

# Elevation QA Report

**Project:** Washtenaw Co. MI-GPSC re-delivery

**Contractor:** Woolpert

**Data Delivery Date:** 7/22/2010

**Date Data Reviewed:** 1/4/2011

**Reviewer:** Sheila Ruhl

**Total Square Miles Reviewed:** 727.97

**Elevation Type:** LIDAR **Format:** Arcgrid **Grid Spacing:** 2 Int. ft

**Tile size:** 2500x2500

**Projection:** SPCS **Zone:** MI 2113 South

**Datum:** NAD83 **Units:** Meters

**Licensing:** Public Domain

**Metadata:** Project Level

## Materials Received:

Arc Grids  
.las  
Metadata

**Vertical Accuracy Test Performed:** Yes **Test Point Source:** Contractor

**RMSE:** .29 ft

## Vertical Accuracy Test Notes:

Reported vertical accuracy is .29 ft (8.8cm) RMSE. There is no reason to dispute the claimed accuracy.

## QC Review Summary:

REVIEW PROCESS USED and AREA EXTENT are ATTACHED.

### RESULTS OF REVIEW ARE:

Hydro-flattened Arc Grids were reviewed in Global Mapper.

No significant errors were found.

All materials received, a footprint shapefile, the area extent, and ERDAS Imagine images in the native projection and resolution are included in the shipment to EROS.

LiDAR Quality Control (QC) Review ProcessPreparation:

- Metadata reviewed to determine data projection, datum, format, etc.
- If ARRA contract, check for raw .LAS files, classified .LAS files, breaklines, blind control points, and DEM in Image or Grid format
- Open data in Global Mapper

Vertical accuracy testing:

- If ARRA contract, use Vertical Accuracy Test Worksheet to perform RMSE on 20 blind point positions provided by contractor

Inspection and Correction of data:

- Minimum and maximum elevations in dataset; correct if in error
- Appropriate hydro flattening as specified in V12 Lidar Specification (For ARRA/GPSC Data)
- Data void areas
- Data spikes
- Tile edge seam lines
- Non-bare earth surface artifacts (structures, bridges, vegetation, etc.)
- Elevation errors - raised/lowered areas/tiles
- Other surface treatment anomalies
- Check DRGs for correct elevations and horizontal positioning (if test points not available)
- Create footprint (project boundary) shape file and establish square miles

*During Inspection, identify data errors and create "error" file folder:*

- Capture geo-referenced JPG or TIFF image(s) of identified errors
- Copy to Error file

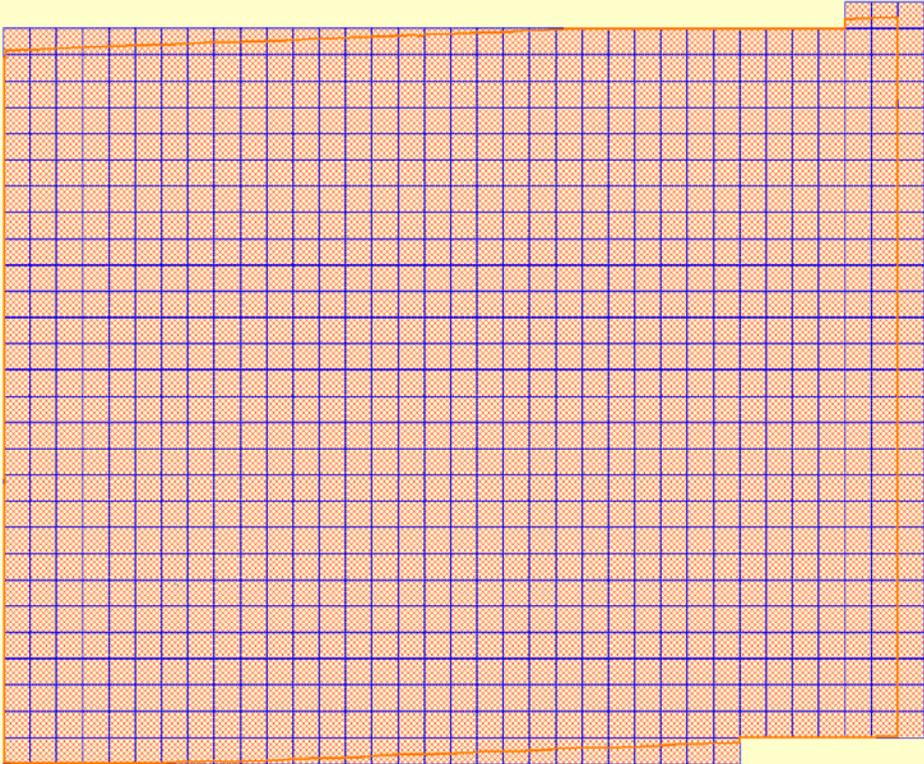
*During Inspection, level elevations and remove artifacts (these two steps not done for ARRA data):*

