ArcGIS Pro: 3D Editing

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SEE
WHAT
OTHERS
CAN'T

Agenda

- 3D Editing Fundamentals
  - Surfaces and elevation
  - Layer properties
  - Working with points, lines, and polygons
- Multipatch Editing
  - Creating new features
  - Working with textures
  - Modifying faces and vertices
  - New tools at 2.4

3D Editing Overview

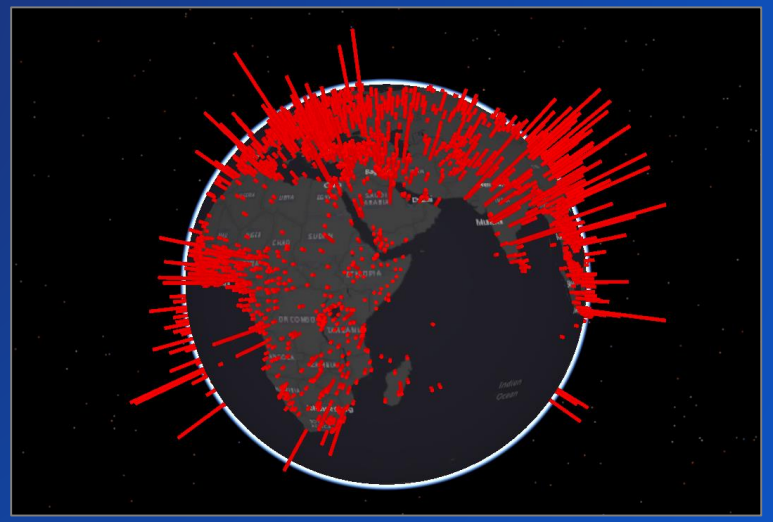
- Create new features in 3D
  - Create features at any location
  - Draw vertical lines or lines with pitch (at any angle)
  - Duplicate features vertically

- Modify features in 3D
  - Reposition features along XYZ axis or freely in 3D space
  - Tools to edit vertices, split, and reshape

Local Scenes vs Global Scenes

- **Benefits of Local Scenes**
  - Use a projected coordinate system and linear units
  - Manage data below the surface
  - Use your own ground elevation source

- **Use Global Scenes when you need to…**
  - Work in a fixed geographic coordinate system (WGS 84)
  - Work in large, multiple geographic areas
  - Use enhanced illumination and time effects



- **Easy to switch between these two scene views**

Recommendations for 3D Editing

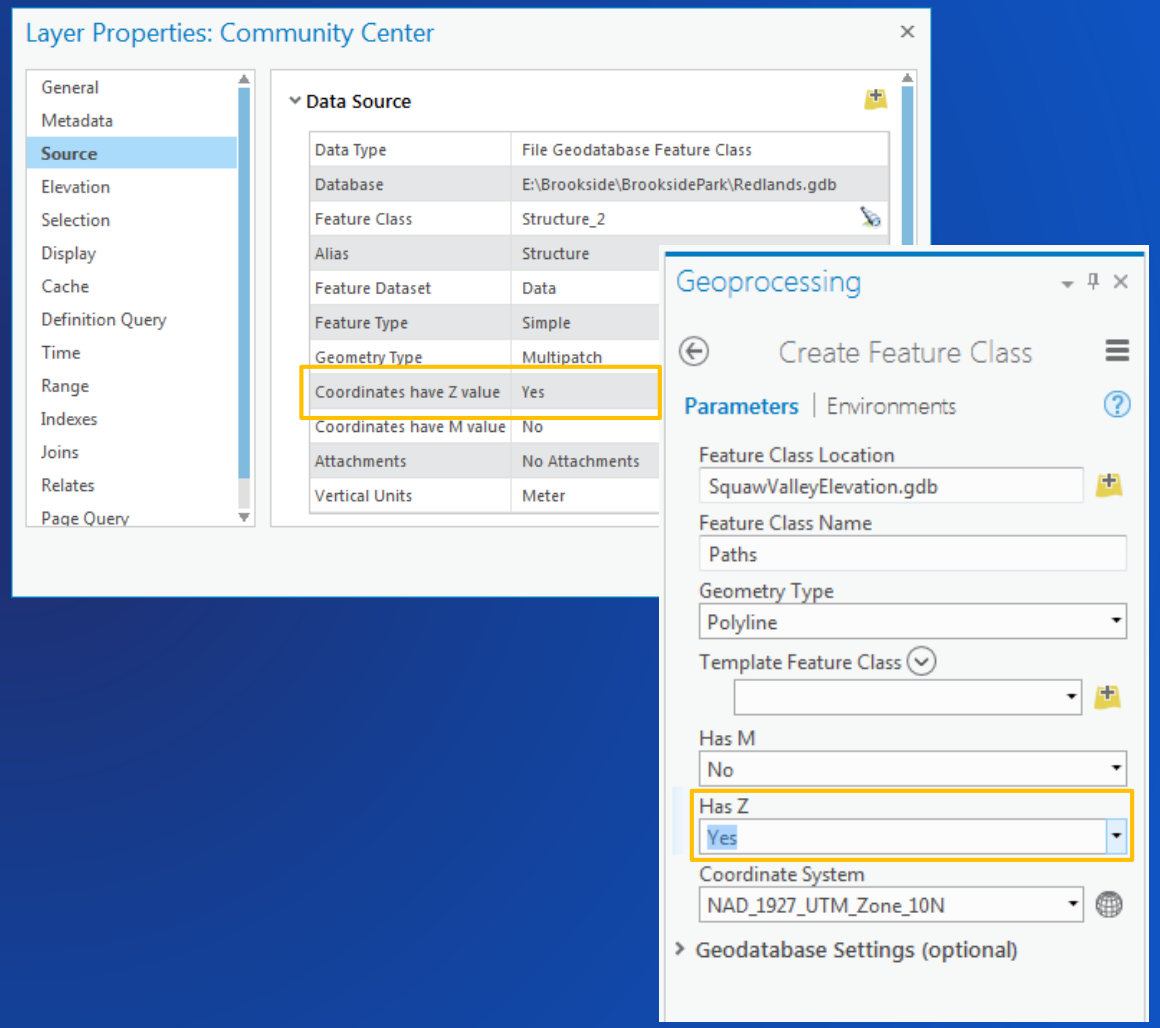
- Use Local Scenes for editing
- Set layer elevation property to ‘an absolute height’
- Avoid using cartographic offsets for layers
- Try to use the same units for scenes and layers

