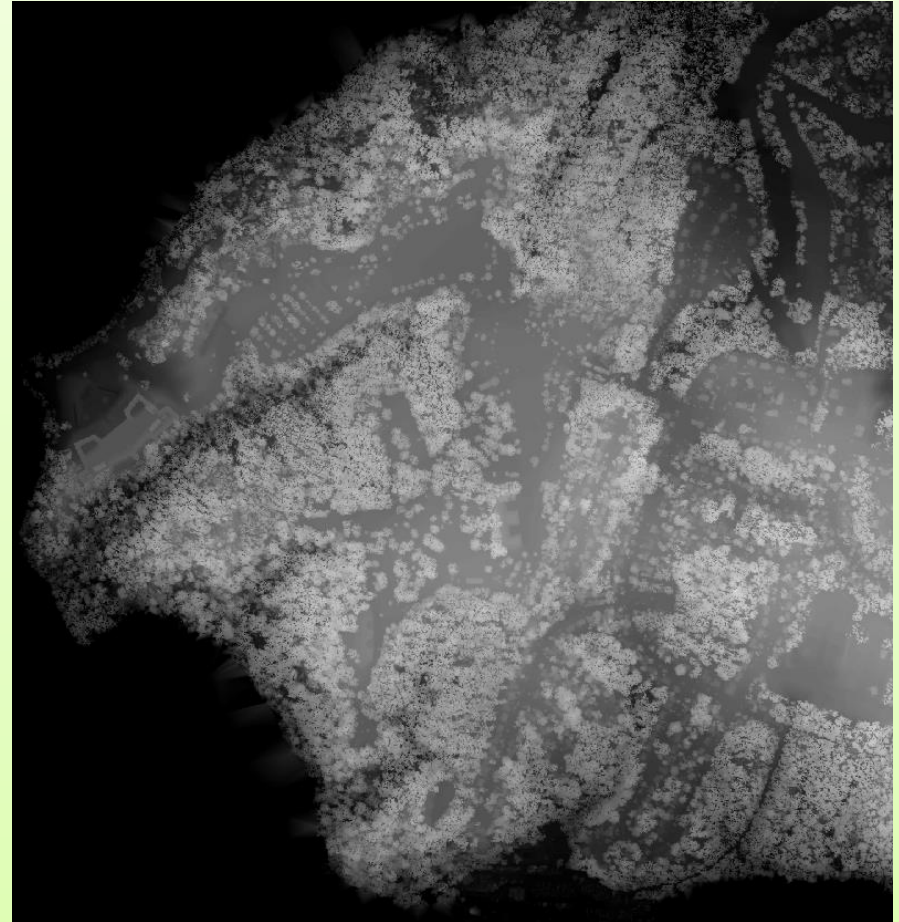
2009 Prince George's County LiDAR Data