- Level smoothing to remove non-bare earth surface artifacts (structures, bridges, vegetation, etc.)
- Level data spikes where possible

Export image files and create project Elevation QC Review Report:

- Export ERDAS Imagine image files in native projection and resolution
- If ARRA, Copy Vertical Accuracy Test Worksheet into QC Report
- Place QC Review Process and Project Area Extent into QC Report
- If rejected, attach sample geo-referenced JPG or TIFF error images with an explanation of reason
- If rejected, restart QC process when replacement data is received
- Provide completed Elevation QC Review Report to Elevation Supervisor for final viewing
- Add QC Report, footprint, Imagine image(s), and Error file to original data file for final shipment to EROS

Washtenaw Co. area extent



# Elevation QC Review Report

**Project:** Wayne Co. MI - GPSC      **Contractor:** Woolpert

**Data Delivery Date:** 5/28/2010      **Date Data Reviewed:** 6/9/2010

**Reviewer:** Sheila Ruhl      **Total Square Miles Reviewed:** 769.26

**Elevation Type:** LIDAR    **Format:** Arcgrid    **Grid Spacing:** 2 Int. ft    **Tile size:** 2500x2500

**Projection:** SPCS    **Zone:** MI 2113 South    **Datum:** NAD83    **Units:** Meters

**Licensing:** Public Domain      **Metadata:** Project Level

## Materials Received:

Arc Grids  
.las  
Metadata

**Vertical Accuracy Test Performed:** Yes    **Test Point Source:** Contractor    **RMSE:** .29 ft

## Vertical Accuracy Test Notes:

Reported vertical accuracy is .29 ft (8.8cm) RMSE. There is no reason to dispute the claimed accuracy.

## QC Review Summary:

Non hydro-flattened Arc Grids were reviewed in Global Mapper.

Wayne Co. does not require hydro-flattening. See the Teleconference Notes attached. Five areas of missing data were found. See all examples on following pages.

A footprint shapefile was created as well as a 1/9th arc-second ERDAS image.

All materials received, the footprint shapefile, and 1/9th arc-second ERDAS data are included in the shipment to EROS.

Teleconference Notes with Woolpert – Wayne/Washtenaw Quality Review telecom

September 30, 2009

Participants;

USGS – Robert Kelly, Tim Saultz

USGS Observers – John Murphey, Pat Emmett, Gail Dunn

Woolpert – Bob Brinkman, John Gerhard, Deanna Burton

This call was requested by Woolpert to discuss the review/rejection of the Wayne/Washtenaw Lidar Task order data delivery.

John said that the issue in the review report regarding the bridges was an unfortunate oversight in their process and that they would add breaklines at the edges of the bridges in both the Wayne and Washtenaw county data sets. This would prevent the tinning of the dataset data across the bridge spans.

The issue of the water bodies with surfaces appearing above the surrounding areas is due to the process of creating the TIN surfaces. There are no data point in the water bodies, but because of the rendering of the TIN, the surface of the water appears above the surrounding areas due to the points that are selected in the tinning process.

Woolpert said that they are in negotiations with Washtenaw County to generate breaklines and that if we would wait until that was negotiated and data collected, they would use the breaklines to flatten the water bodies in the lidar data generated under this task order.

Since there was no requirement in the task order for breaklines or for flattening water bodies, nothing would be done with the Wayne county data.

The resolution to the issue was agreeable to the USGS.

Woolpert, in their continuing discussion with Wayne and Washtenaw Counties would advise them of the handling of this data and seek their concurrence to the resolution.

**Conclusion:**

Since this data will meet the specifications of the task order, once the corrections to the bridges are applied, the data will be returned for review. Although not specifically required by our task order, Woolpert will apply the hydro breaklines that will be generated by separate contract **directly with Washtenaw County** which states *"Features that are represented by Hydro Breaklines include: closed water bodies (lakes and ponds) over 1 acre in size and rivers, streams, creeks over 20-feet wide. No single line streams will be compiled."*

The data will not be rejected due to the water bodies in the Wayne portion of the data.

