

# Bluestone Lake and Downstream 2009 Bare- Earth Digital Elevation Model Report

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## **Overview**

The Bluestone Lake and Downstream 2009 Bare-Earth DEM (digital elevation model) is a 2-meter digital elevation model derived from a bare-earth LiDAR data set. A digital elevation model (DEM) is a cartographic representation of the terrain expressed in horizontal and vertical units. A DEM consist of regularly spaced intervals in the x and y direction and z values are referenced to a vertical datum. The Bluestone Lake and Downstream 2009 Bare-Earth DEM is void of vegetation and man-made features. To enhance the surface and ensure that it would be suitable for two-foot contours breaklines were compiled and used in the final DEM. To meet the specifications of the statement of work the following instructions were documented, monitored, and verified in the Quality Control Plan before submitting the dataset. The Bluestone Lake and Downstream dataset is

- Tiled to WVASAMB10-FT tile layout
- Referenced to the vertical and horizontal spatial reference specified in the Scope of Work
- Edge-matched between tiles and across the dataset. There are no gaps, edge artifacts of mismatch between tiles.
- Produced from the bare-earth processed LiDAR data using breakline data where collected as specified.
- The DEMs have a pixel resolution to support the generation of two-foot contours. The DEM reference point is the lower left corner of the DEM and is an integer multiple of the pixel size. The elevation of each grid cell should be interpolated from a TIN surface of the data points. Voids in the bare-earth points due to the presence of trees, buildings, and other features were interpolated across and areas that contained no data were assigned the value -9999.

## **Processing**

The Bluestone Lake and Downstream DEM was created from the bare-earth class of the classified LAS version 1.2 file and the photogrammetrically compiled breaklines. Before the DEM creation began, the breaklines were compared to the LiDAR surface and corrected in areas that did not match. The most common errors involved breaklines digging into or floating above the LiDAR surface. The breaklines were also checked along the tile seams and the gradual slope main channel was verified.

To facilitate the generation of the DEM, 2-meter GRID files were generated from a triangulate irregular network representing the bare-earth surface in Terrasolid's software package. The GRIDs were then converted to Arc Floating Point DEMs using the Arc Macro Language Script (AML) ASCIIGRID.

## **Quality Control**

The Bluestone Lake and Downstream 2009 Bare-Earth DEM quality control procedures were thorough and documented. To verify the coverage and completeness of the DEM a mosaic of the entire project was created. The mosaic was compared against the client provided

boundaries and tiling scheme to verify coverage. To verify the completeness of the DEM the mosaic was compared against the tiling scheme to ensure that each tile was created in its entirety, that there were no data voids or errors in the DEM. A hillshade of the mosaic was created to verify that all vegetation man-made features were removed from the DEM. As errors were identified, the Quality Control Team they were sent to the production team to be fixed and the DEMs were regenerated and sent back to quality control for a final review. Before delivery, the datasets were compared against the scope of work to ensure that all of the requirements were met. As a final quality measure, the accuracy of the final DEM assessed to ensure that the data was in project specifications. The RMSE of the final DEM is .239-feet or .072-meters.