

Layer Development Overview

Objective

The goal of this project was a single, seamless layer of relatively recent, cartographic-quality digital elevation contours for the 16-county NCTCOG Region.¹ Requisite data for the entire region for a recent, single period are not available. For some portions of the region, data are not even available for any recent year. Therefore, the final layer is a compilation of data from various sources for various years covering as much of the region as possible. See Appendix A for a map of areas covered by the various sources.

Process Summary

Essentially, the objective was accomplished by processing data from the various sources resulting in multiple layers of digital elevation models (DEM). These layered DEMs were used to generate the contours using specialty tools and software. Some of the data were already in the desired DEM format. Other data arrived in the form of LiDAR point cloud data (LAS files) and had to be transformed to DEMs. The LAS datasets were rasterized to build the required hydro-flattened DEMs. This process was applied to each individual dataset for each year. Additionally, the DEMs were mosaicked by source and year to build a seamless layer. The mosaicked raw DEM layer was smoothed using adaptive smoothing to generate contours. Finally, smoothing was also applied to the contours to get the desired 2 ft cartographic contours.

The brevity of this summary is by no means meant to diminish the level of complexity of this project. Indeed, this project was a major undertaking requiring much patience and significant resources.² There were numerous individual steps that contributed to the overall process summarized earlier. In addition, there were many efforts taken to

¹ The NCTCOG Region comprises Collin, Dallas, Denton, Ellis, Erath, Hood, Hunt, Johnson, Kaufman, Navarro, Palo Pinto, Parker, Rockwall, Somervell, Tarrant, and Wise counties.

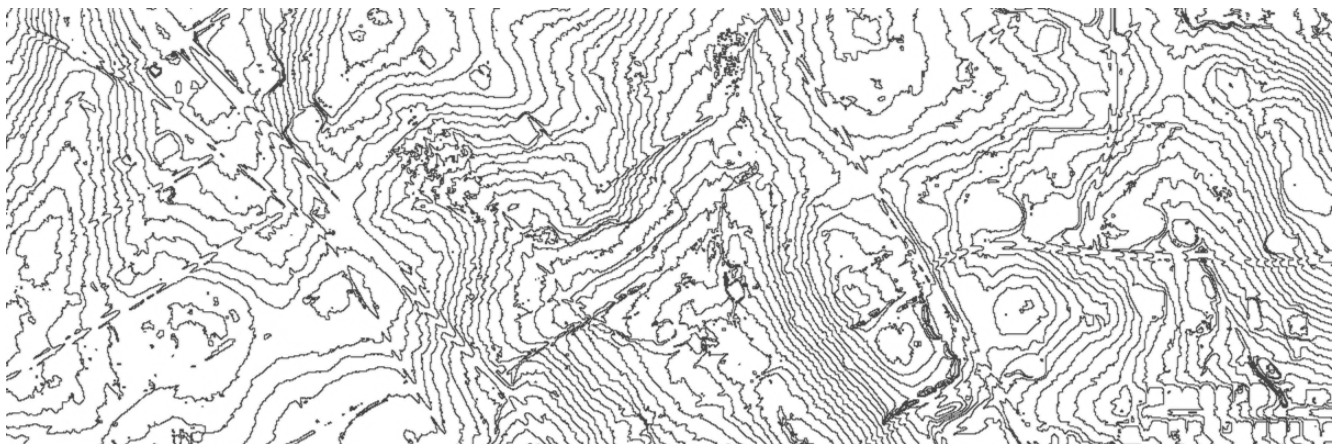
² See Appendix B for listings of the primary hardware and software used on this project.



ensure the quality and comparability of the data, including both automatic and manual processes. Processes had to be run multiple times on the various datasets and, in many cases, the final processes selected and used were the result of evaluation of several different approaches. There were even multiple processes running on multiple machines simultaneously. Some of this was for testing; some was due to the size of the datasets. The resulting product is cartographic 2-foot contours for the most recent year for which usable data was available.