*Preparation:*

- Metadata reviewed to determine data projection, datum, format, etc.
- If ARRA contract, check for raw .LAS files, classified .LAS files, breaklines, blind control points, and other V12 Lidar Specification requirements
- Open data in Global Mapper
- Create footprint (project boundary) shape file and establish square miles

*Inspection of data for:*

- Appropriate hydro flattening as specified in V12 Lidar Specification (For ARRA/GPSC Data)
- Data void areas
- Data spikes
- Tile edge seam lines
- Non-bare earth surface artifacts (structures, bridges, vegetation, etc.)
- Elevation errors - raised/lowered areas/tiles
- Other surface treatment anomalies
- Check DRGs for correct elevations and horizontal positioning (if test points not available)

*Identify data errors/create "error" file folder:*

- Capture geo-referenced JPG or TIFF image(s) of identified errors
- Copy to Error file

*Elevation leveling/artifact removal (these two steps not done for ARRA data):*

- Level smoothing to remove non-bare earth surface artifacts (structures, bridges, vegetation, etc.)
- Level data spikes wherever possible

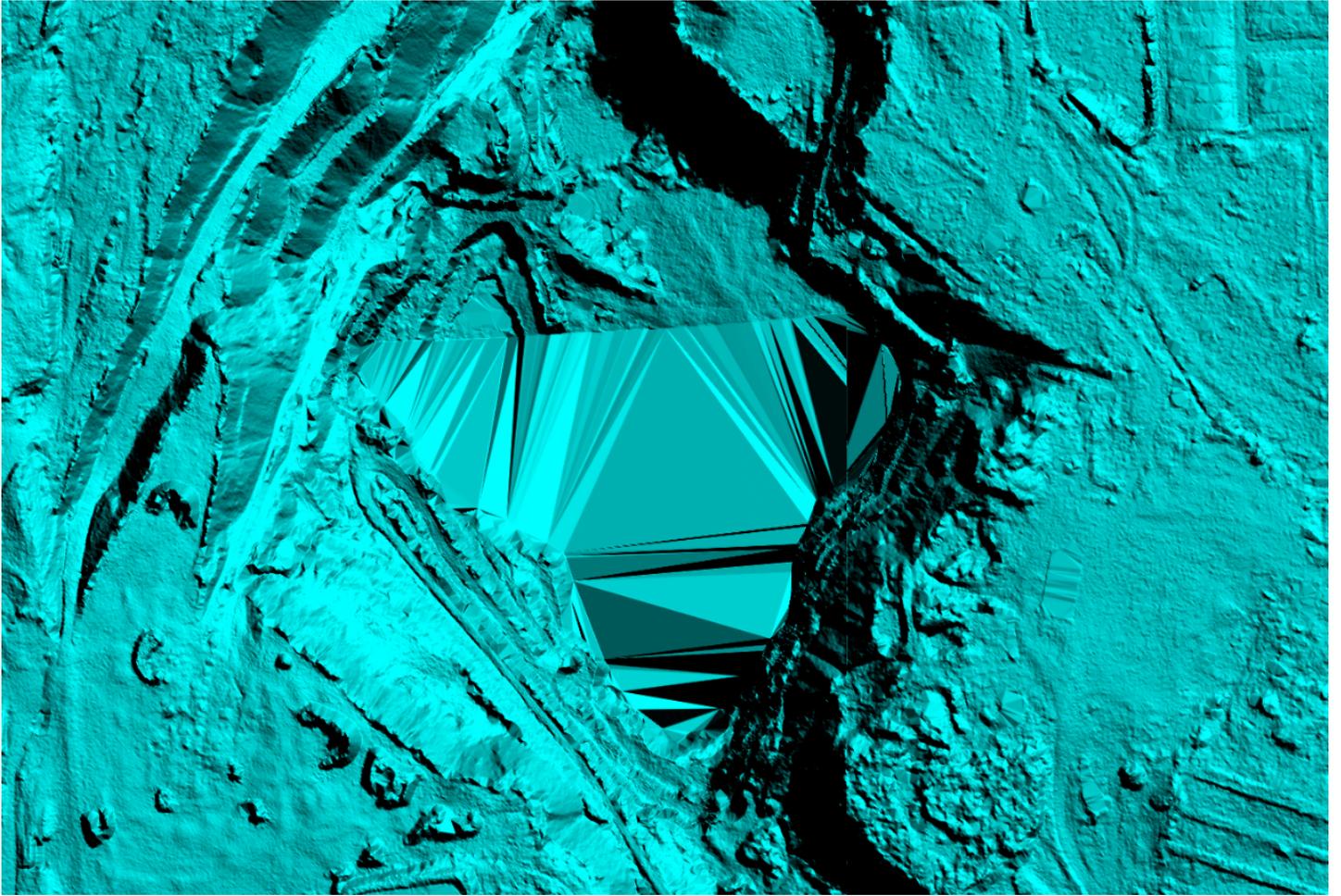
*Vertical accuracy testing:*

- If ARRA contract, use Vertical Accuracy Test Worksheet to perform RMSE on 20 blind point positions provided by contractor

