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# Dewberry Response to USGS Review of the Texas Neches 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 Texas Neches Lidar Project Area.

The lidar data were processed to bare-earth digital terrain models (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 hydro-flattened digital elevation models, intensity images, breaklines, control points, metadata, project report, and project extent shapefiles.

The USGS' review of these deliverables resulted in three (3) metadata calls, two hundred thirty three (233) hydro calls, sixty four (64) DEM/Classified LAS Calls, and one (1) overlap call.

**PROJECT AREA**

Data was formatted according to tiles with each tile covering an area of 1500m by 1500m. A total of 16,796 tiles were produced for the project encompassing an area of approximately 14,237 sq. miles.

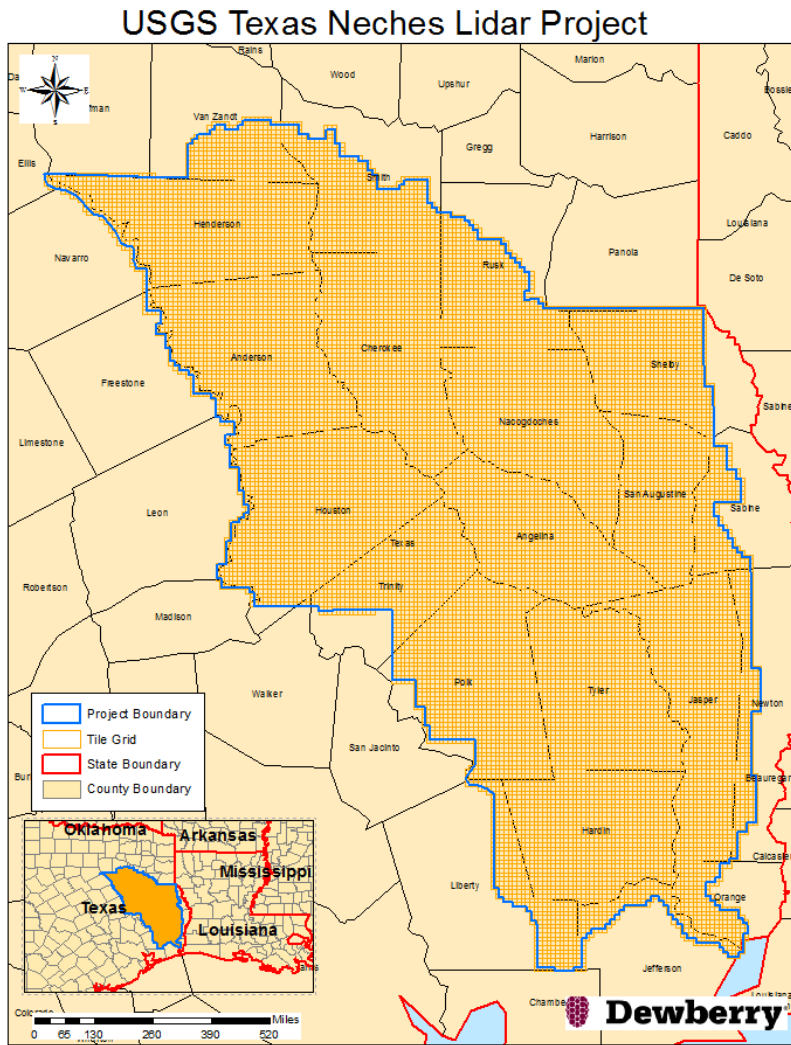


Figure 1- Project Map

## Edit Calls

### METADATA

USGS' Assessment report states that the vertical accuracy values are incorrect in the Project and Classified LAS xml files because they do not report the tested swath NVA. Dewberry tests the NVA/VVA of the tiled lidar data and typically reports this accuracy in the Project and Classified LAS xml files. Dewberry has adjusted the Project xml file to report the swath vertical accuracy per USGS' request. However, as Dewberry tests the NVA/VVA on the tiled, classified lidar data, these values are still reported in the Classified LAS xml as they are more pertinent to this metadata file. Testing the tiled, classified lidar data allows Dewberry to verify the VVA is passing prior to DEM production and allows Dewberry to further analyze the NVA, especially if points were removed from the swath NVA testing due to the point cloud being unfiltered. If users will be using the classified LAS tiles for any analysis or creation of their own derivative products, the classified LAS NVA/VVA will be the most pertinent vertical accuracy value for those analyses and derived products.

