

Creating a Functional 3D Terrain Fabric

ESRI 2018 UC – “Building Bridges”

Presented By:
Mark Marcacci & Sharon De Leon

July 10, 2018



Project Background

- **Project Challenge:**

- Engineers need a terrain model for potable, recycled and sewer system hydraulic models (assists with determining pressure zones, sewersheds, drainage areas, etc.)

- **Data Available:**

- Contours from an aerial survey, totaling 19 Mr. Sid files

- **Objectives:**

- Preserve data integrity (minimize triangulation inaccuracies)
- Develop a terrain fabric, one file, with all elevation data

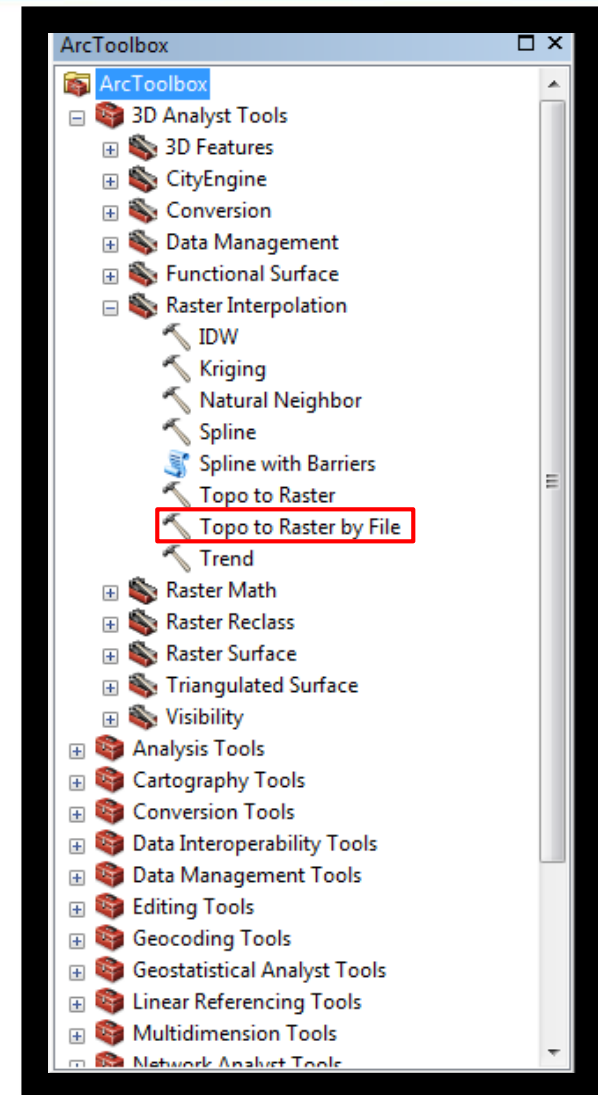
Creating a Surface Elevation

- Preliminary Research
 - Topo to Raster challenges
- Overlap with AutoCAD and ArcMap
- Creating a Triangular Irregular Network (TIN)
- QA/QC'ing TIN
- TIN to Raster



