



# MODIFYING THE GOOGLE EARTH TERRAIN USING GOOGLE SKETCHUP



HILL, Jesse S. and HARRISON, Michael J., Department of Earth Sciences, Tennessee Tech University, PO Box 5062, Cookeville, TN 38505, hilljs@live.unc.edu (currently at Univ. of North Carolina at Chapel Hill)

## Abstract

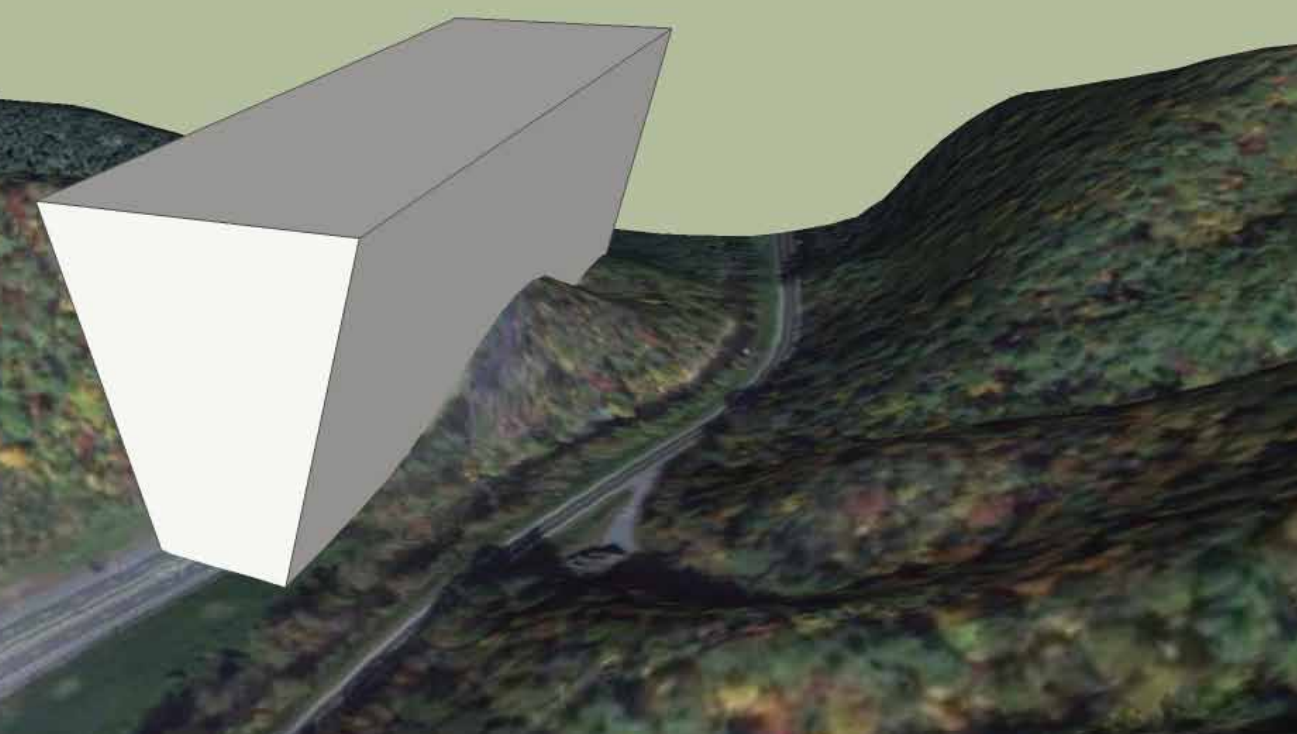
Google Earth (GE) is a dynamic virtual globe that can be used to display and link field data to geologic maps and cross sections. On occasion, however, the GE terrain does not accurately reflect the present-day land surface. For example, the GE terrain does not depict several large outcrops that formed during 1990s construction along I-26 in Unicoi Co., northeastern TN. To correct this discrepancy, Google SketchUp (GSU) was used to build a topographic model from a copy of the GE terrain. This model was then imported back into GE and georeferenced to align with the surrounding terrain. The result is a virtual excavation of the GE terrain that better represents the current topography. Here, we demonstrate step-by-step instructions for building a topographic model using GSU and then placing the model back into GE. This technique can be used anywhere a mismatch exists between the GE terrain and the Earth's surface.

