Quality Report

2024

Waggoner Engineering

Project Title: North South Mississippi 1- & 2-Foot Contour Development – East Central MS

Prepared By: Waggoner Engineering, Inc.

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1. Introduction

This report provides a comprehensive overview of the data quality checks and validation procedures performed for the South Mississippi contour development project using E Central MS LiDAR data. The purpose is to ensure the integrity, accuracy, and consistency of the processed data used for generating 1ft and 2ft contours.

2. Data Sources

- **Primary Source:** Mississippi LiDAR sets from MARIS (Mississippi Automated Resource Information System).
- **Contributing Organizations:** Mississippi Geographic Information LLC, United States Geological Survey (USGS), Natural Resources Conservation Service (NRCS), Mississippi Department Environmental Quality, NOAA Coastal Services Center, Mississippi DOT, Mississippi State University, and Mississippi Coordinating Council for Remote Sensing and GIS.
- **Resolution:** 1 to 4-foot resolution LiDAR DEM Raster data acquired from 2015 - 2020.

3. Data Processing Overview

- **Initial Data Gathering:** Collection of municipal boundaries and DEMs.
- **Feature Classes Created:**
    - County Boundary
    - Mississippi DEM Coverage
    - Contours (1ft and 2ft intervals)
    - 2D and 3D Contours
- **DEM Merging:** Overlapping DEM image tiles were merged using a 10,000 ft buffer of county boundaries.
- **Tools Used**
    - ArcGIS Pro for DEM processing and contour generation.
    - ArcPy Scripts for automated QA checks.
    - Google Earth Pro for cross-referencing elevation points.

4. Contour Generation Process

- **Contour Creation Parameters:**
  - 1ft and 2ft intervals contour generated using a 5000 ft buffer of county boundaries.
- **Line Smoothing:**
  - Smoothing tolerance set at 50ft for 1ft and 2ft contour lines.
- **Removal of Small or Slivers:**
  - Removed the lines less than 50ft of shape length.
- **PLSS Feature Clipping:**
  - Contours clipped using PLSS based boundaries.

5. Quality Assurance Checks

5.1 DEM Quality Checks

Pre-Merge QA Checks:

- **Image Validation:** Raster Image pixel type (32-bit float).
- **Visual Inspection:** Checked for seams, anomalies, and alignment across DEM tiles.
- **Elevation Validation:** Cross-referenced extracted elevation points with Google Earth and other known data sources.
- **Projection and Metadata Verification:** Ensured DEMs were projected in NAD 83 State Plane MS East FIPS 1301 Feet or NAD_1983_StatePlane_Mississippi_West_FIPS_2302_Feet

Post-Merge QA Checks:

- **Elevation Validation:**
  - Random points were generated within county boundaries to extract and cross-validate elevation values.
  - Comparison with reference sources, including Google Earth, was performed for accuracy verification.
- **Elevation Validation Result:**
  - The average elevation difference was within an acceptable margin of ±3ft.
- **Visual Inspection:**
  - Checks for seams mosaic of raster between tiles and any anomalies or inconsistencies in the merged DEMs.
- **Projection Verification Result:**
  - All DEMs were correctly projected was complete.

6. Contour Quality Checks

- **Visual Checks:**
  - Inspection for jagged lines, small loops between DEM Rasters.
- **Edge-matching checks**
  - Edge Match check between neighbor sets of contours, no visible mismatches were observed.
- **Elevation Checks:**
  - Contour elevations were consistent with DEM data.
- **2D to 3D Conversion Result:**
  - Confirmed 3D contours maintained correct elevation attribute,
- **Attribute Checks:**
  - **Field Completeness:** Verified that all required attributes were present in the feature classes, including contour elevation values, source DEM identifiers, and processing timestamps.
  - **Attribute Consistency:** Ensured that attribute values were logically consistent across the dataset, with no null or erroneous entries detected.
- **Accuracy of Metadata:**
  - Confirmed that metadata included complete information on the data source, projection, and processing methods.
- **PLSS Clip:**
  - County contours are clipped into PLSS

7. Quality Metrics

- **Completeness**: Assessed by verifying merged DEMs for gaps.
- **Elevation Accuracy:** Evaluated through random point extraction and cross-comparison.
- **Data Integrity:** Checked using feature class rules (e.g., no gaps, no overlaps).
- **Visual Coherence**: Conducted through manual inspection of seam lines and contour accuracy.

8. Recommendations

To maintain data integrity:

- Ensure consistent updates of metadata for future contour revisions.
- Regular cross-referencing with additional elevation sources is advised.

9. Conclusion

This quality report confirms that the data processed for the South Mississippi contour development project meets the required accuracy and validation standards. All deliverables have undergone thorough checks and have been approved for submission.

		DEM Checks		Contours Check					
No	**COUNTY**	**Visual Inspection**	**Projection**	**Elevation Points**	**Edge Matching**	**2D to 3D Conversion Checks**	**Attribute Checks**	**Metadata**	**PLSS Clip**
1	Carroll	✓	✓	✓	✓	✓	✓	✓	✓
2	Montgomery	✓	✓	✓	✓	✓	✓	✓	✓
3	Webster	✓	✓	✓	✓	✓	✓	✓	✓
4	Choctaw	✓	✓	✓	✓	✓	✓	✓	✓
5	Winston	✓	✓	✓	✓	✓	✓	✓	✓
6	Neshoba	✓	✓	✓	✓	✓	✓	✓	✓
7	Kemper	✓	✓	✓	✓	✓	✓	✓	✓
8	Newton	✓	✓	✓	✓	✓	✓	✓	✓
9	Lauderdale	✓	✓	✓	✓	✓	✓	✓	✓
10	Holmes	✓	✓	✓	✓	✓	✓	✓	✓
11	Leake	✓	✓	✓	✓	✓	✓	✓	✓
12	Scott	✓	✓	✓	✓	✓	✓	✓	✓
13	Smith	✓	✓	✓	✓	✓	✓	✓	✓
14	Jasper	✓	✓	✓	✓	✓	✓	✓	✓
15	Clarke	✓	✓	✓	✓	✓	✓	✓	✓
16	Attala	✓	✓	✓	✓	✓	✓	✓	✓