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Dewberry Response to USGS Review of the Schoharie County NY QL2 LiDAR Project

Produced for U.S. Geological Survey

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Executive Summary

The primary purpose of this project was to develop a consistent and accurate surface elevation dataset derived from high-accuracy Light Detection and Ranging (LiDAR) technology for the USGS Schoharie County NY LiDAR QL2 Project Area.

The LiDAR data were processed to a bare-earth digital terrain model (DTM). Detailed breaklines and bare-earth Digital Elevation Models (DEMs) were produced for the project area.

Deliverables for this project included raw point cloud data, classified point cloud data, bare earth digital elevation models, intensity images, breaklines, control points, metadata, project report, and project extent shapefiles.

The USGS review of these deliverables resulted in one call to deliver intensity imagery, one call to redeliver the full swath delivery including cross flights, three calls regarding vertical accuracy, one call regarding LAS classifications, fifteen excessive tinning calls, eight data holiday calls, four tile edge mismatch calls, one breakline call, two hydro-flatten calls and one call to remove a manmade structure.

Two tiles were impacted by voids in the original delivery. These two tiles have been corrected and delivered to USGS. Dewberry has updated the project report and metadata files to reflect that these void tiles have been corrected.

PROJECT AREA

Data was formatted according to tiles with each tile covering an area of 1500m by 1500m. A total of 1222 tiles were produced for the project encompassing an area of approximately 1270 sq. miles.