## Background

Although Google regularly adds and updates satellite imagery in GE, elevation data may be outdated and may not accurately represent the current day topography. Such is the case in this study, where numerous outcrops are seen in GE satellite and Streetview photographs, but are not represented in the GE terrain. Virtual excavation and addition of photomosaics are techniques that can be added to the powerful and free realm of GE and GSU geology, a growing sector of digital mapping (Hill and Harrison (in press), Karabinos, 2010, Whitmeyer et al 2010). Correction of the mismatch in topography and terrain allows outcrop-scale field data to be viewed in a more accurate position on the globe.

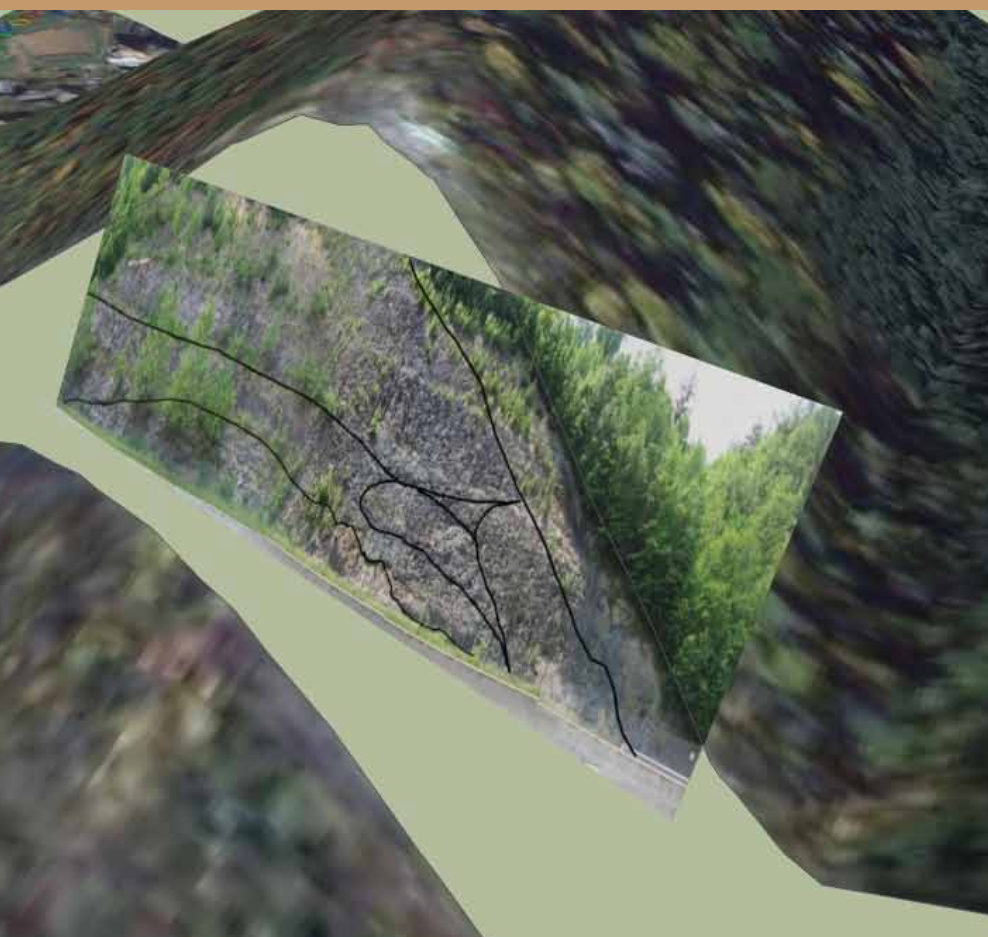
3

The sides of the box are tilted to better fit the shape of the outcrop



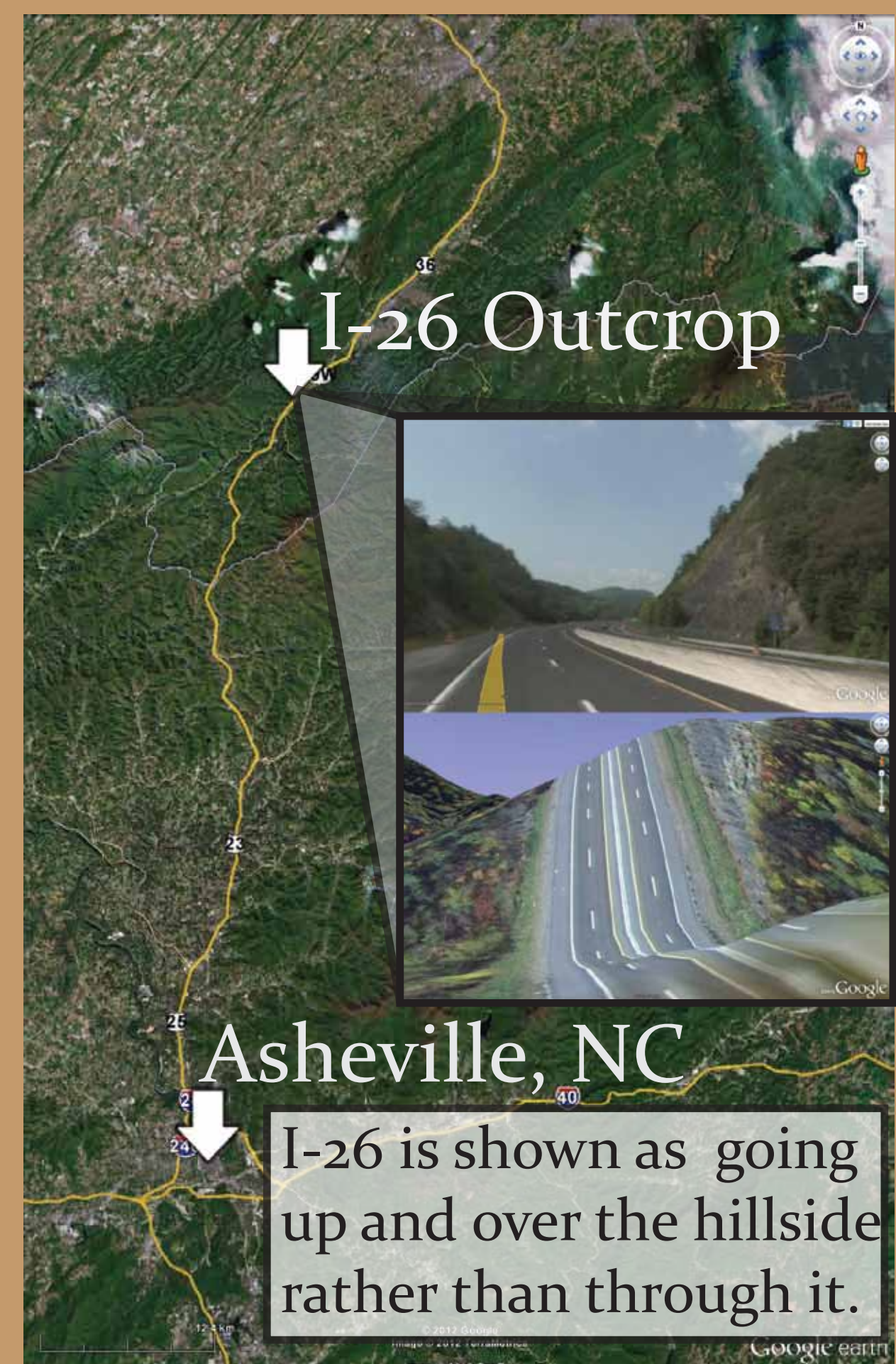
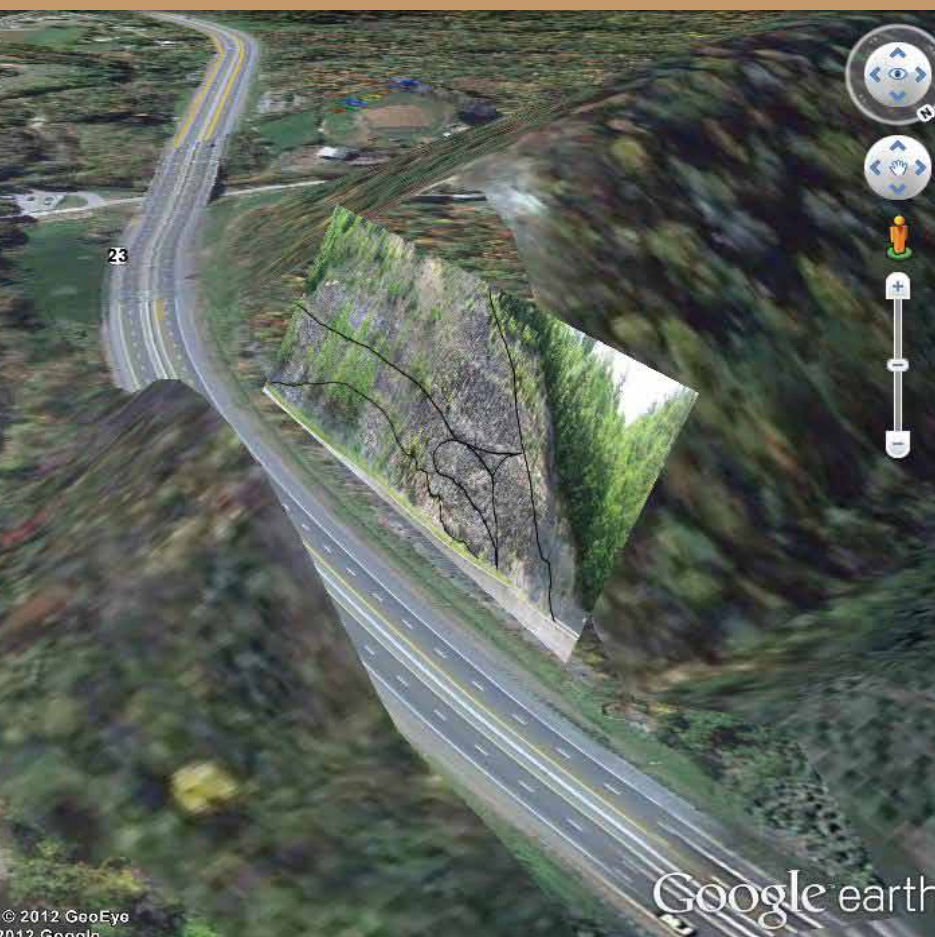
6