USGS' Assessment report also states that the Texas Neches metadata xml files were missing Distribution Information. The Distribution Information section was removed from the lidar templates files provided to us by USGS in September of 2016. Texas Neches was delivered prior to Dewberry receiving the new templates on January 26, 2018 which included the Distribution Information. The new templates state that the Distribution Information should only be populated if any other entity other than the USGS holds distribution rights of the data. Since USGS holds all distribution rights and an empty section will cause MP errors, Dewberry did not include the Distribution Information in the Texas Neches metadata xml files.

USGS also reported duplicate ldrinfo tags for the Neches metadata. Multiple acquisition sensors used for the Texas Neches Lidar project were the cause of the duplicate ldrinfo tags. In the new templates received on January 26, 2018 USGS clarified how they would like multiple acquisition sensors listed in the metadata, with a full lidar information section (ldrinfo) completed for each sensor/acquisition rather than duplicating the individual ldrinfo tags within one lidar information section. Dewberry revised the metadata xml files according to the new metadata templates. Dewberry ran the MetaParser tool and received one error due to having two sets of ldrinfo tags but that is necessary for the multiple acquisition sensors and follows the new USGS metadata templates.

### HYDRO CALLS

USGS placed two hundred thirty three (233) hydro calls to hydro-flatten features meeting minimum collection requirements. Two hundred twenty two (222) of the calls were corrected. Upon review, Dewberry determined that eleven (11) features requested to be hydro-flattened were not waterbodies by definition or should not be collected for consistency proposes. Examples are shown below.