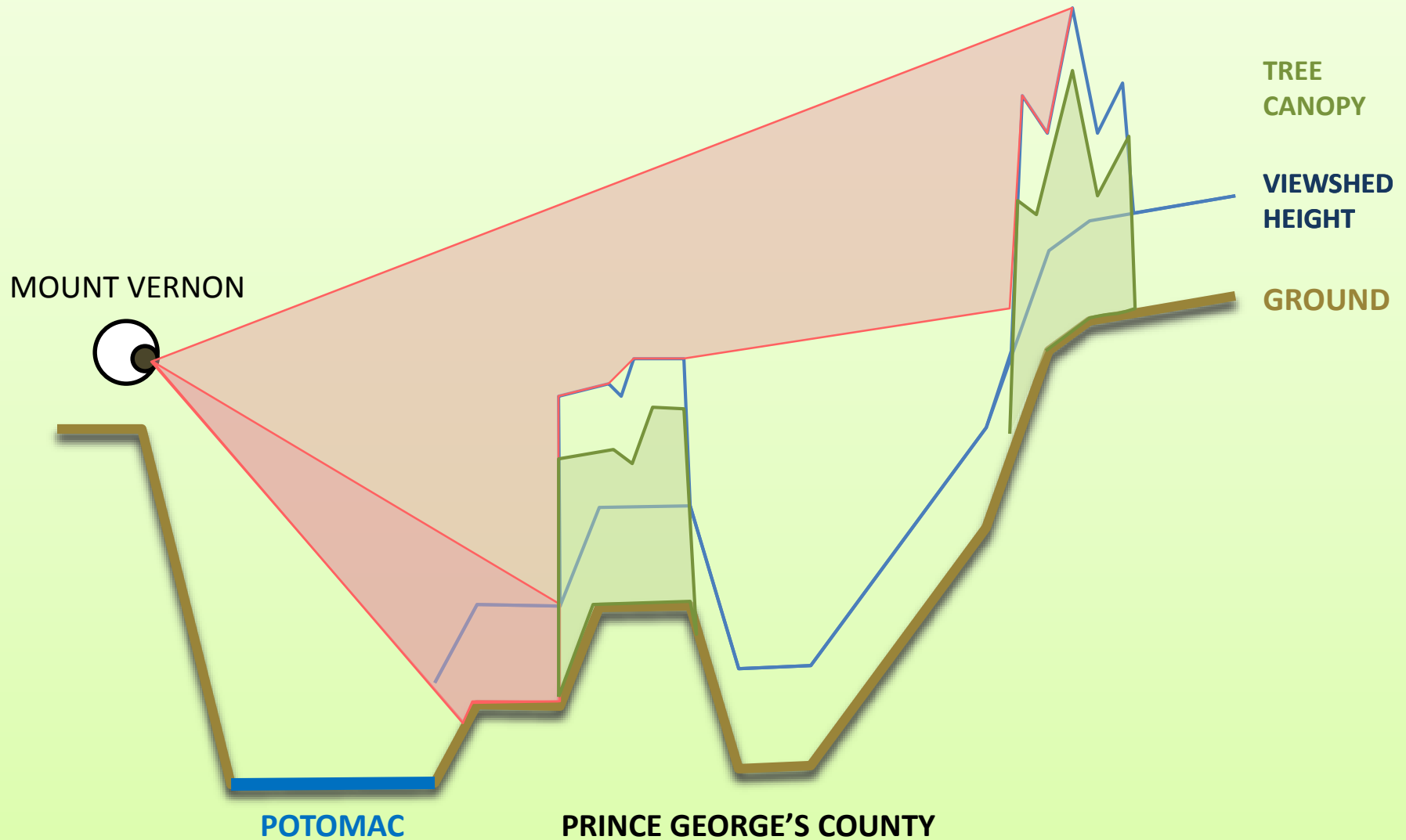
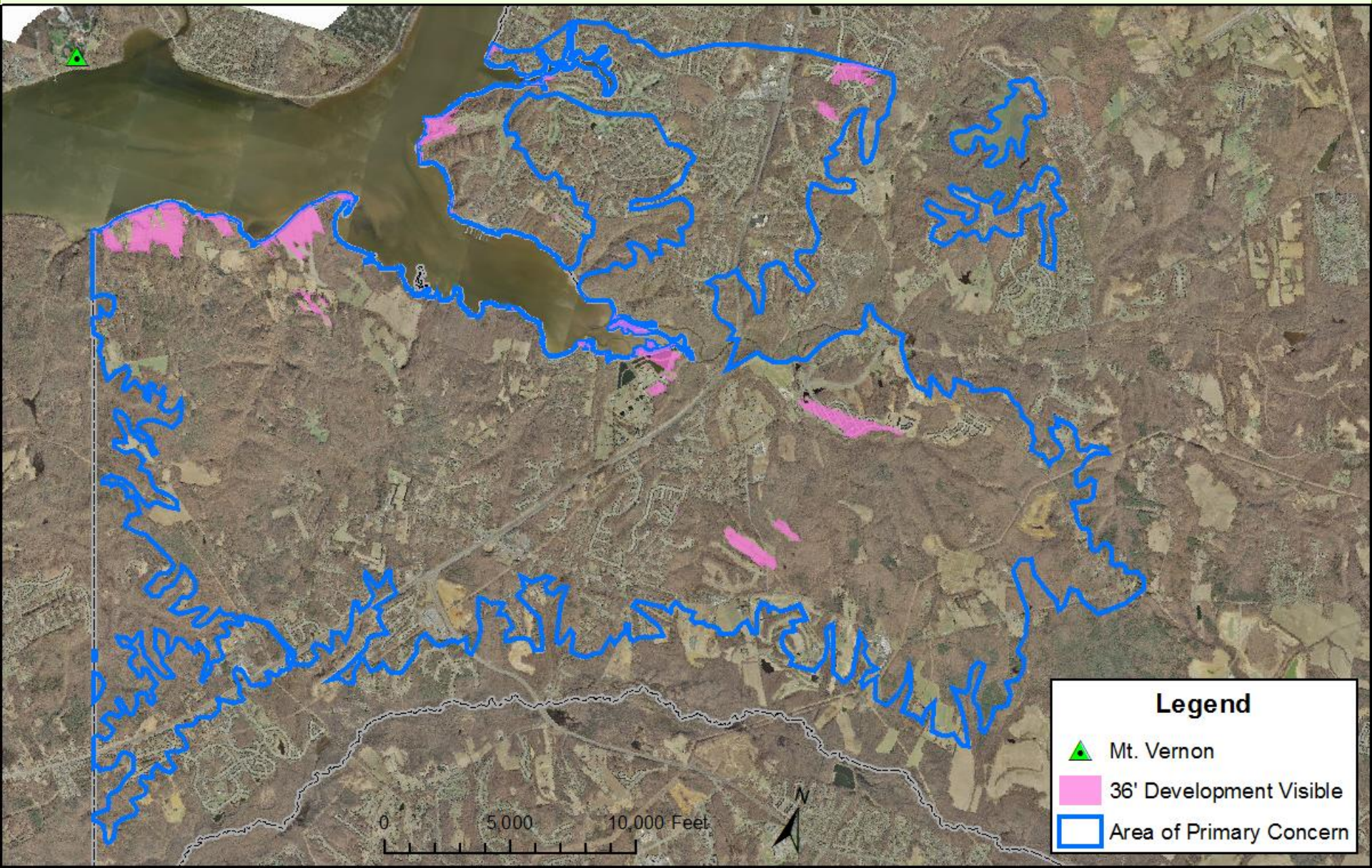Digital Elevation Model