A photomosaic was added to the virtual outcrop face.



9

The model can now be exported into Google Earth and used to geo-reference outcrop-scale field data.



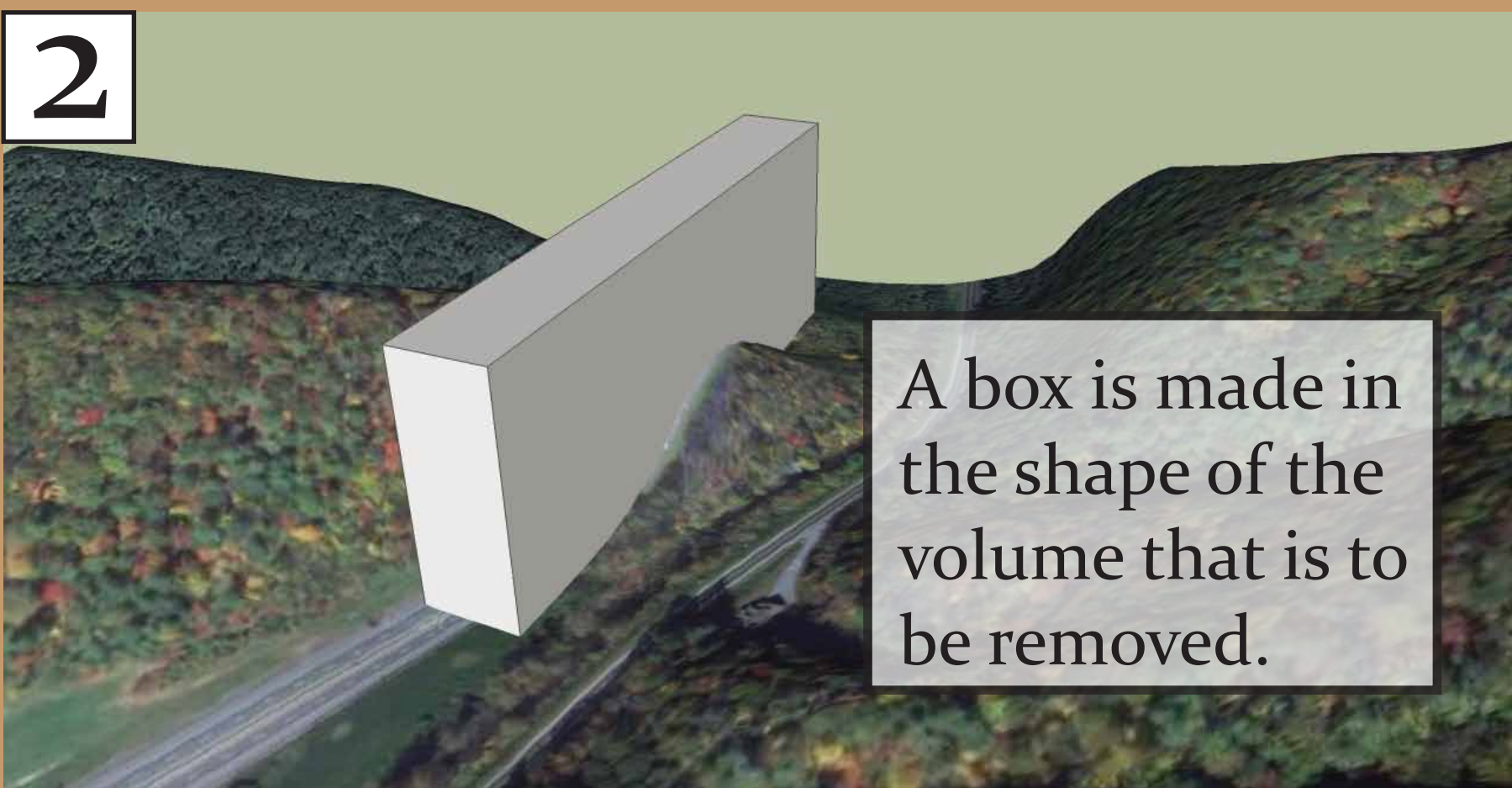
1

A copy of the terrain was imported from GE into GSU.