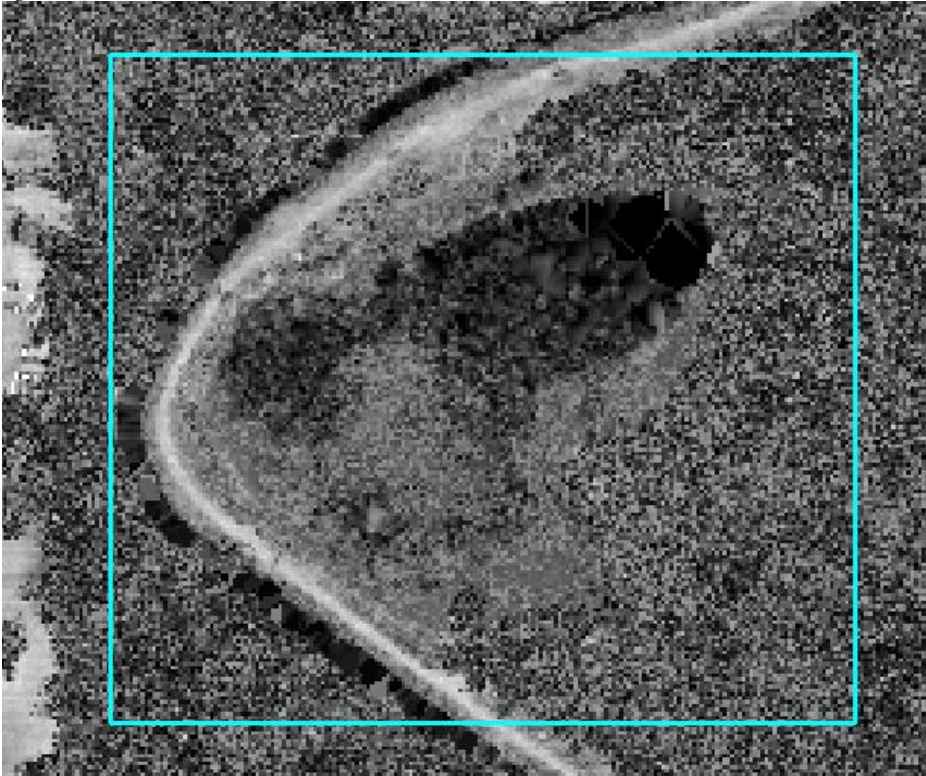


Figure 2 - Tile 15RVP4023345-- This waterbody does not meet -collection requirements as a portion of the feature is dry at the time of acquisition and the “wet” portion is less than 2 acres in size. This waterbody was not collected for consistency purposes.

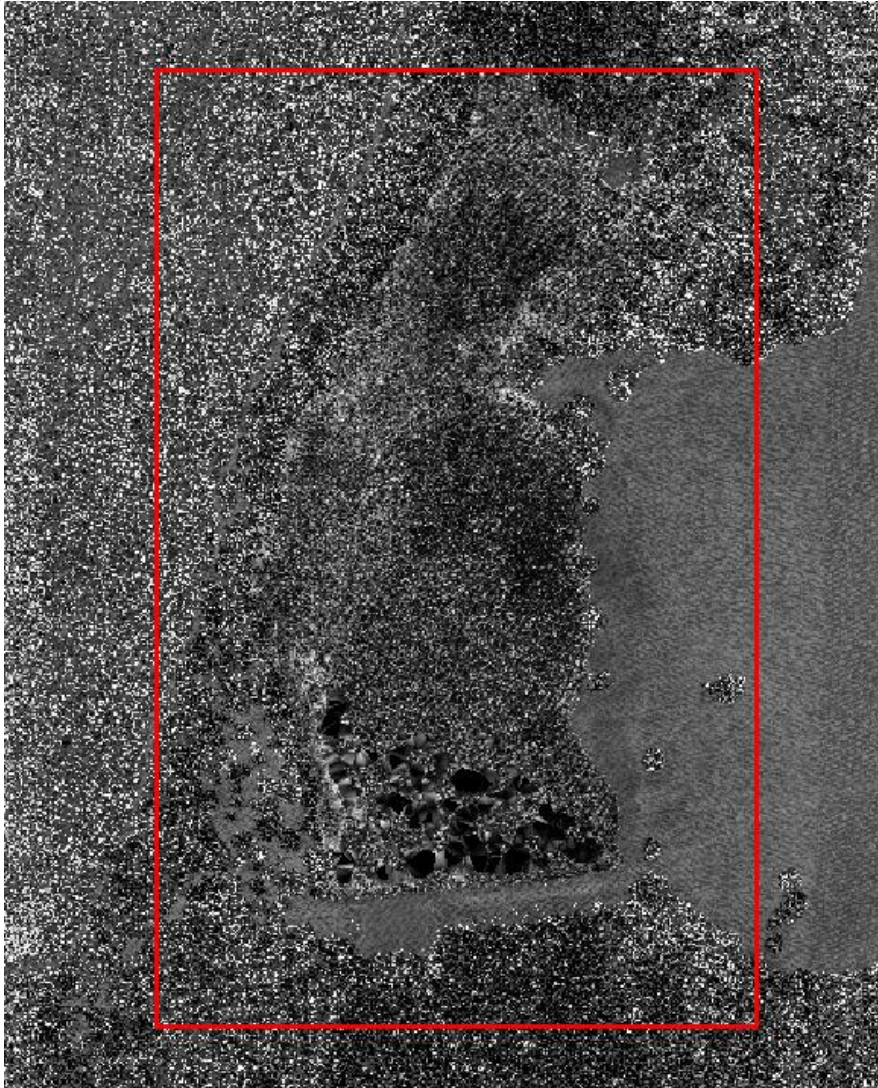


Figure 3 - Tile 15RUP3603990-- This waterbody does not meet collection requirements as it is mostly dry at the time of acquisition. This waterbody was not collected for consistency purposes