Digital Surface Model

We processed the tree canopy elevations from the DSM & the ground elevations from the DEM into a single raster to use for Viewshed Analysis.

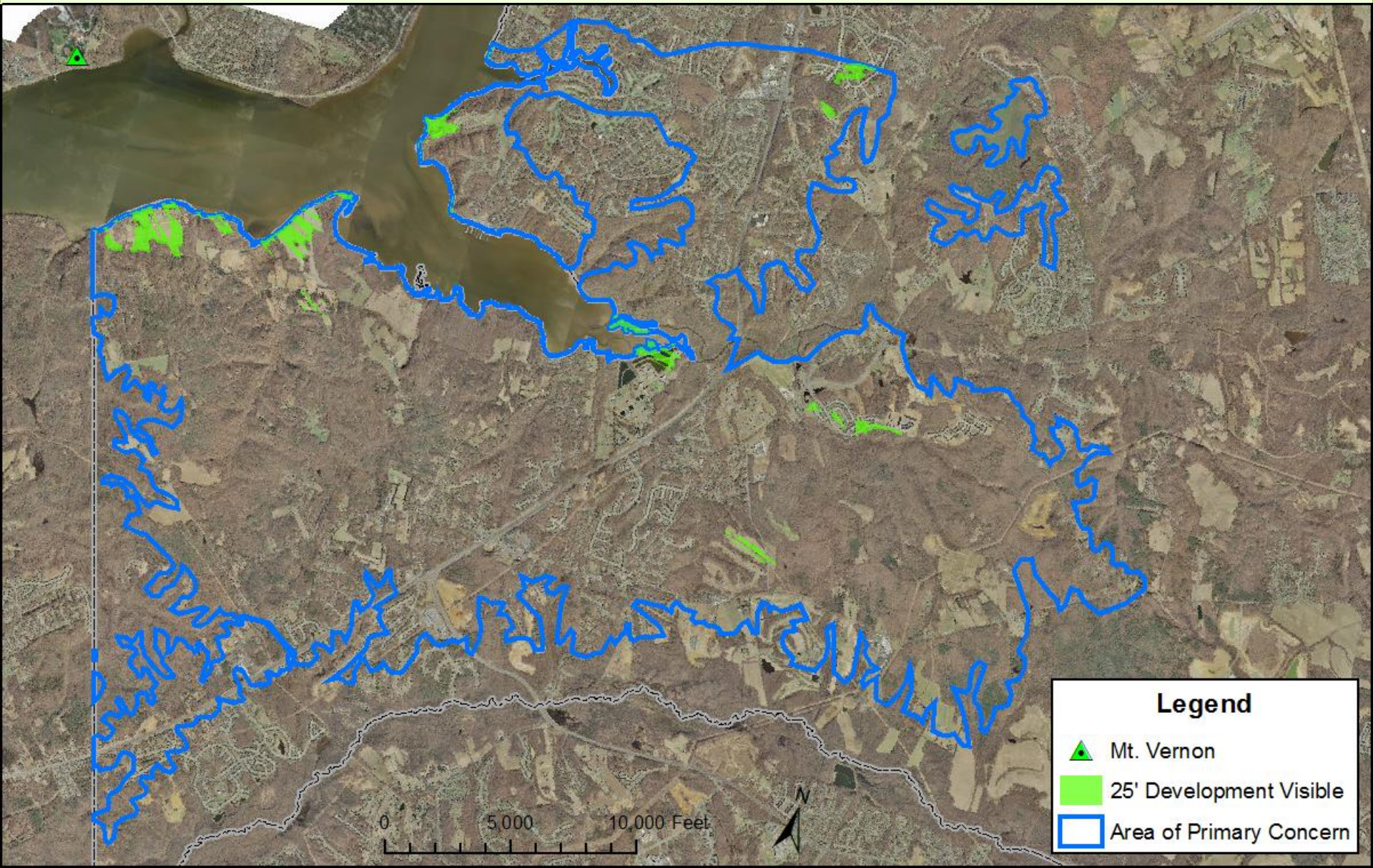# Viewshed Analysis on Updated Raster

TREE CANOPY

VIEWSHED HEIGHT

GROUND

MOUNT VERNON

POTOMAC

PRINCE GEORGE'S COUNTY

Viewshed Analysis Results

Legend

△ Mt. Vernon

■ 36' Development Visible

▭ Area of Primary Concern

0   5,000   10,000 Feet

Viewshed Analysis Results