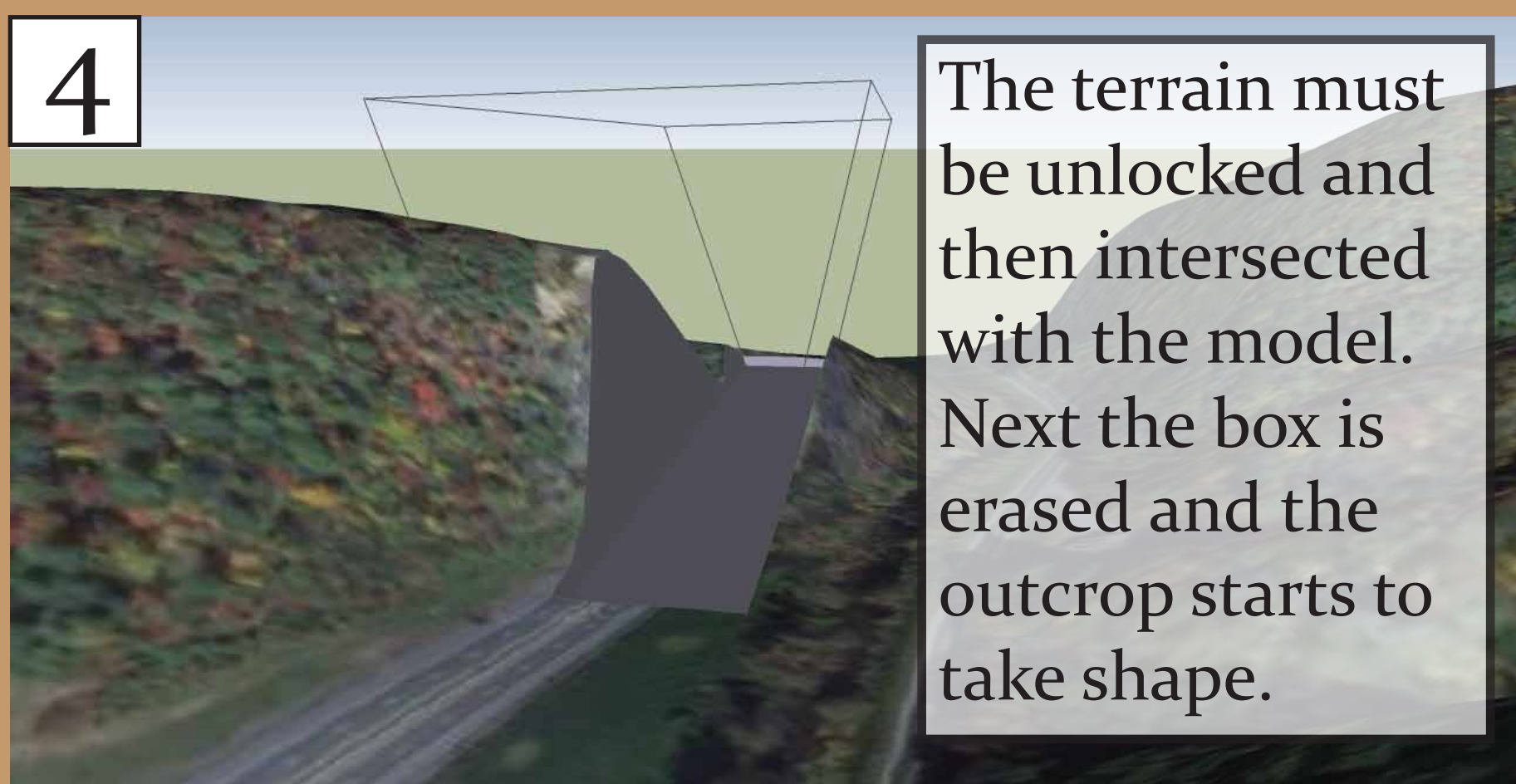
2

A box is made in the shape of the volume that is to be removed.



4

The terrain must be unlocked and then intersected with the model. Next the box is erased and the outcrop starts to take shape.