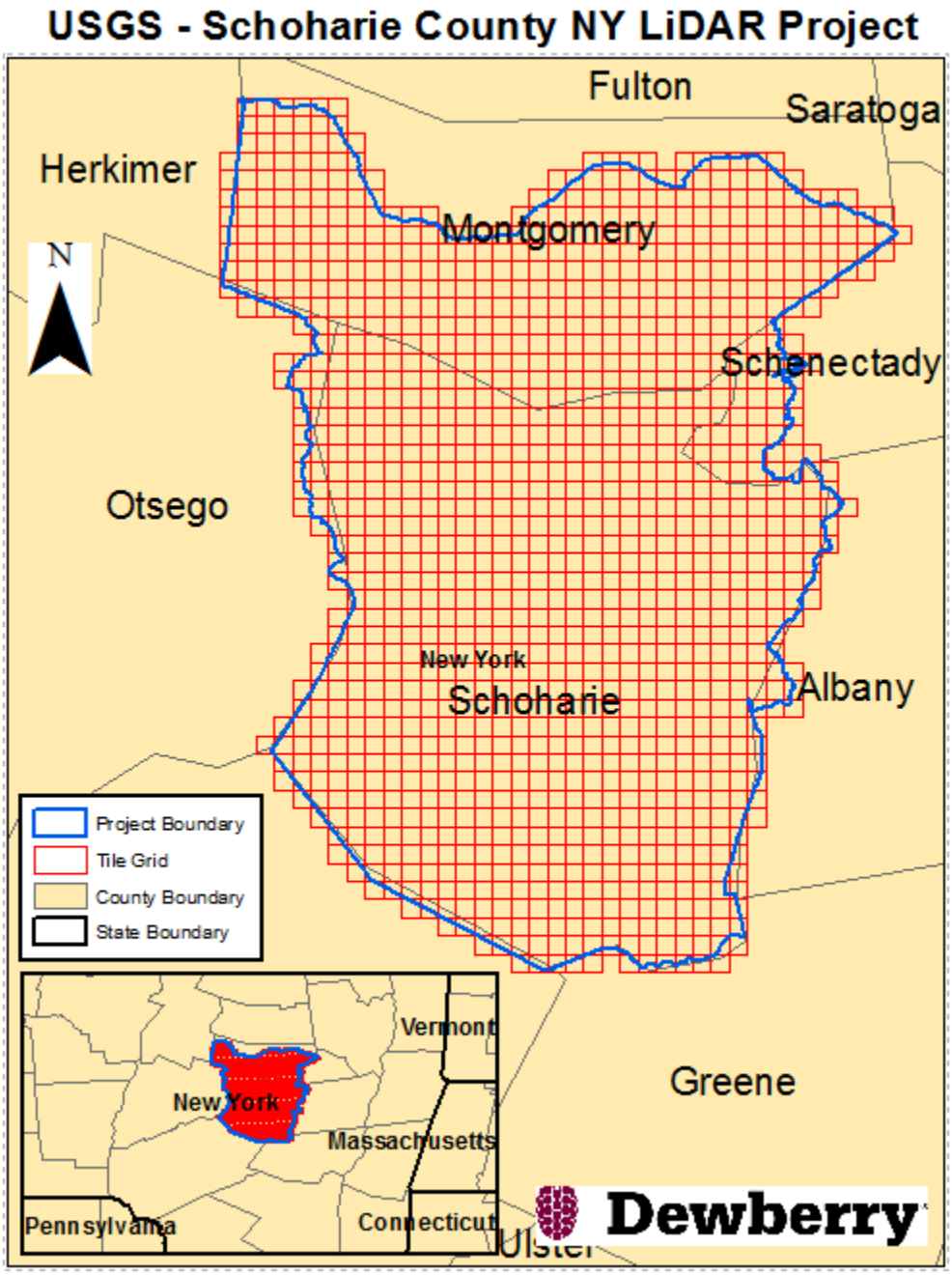

Figure 1 - Project Map

Edit Calls

INTENSITY IMAGERY

The intensity imagery was mistakenly left off of the original hard drive deliverable. 1,222 intensity imagery files are included in this re-delivery.

ACCURACY TESTING

USGS stated that the vertical accuracy failed because two land categories (forest and brushland/low trees) did not meet the target SVA values of 0.269 meters. However, according to ASPRS and NDEP guidelines the SVA are target values and individual land categories are allowed to fail when overall CVA is passing. The Schoharie County NY LiDAR Project CVA standard is 0.269 meters based on the 95th percentile. CVA for all checkpoints in all land cover categories combined tested 0.249 meters based on the 95th percentile; the Schoharie County NY LiDAR Project passes required vertical accuracy specifications.

USGS also failed the vertical accuracy because the survey report (page 44 of project report) states that Dewberry surveyed 110 checkpoints but 108 checkpoints were delivered. Only 100 checkpoints were required for this project but Dewberry tries to collect additional checkpoints in case some are unusable. As explained on pages 23-26 of our project report, two checkpoints could not be used in our vertical accuracy testing due to their location on sloped terrain. These checkpoint locations are still provided in coordinate information of the survey data, but are not included in the shapefile as they are unusable.

USGS stated that we did not calculate swath vertical accuracy. Dewberry provided the swath vertical accuracy results on pages 11-12 of the project report. The results are also provided in the swath or lift metadata files.

LAS SWATHS

Cross-flights were not included in the initial delivery. Dewberry provided a complete re-delivery of the swaths including cross-flights.

LAS STATS

USGS stated that classes 8 and 11 were present in some tiles. The project specifications did not include classes 8 and 11. Dewberry has reclassified the affected tiles so that these classes no longer exist.

EXCESSIVE TINNING

USGS made fifteen calls of areas that had excessive tinning. These calls were located in highly vegetated areas where ground points are sparsely classified. Dewberry was able to add some additional ground points in nine of the identified areas, but no additional points could be classified to ground in other areas. In these areas, the dense vegetation has prevented the lidar pulse from penetrating to the ground.