Legend

▲ Mt. Vernon

■ 25' Development Visible

□ Area of Primary Concern

0   5,000   10,000 Feet

Viewshed Analysis Results

Legend

△ Mt. Vernon

▮ 84' Development Visible

▭ Area of Primary Concern

0   5,000   10,000 Feet
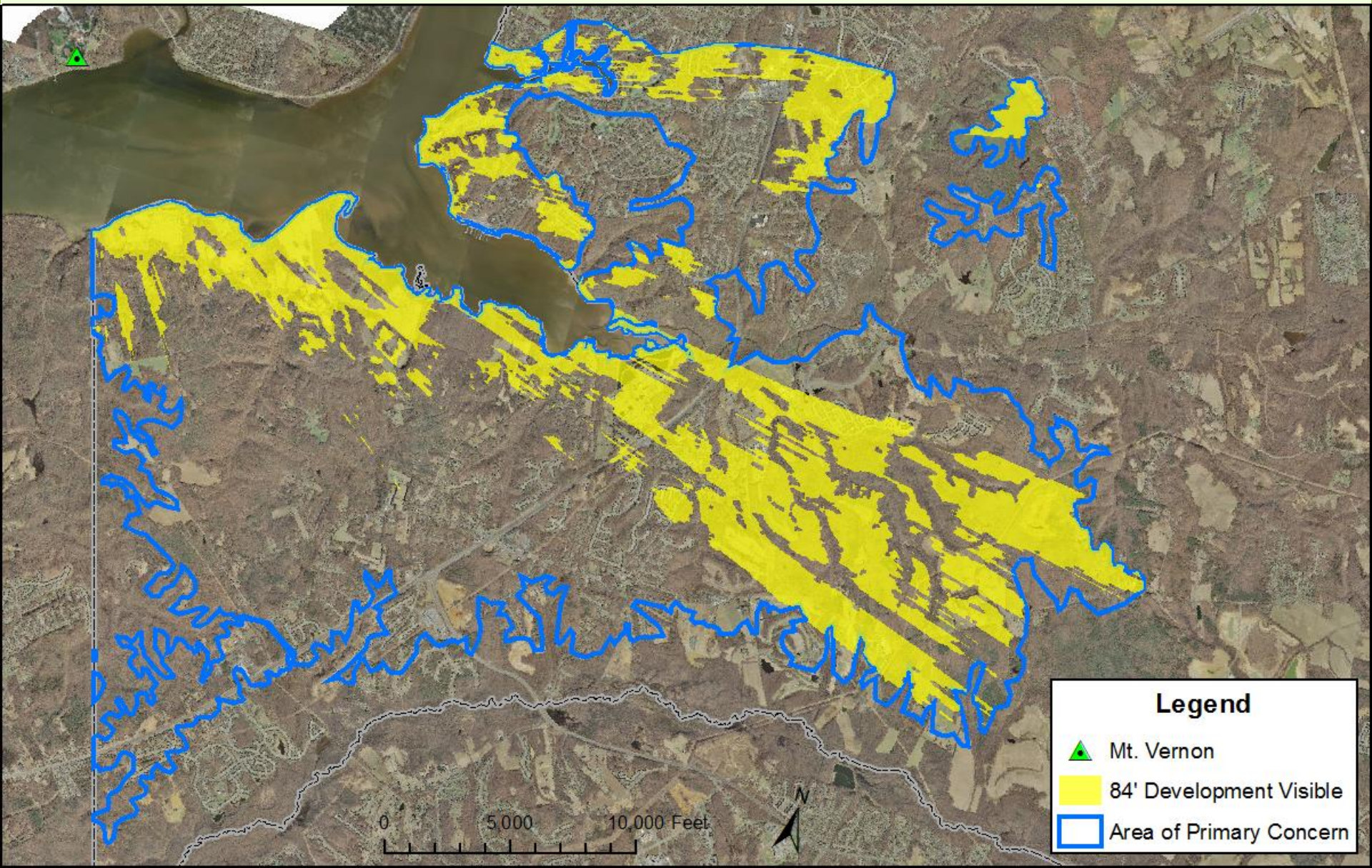
Real World Analysis Check

Preserve at Piscataway: Neighborhood falls within 36' Viewshed results...


...and is visible in Mount Vernon's east lawn panoramic view.

6.5 Miles