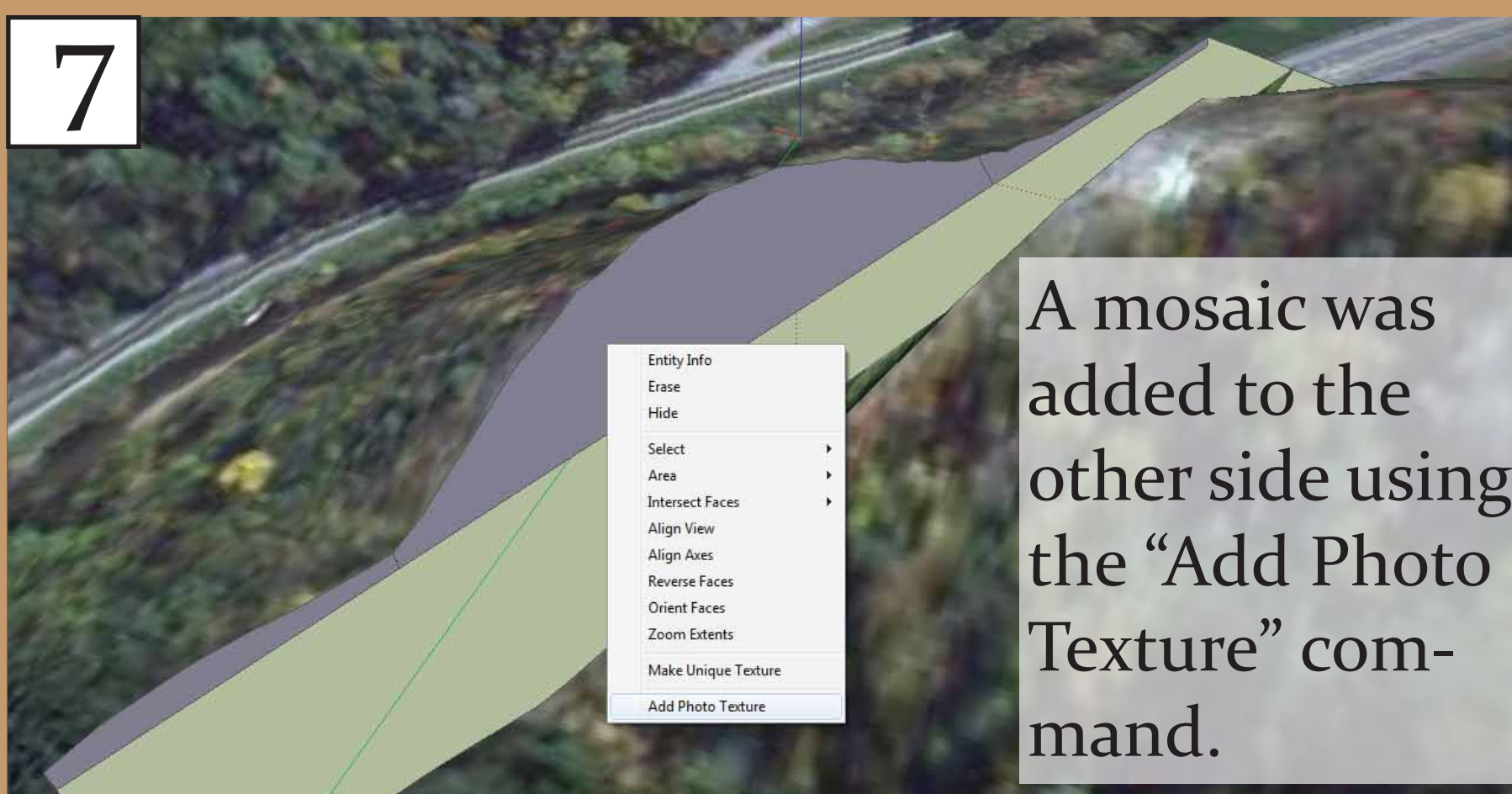
5

Only the modified surface remains.