Disclaimer

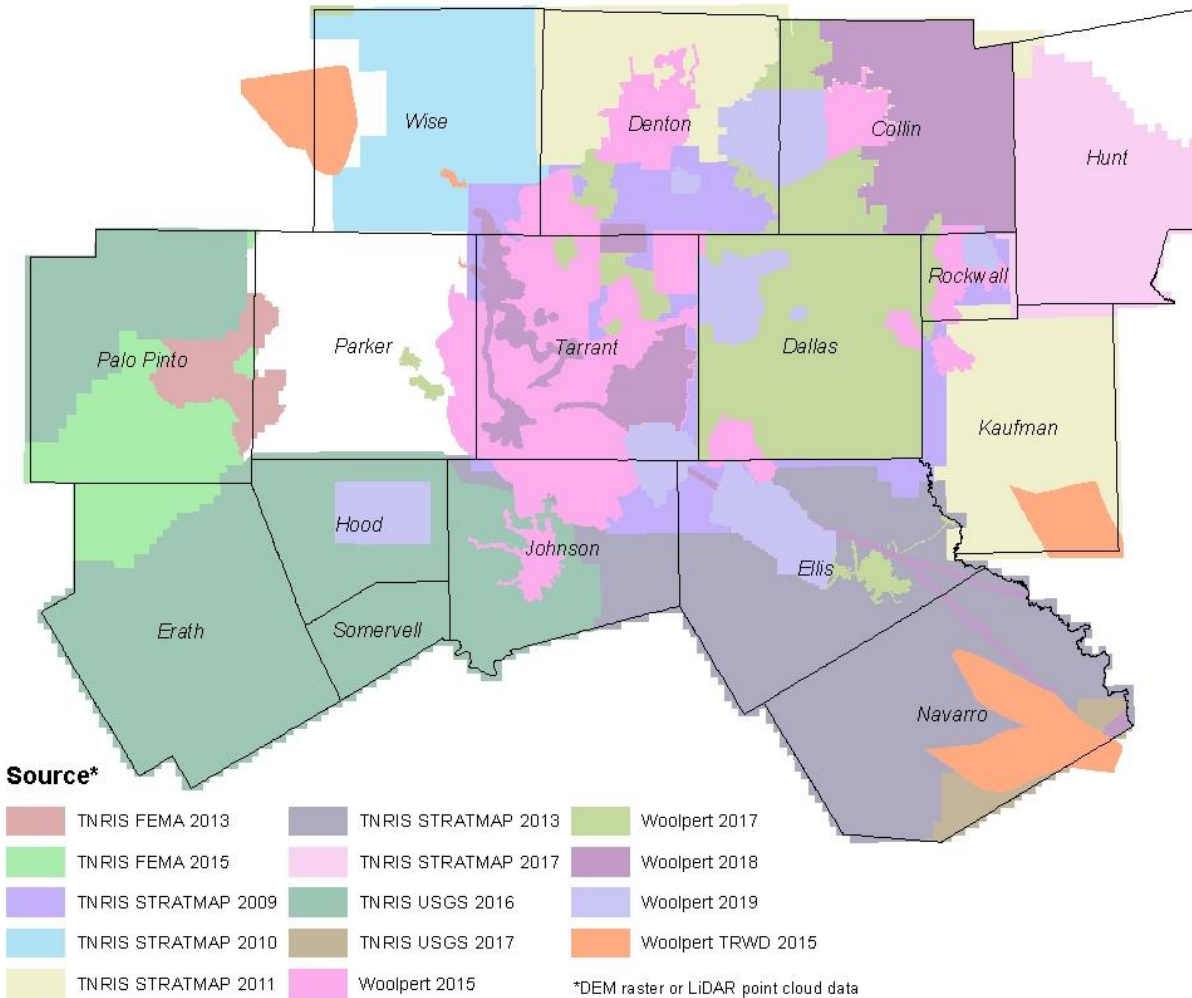
The NCTCOG Digital Elevation Contours were developed using best practices as identified through diligent research and in consultation with industry experts. Every effort was made to generate as good a product as possible and practical given data and resource constraints. The end result is a value-add product with limitations including varying levels of precision. The resulting contours are likely to differ from those produced by other organizations or through other processes. The layer was derived from sources considered reliable. However, no particular level of accuracy in either the source data or in the final product is guaranteed. The data are provided “as is”. The North Central Texas Council of Governments makes no warranty, express or implied, including warranties of merchantability and fitness for a particular purpose. Responsibility for the use of these data lies solely with the user.



NCTCOG 2' Cartographic Digital Elevation Contours Example



Appendix A: Map of Data Sources



TNRIS – Texas Natural Resources Information System. Data from TNRIS were LiDAR point cloud data.

Woolpert - architecture, engineering, geospatial and strategic consulting firm. Data from Woolpert were in the form of digital elevation models (DEM) that were acquired through the NCTCOG Spatial Data Cooperative Program.³

³ Visit the Spatial Data Cooperative Program (SDCP) website for more information: [www.nctcog.org/regional-data/spatial-data-cooperative-program-\(sdcg\)](http://www.nctcog.org/regional-data/spatial-data-cooperative-program-(sdcg))



Appendix B: Primary Hardware and Software

Hardware

- VMware Workstation
 - Intel® Xeon® Gold 6230 CPU @ 2.10GHz 2.10 GHz (2 processors)
 - RAM 64.0 GB
 - 64-bit Operating System, x64-based processor
- VMware Workstation
 - Intel® Xeon® Gold 6230 CPU @ 2.10GHz 2.10 GHz
 - RAM 32.0 GB
 - 64-bit Operating System, x64-based processor

Software

- Esri ArcGIS Pro 2.4
- Esri ArcGIS 10.8
- Esri 3D Analyst Extension
- Esri Spatial Analyst Extension