Even though it is a good distance from the observation point, the channel configuration provides no screening for this development.

Planning Application

• The Viewshed Results GIS layer gives a good overview of areas of the County that are visible from Mount Vernon

• Planners found it useful to have more detailed information when analyzing viewshed on a per-site basis. In these cases, we used 3D Analyst to create a Profile Graph.
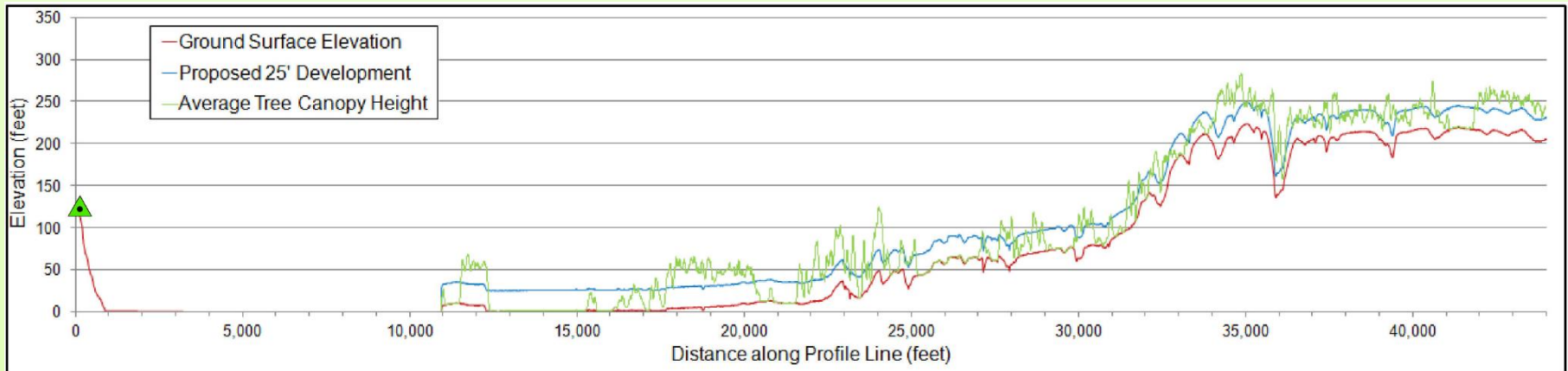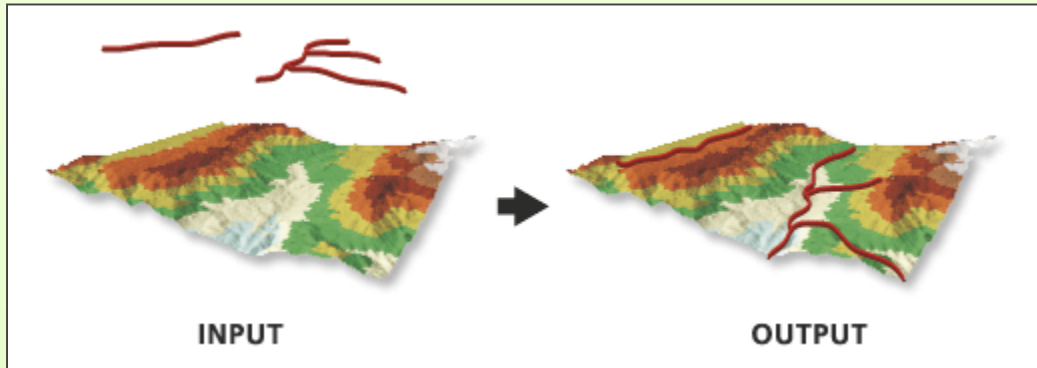