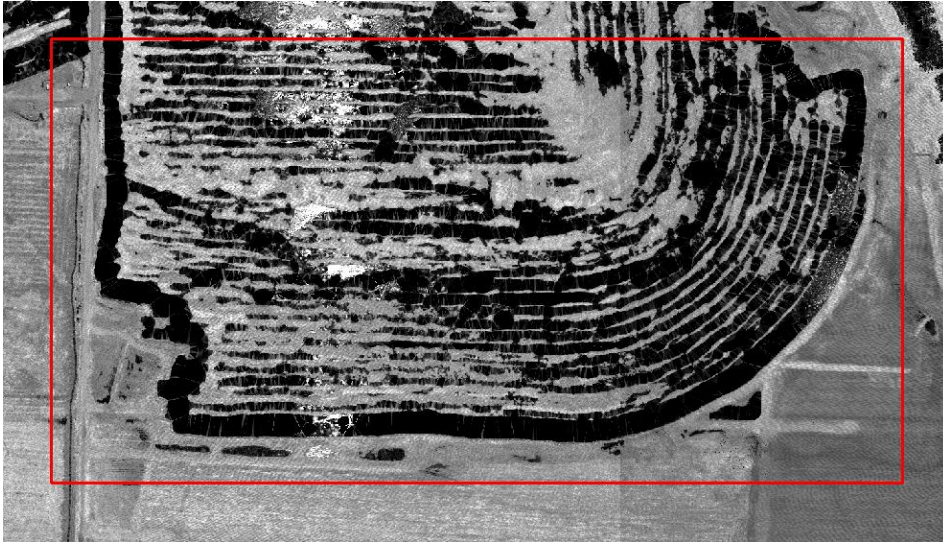


Figure 4 - 14SQA1785850 and 14SQA1775850—This feature is not a waterbody but a flooded field.  
This feature was not collected for consistency purposes.