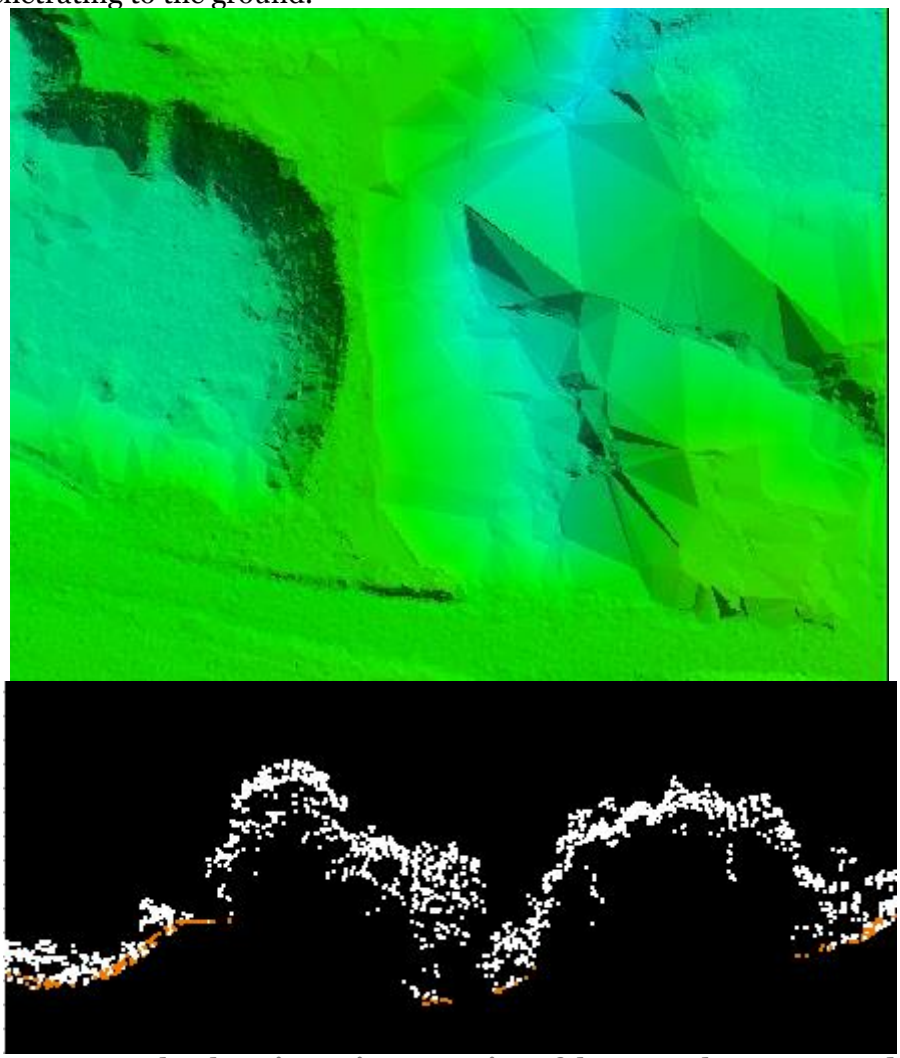

Figure 2- 18TWN235595. The above image is an overview of the DEM where USGS made an excessive tinning call. The below image shows a LiDAR cross section of the area. This area is highly vegetated and points cannot penetrate to the ground. There are no additional points to classify as ground to reduce tinning in these areas.

DATA HOLIDAY

USGS made nine calls of data holiday. Dewberry has corrected all data holiday calls.