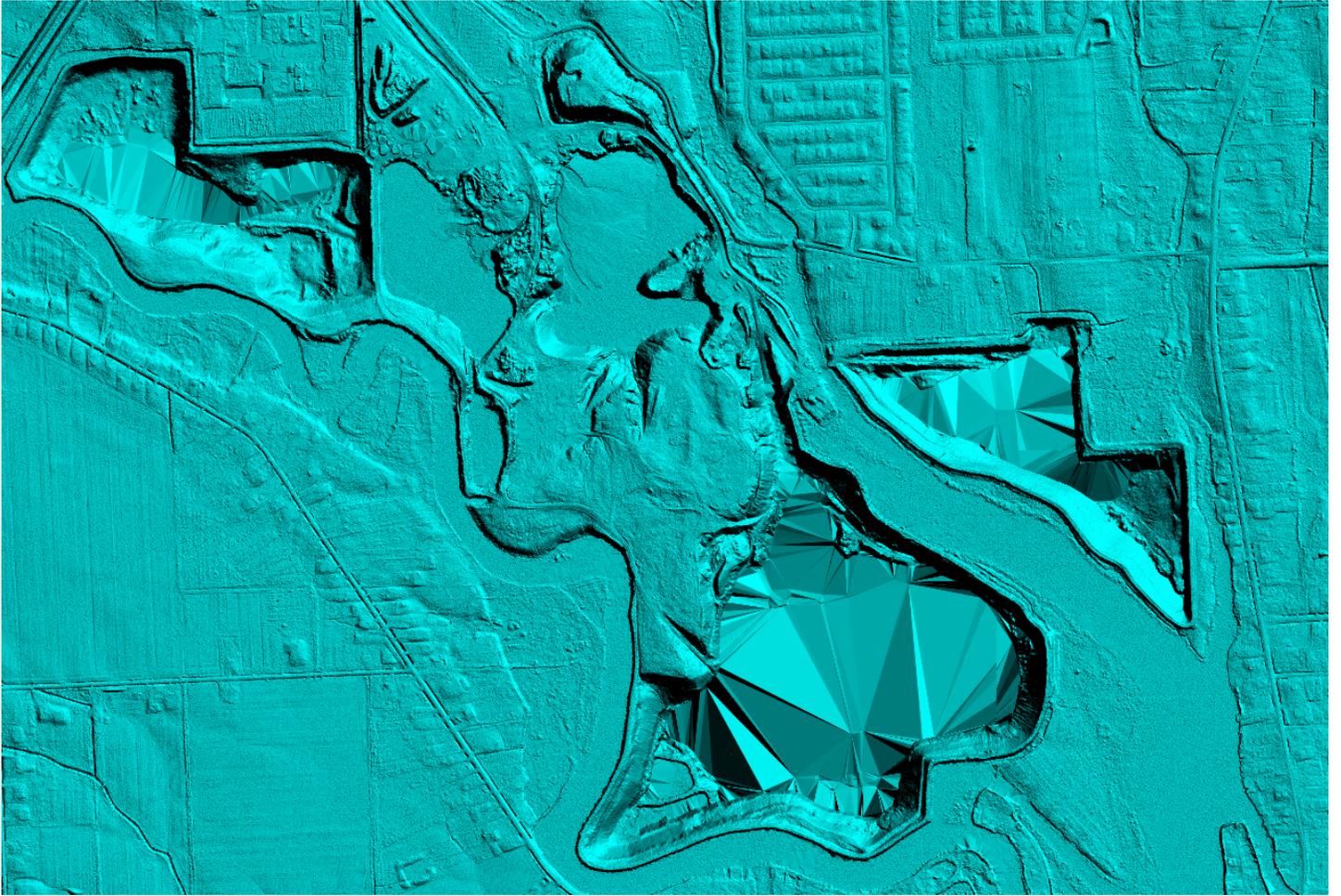
*Export image files and create project Elevation QC Review Report:*

- Export 1/9th arc-second ERDAS Imagine image files
- Obtain copy of MS Word format Elevation QC Review Report
- Select proper metadata pull-down box items and fill in descriptive text boxes
- Copy Vertical Accuracy Test Worksheet into QC Report
- Place Review Process information into QC Report
- If rejected, attach sample geo-referenced JPG or TIFF error images with an explanation of reason
- If rejected, restart QC process when replacement data is received
- Provide completed Elevation QC Review Report to Elevation Supervisor for final viewing
- Add QC Report, footprint, Imagine image(s), and Error file to original data file for final shipment

Example # 1



Example # 2-4



Example # 5