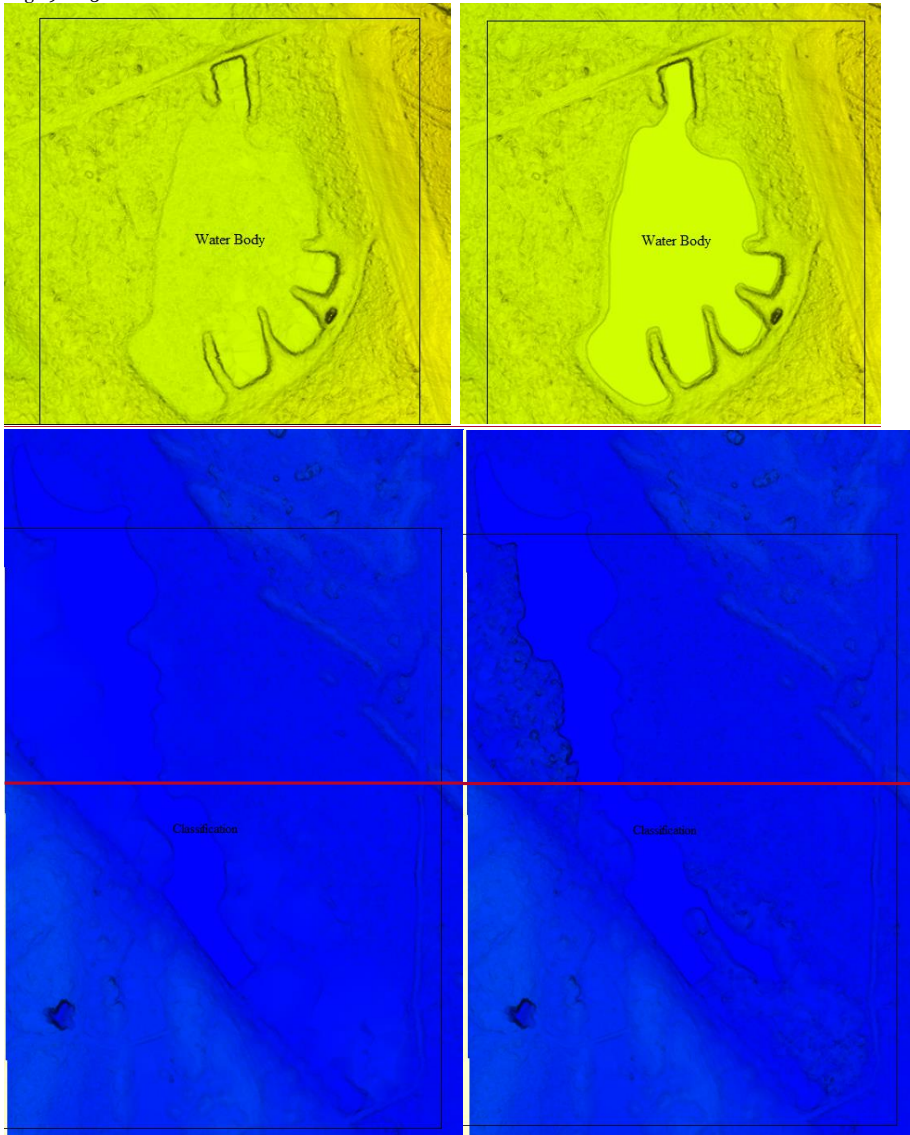
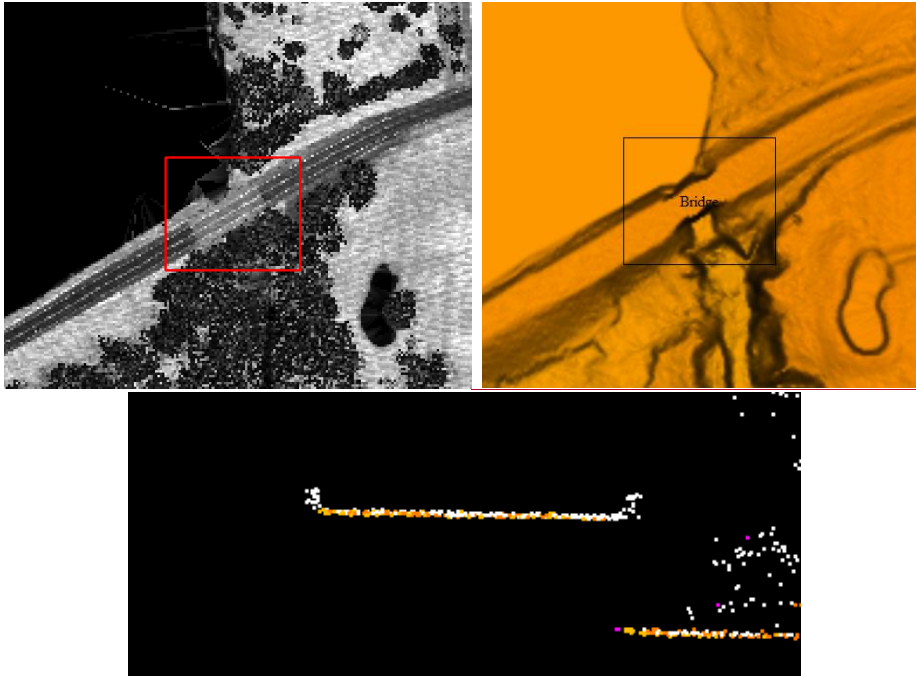


Figure 6 | ~~15RTR2385220xxx~~ Most hydro calls identifying features for hydro-flattening have been corrected. This feature is greater than 2 acres in size-breaklines have been updated, LAS hydro-classified, and the DEM hydro-flattened.