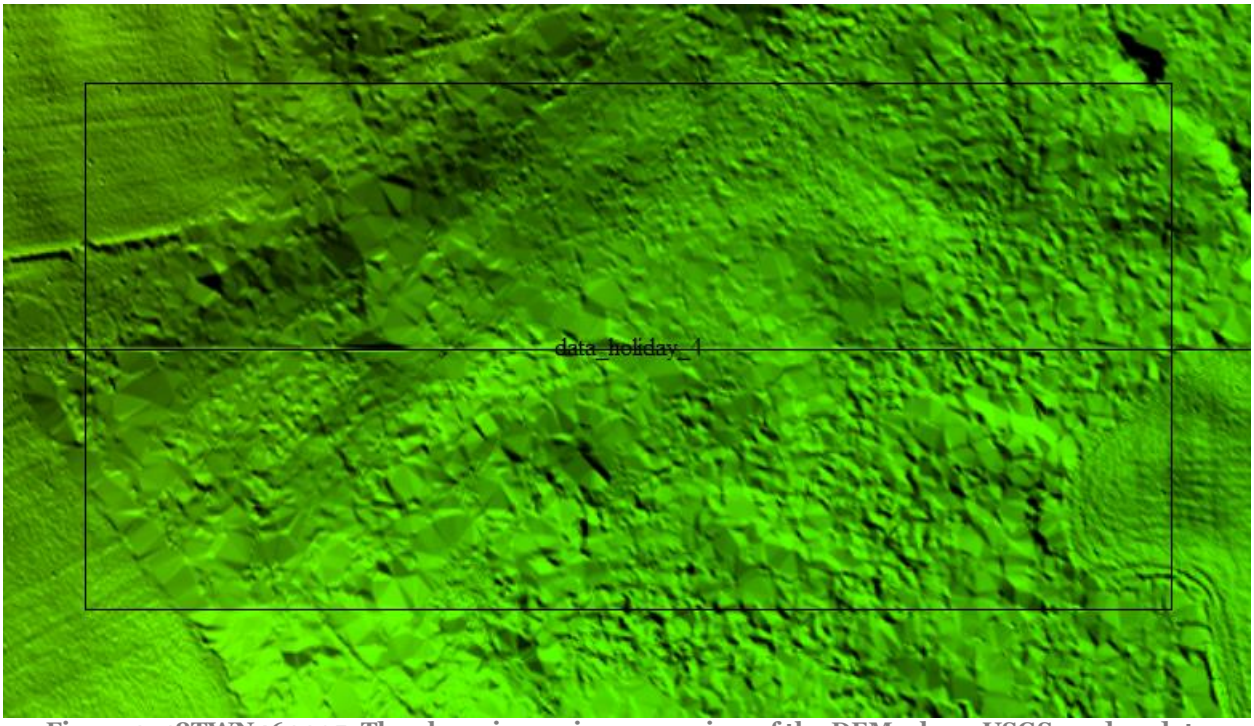

Figure 3- 18TWN460295. The above image is an overview of the DEM where USGS made a data holiday call. Dewberry has corrected the issue and no data holidays exist.

TILE EDGE MISMATCH

USGS made four calls on areas where the tile edge did not appear to be seamless. Dewberry reviewed these areas and removed the ground points that were causing the tile edge mismatch.

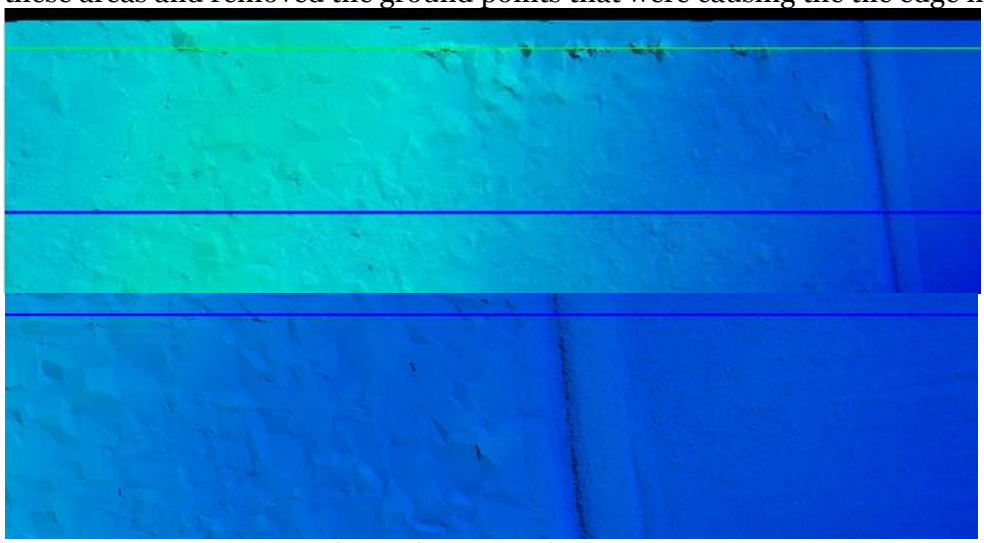

Figure 4 - 18TWN610295. The above image is an overview of the DEM where USGS made a tile edge mismatch call. The below image shows Dewberry removed the ground points that were causing the tile edge mismatch.

BREAKLINE ANALYSIS

USGS made one call to remove a small island breakline that did not contain any actual ground points. Dewberry has removed this breakline.

HYDRO-FLATTENING

USGS made two calls where water artifacts in streams needed to be hydroflattened. Dewberry has corrected both locations.

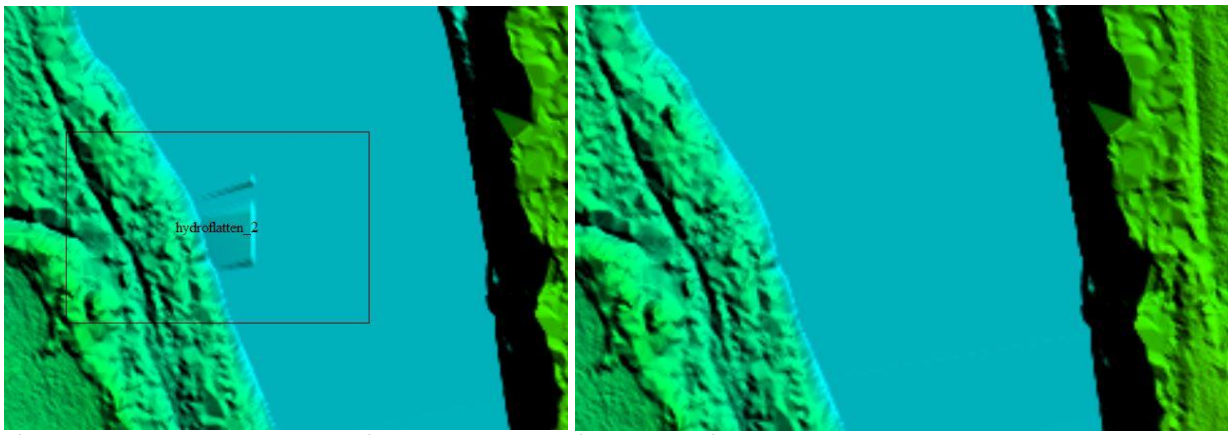

Figure 5- 18TWN580535. The image on the left is an overview of the DEM where USGS made a call to hydroflatten an area in the river. The image on the right shows an overview of the DEM after Dewberry hydroflattened the area in the river.