These Profile Graphs show:

- Fluctuations in ground & canopy elevation across the viewshed
- A direct line of sight to the location in question
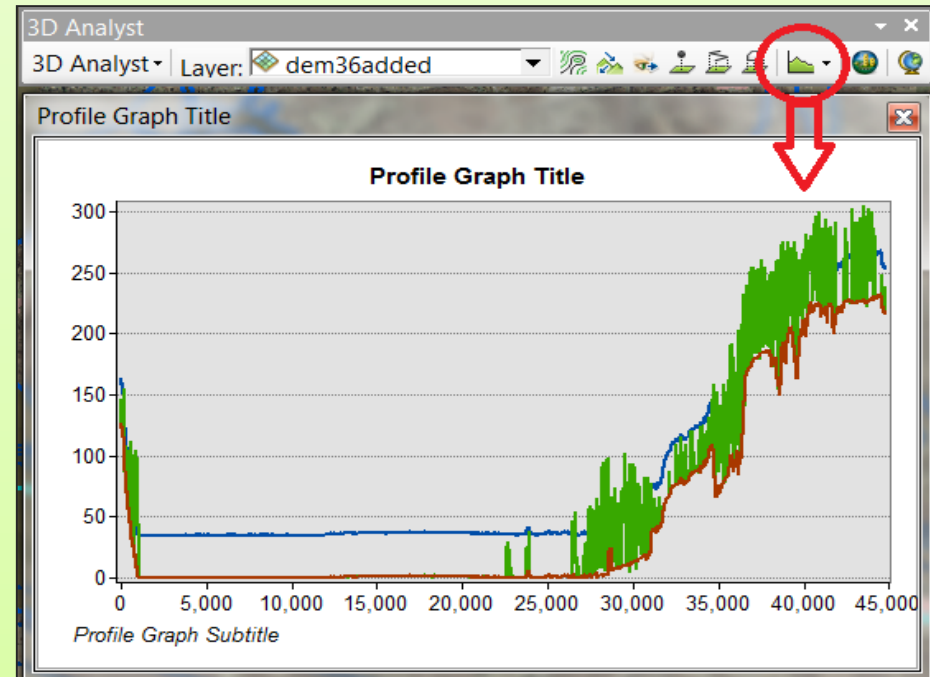- The specific portion of tree canopy providing screening for the site

Profile Creation

1. Digitize a profile line from Mount Vernon to the site.

INPUT → OUTPUT

2. The Interpolate Shape tool inherits elevations from 3D surfaces into the profile line.

3. Generate a Profile Graph from the 3D lines using the 3D Analyst toolbar.

Profile source data can be exported to Excel and formatted into a cleaner map exhibit.

Profile Example