**Commented [NJ1]:** Add an example of an edit call we did fix. Show original on left and corrected DEM on right.

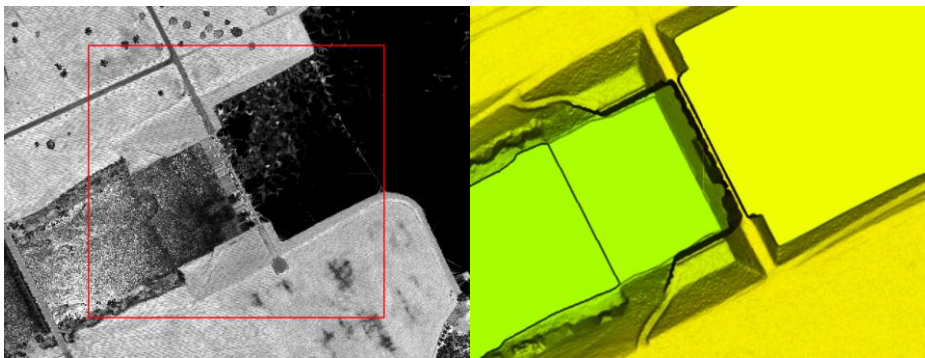
**DEM/CLASSIFIED LAS CALLS**

USGS made sixty-four (64) DEM/Classified LAS calls. Sixty-one (61) of the calls were corrected. One (1) call was to remove a bridge which was actually a box culvert and should remain in ground. Two (2) calls were to remove dams. The dam structures have been left classified in the ground class since they are acting as impoundments. Examples are shown below.



**Figure 6 - 15STR2375685—Box culvert should remain in ground class. The left image shows the box culvert in the intensity imagery. The right image shows the box culvert remaining in the bare earth DEM. The bottom image is a profile of the box culvert. Ground=orange, white=unclassified, pink=low point)**

**Commented [NJ2]:** Either show the intensity side by side with the DEM or side by side with a lidar profile to show the culvert remains classified as ground.



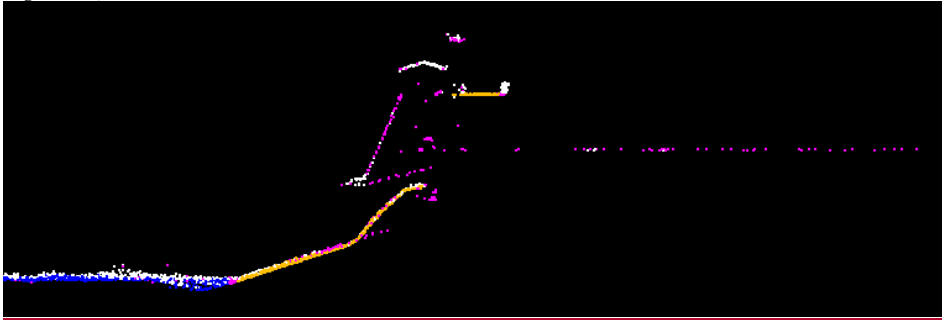


Figure 7 - 14SQA2045700 and 14SQA2025700—Dam is acting as an impoundment and should remain in ground. **The left image shows the dam in the intensity imagery. The right image shows the dam remaining in the bare earth DEM. The bottom image is a profile of the dam acting as in impoundment. Ground=orange, white=unclassified, pink=low point)**

**Commented [NJ3]:** Show the DEM and a lidar profile here as well to fully represent the dam and show how it's being modeled. This will also show the water at two very different levels and how the dam is an impoundment.