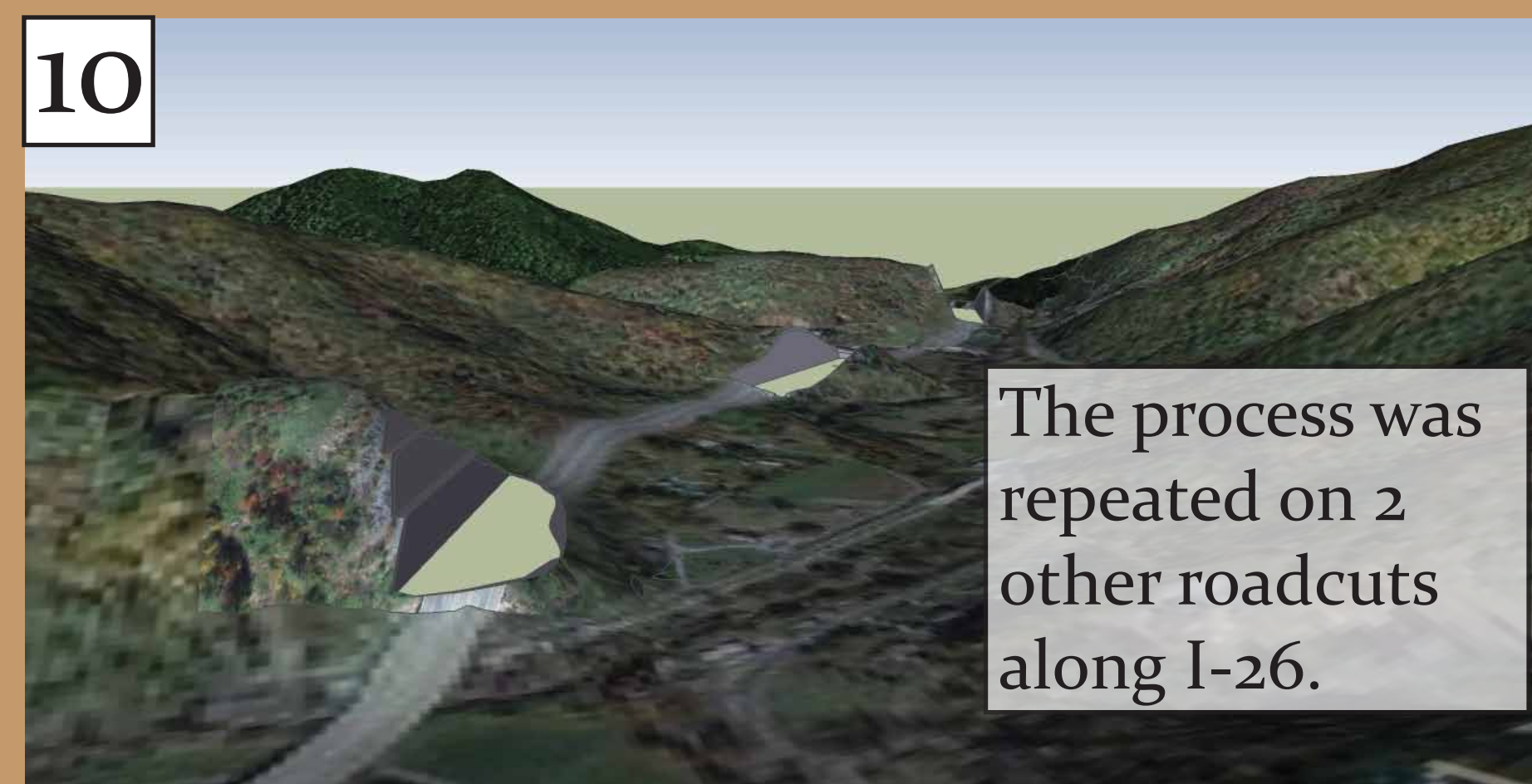
7

A mosaic was added to the other side using the "Add Photo Texture" command.



10

The process was repeated on 2 other roadcuts along I-26.



8

"Add Photo Texture" uses Google Streetview to select texture for GSU models.



## Conclusions

GE and GSU are user-friendly and free tools that can be utilized by geologists at the student and professional level for a multitude of tasks. The techniques presented here can be used at roadcuts or quarries to display new topography or planning for future-land use of an unexcavated area.

## References

Hill, J., and Harrison, M. (in press), Terrain Modification in Google Earth Using Google SketchUp: An Example from the Western Blue Ridge of Tennessee; Geological Society of America, Special Papers: Google Earth and Virtual Visualizations in Geoscience Education and Research.  
Karabinos, P., 2010, Adding structures to 3-D geologic maps: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 421.  
Whitmeyer, S. J., Nicoletti, J., and De Paor, D. G., 2010, The digital revolution in geologic mapping: GSA Today, v. 20, no. 4/5, p. 4-10.