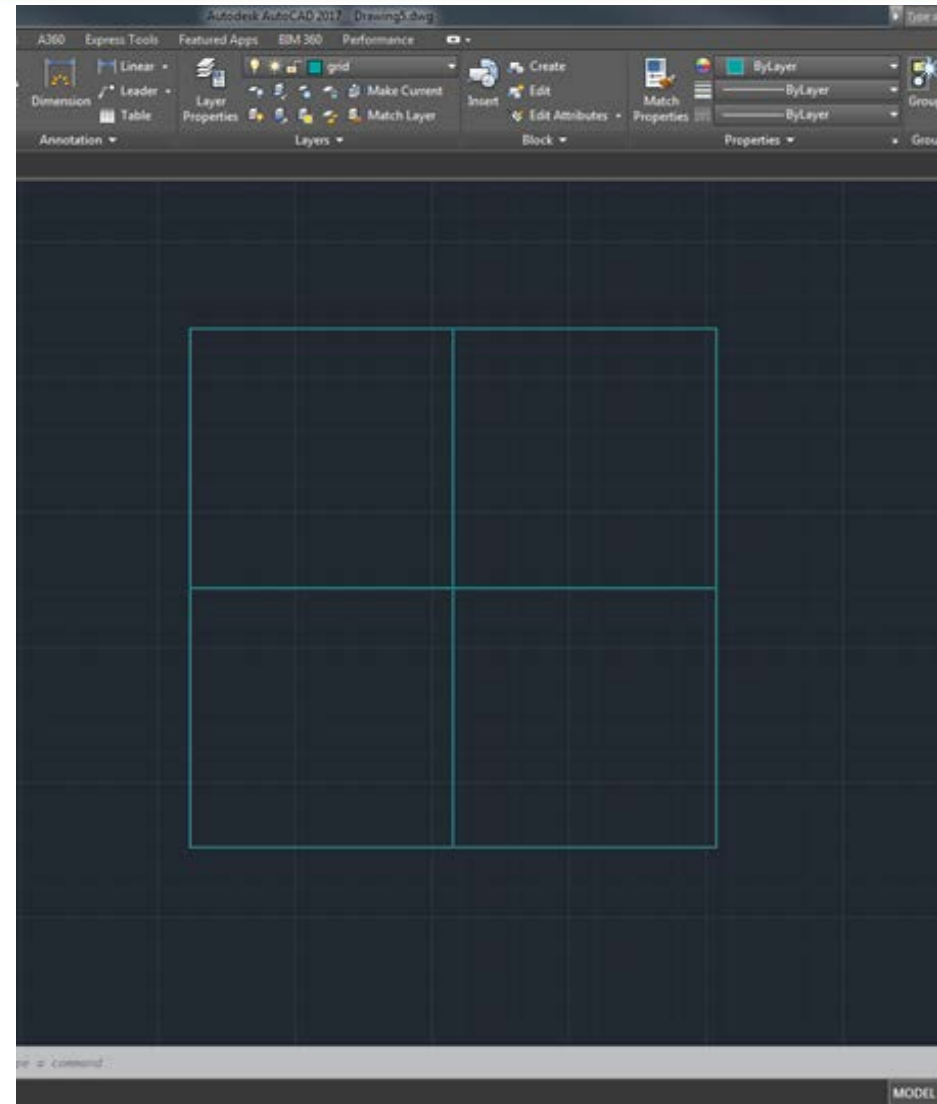
Preliminary Research

- Interpolation methods such as IDW, Kriging, undersample our data
- Raster to Topo method was tried but showed inconsistent results
- Additional research was conducted to look for other possible solutions:
 - Creating Triangular Irregular Networks (TIN) seemed the most viable to complete the project
 - However, contour tiles were too large and another form to create the TINs had to be discovered.



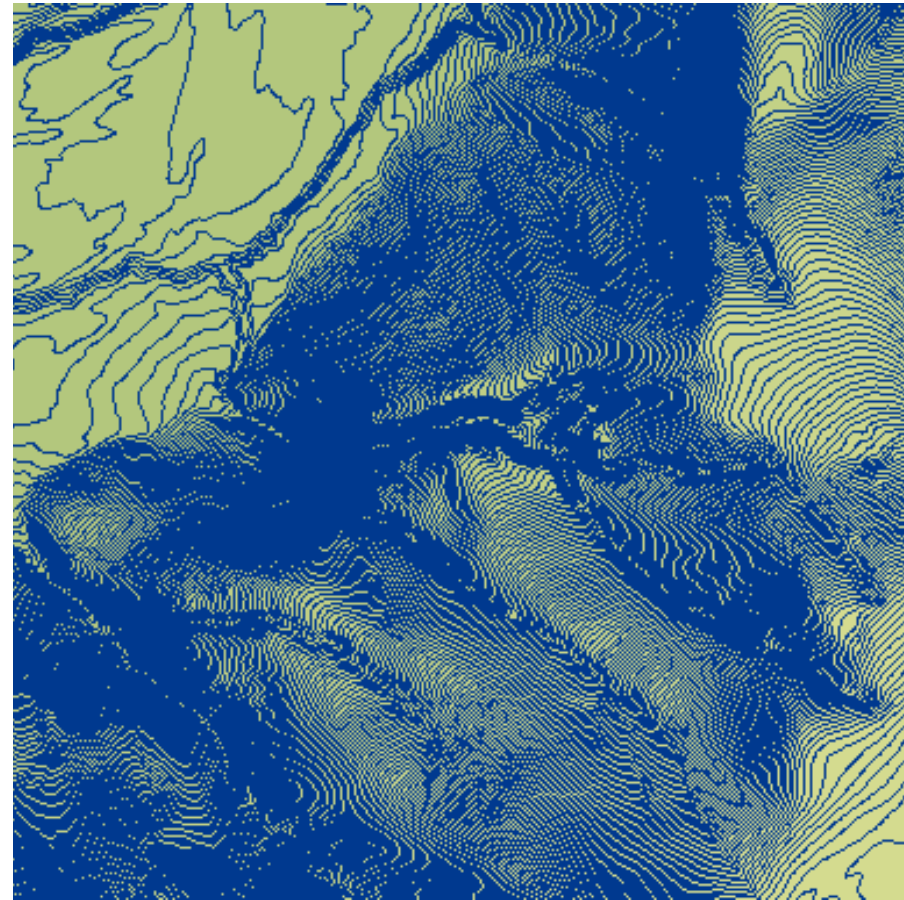
Working in AutoCAD

- Since the contour tiles were too large for the TIN tool to process, sub-grids were created from the original contour tiles in order to run the TIN tool.
- To do this, we used ArcMap and AutoCAD in order to get all-encompassing tiles
- ArcMap is used to obtain the extent values to create the grid and the rest is completed in AutoCad



Creating TIN Tiles

- TINs are created using the **Create TIN** tool from 3D Analyst ToolBox
- With the grids that were made in AutoCAD, individual TINs were then created (aka “TIN Tiles”) ----->
- In order to verify the accuracy of the TIN Tiles, we QA/QC’ed using the contour tiles: the values between the contour lines remained within the neighboring contour bounds
- Once the TINs were all created, they were merged to create one connected fabric as opposed to having separate grids.



Final Step: TIN to Raster

- The last step was to convert the TIN to a raster cloud for hydraulic model integration
- This was done using the TIN to Raster tool from the 3D analyst ToolBox.