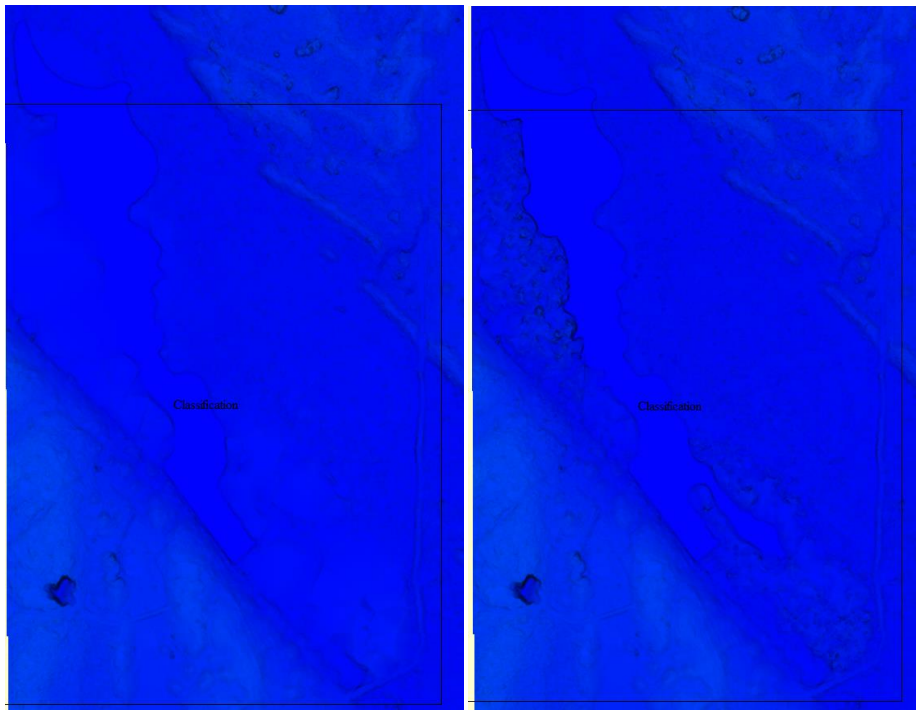


Figure 8 - 15RUP3313450 and 15RUP3303450xxx—Most of the DEM/Classified LAS calls have been corrected. In this example, **USGS made a classification call for tinning around a waterbody. Dewberry added ground points around the waterbody and adjusted the breaklines to get a more accurate representation of the bare earth surface.**

**Commented [NJ4]:** Add an example of an edit call we did fix. Show original on left and corrected DEM on right.

**OVERLAP CALLS**

USGS made a general call about overlap points appearing to be incorrectly set. Dewberry has corrected this issue.

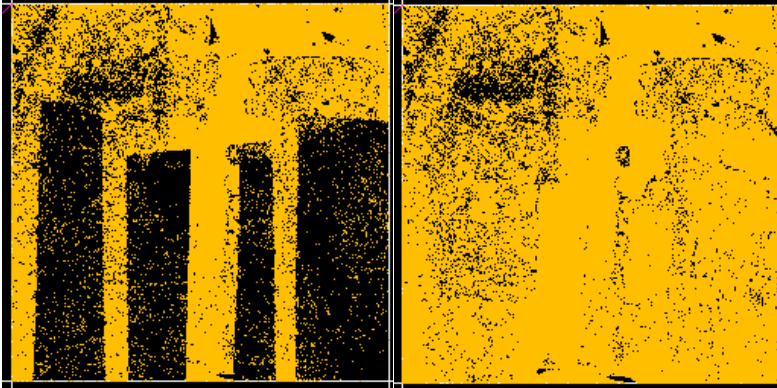


Figure 9-Image on left shows overlap points incorrectly set, which is causing voids in the ground classification when overlap points are turned off. Image on the right shows overlap points are correctly set and there are no longer ground voids when overlap points are turned off.

## Summary of Edit Calls

- There were three metadata calls
  - Project XML vertical accuracy values have been updated
  - Multiple sensor acquisition parameters have been updated
  - Distribution Information was not included in the metadata XML files
- Two hundred twenty two calls out of two hundred thirty three hydro calls have been corrected
- Sixty-one calls out of sixty four DEM/Classified LAS calls have been corrected
- Overlap inconsistency call has been corrected