DEM REVIEW

USGS made one call to remove a manmade structure. Dewberry reviewed the area and determined that this is a permanent hydrographic flow structure and should not be removed. Dams and other permanent flow structures that affect the flow of the stream are always modeled in the bare earth DEMs.

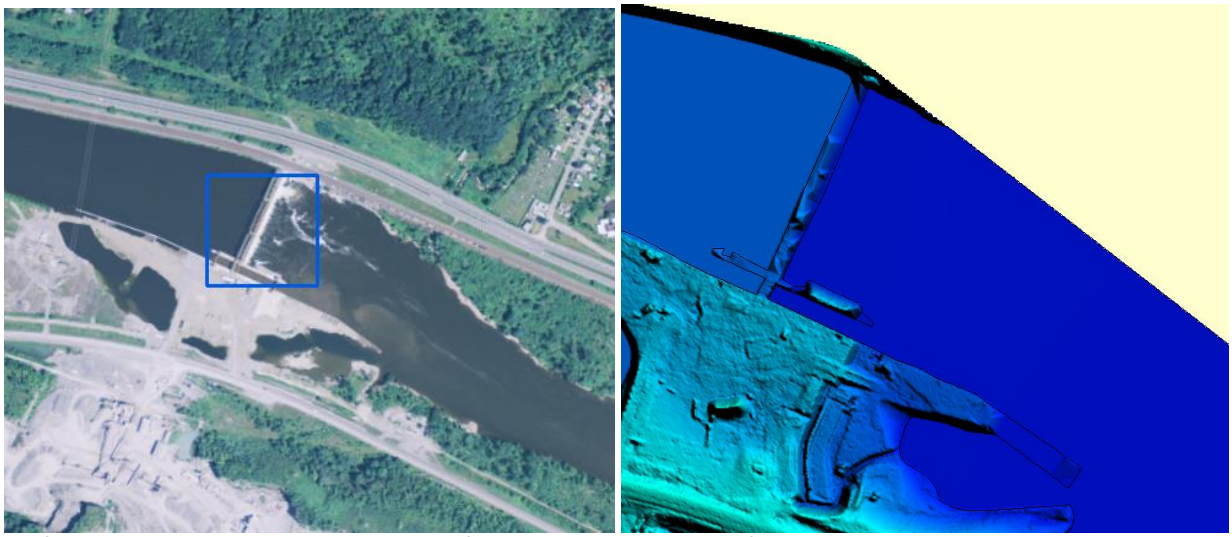

Figure 6- 18TWN580535. The color imagery on the left depicts a dam where USGS made a call to remove a structure. The image on the right shows the bare earth DEM. Dams and other permanent flow structures are always modeled in the bare earth DEMs.

Summary of Edit Calls

- There was one call to deliver intensity imagery.
  - Intensity imagery has been included in this delivery

- There was one call to redeliver LAS swaths, including cross flights

    - A complete redelivery of the swath data with cross flights has been included in this delivery
- There were three calls regarding the vertical accuracy results.
    - Dewberry has provided a description of the results for additional clarity.

- There was one call regarding LAS statistics and the classification schema
    - Points classified incorrectly have been reclassified

- There were fifteen calls of areas with excessive tinning
    - Nine of these calls have been corrected. The remaining six could not be modified to reduce the tinning.

- There were nine data holiday calls.
    - All of these issues have been corrected.

- There were four tile edge mismatch calls.
    - All of these issues have been corrected.

- There was one breakline call to remove an island.
    - The issue has been corrected.

- There were two breakline calls to hydroflatten areas in the river
    - The issues have been corrected.

- There was one call to remove a manmade structure
    - Dewberry determined that it should not be removed because it is a permanent hydrographic structure.

- Dewberry has updated the project report and metadata to reflect that the two tiles impacted by voids in the first delivery have been corrected.