Demo: 3D Editing Fundamentals

Phil Sanchez

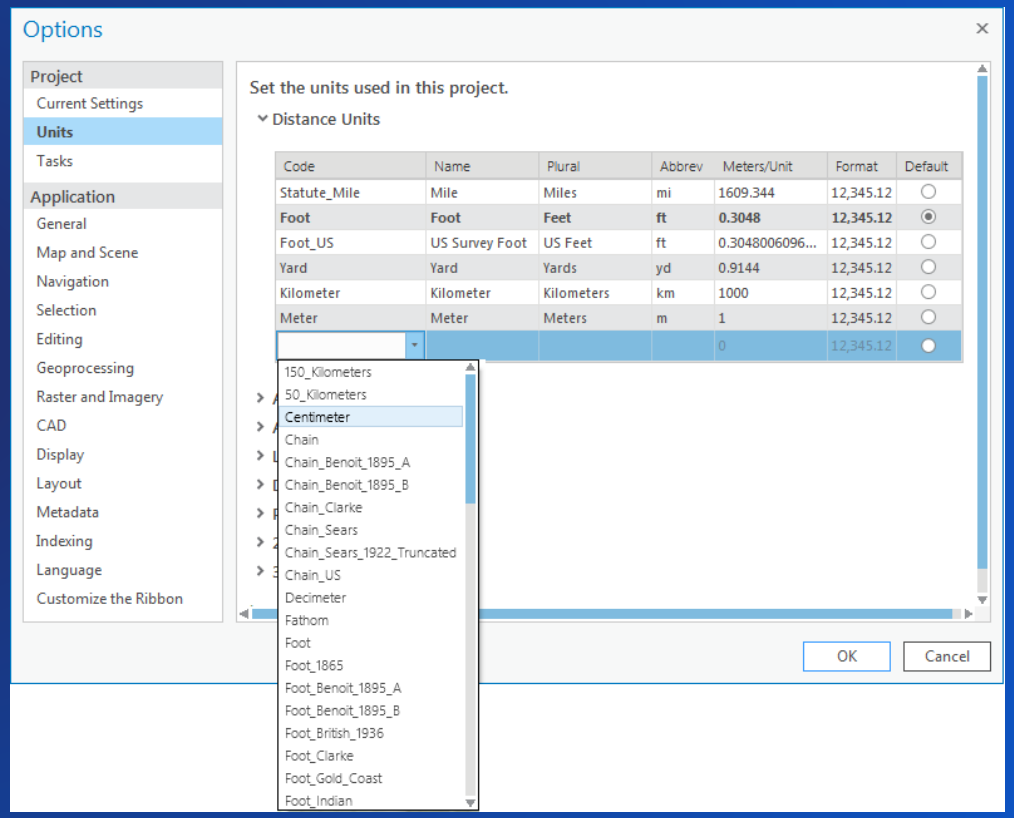
Working with Z-enabled Layers

- Z enabled property reported in Layer Properties window
  - Sometimes referred to as a ‘3D Layer’
- You can Z enable a layer when creating new feature classes
  - Set Has Z = Yes
- Z enabled layers allow:
  - Editing of Z coordinate values
  - Setting layers at an absolute height



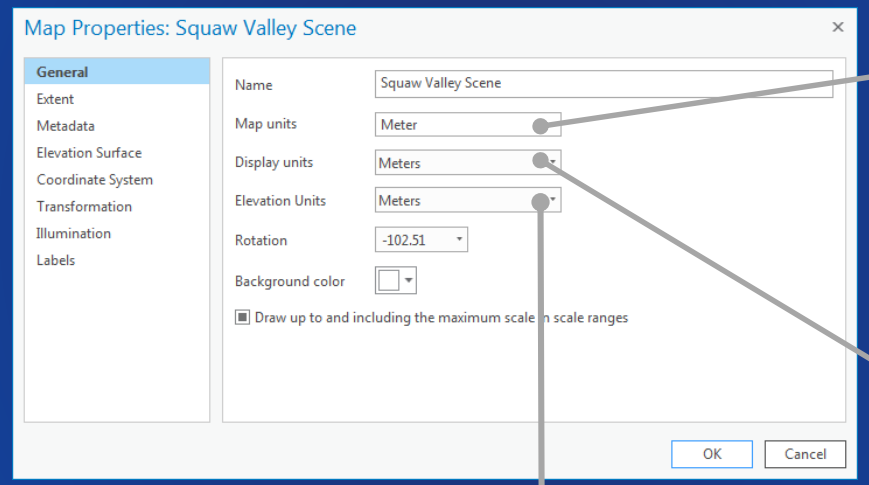
Working with Units

- Units are set at the project level (made available to maps and scenes)
  - In the Options window in the backstage
- Several types of units are available for working with distances, location, direction, etc
- By default, a map's map units are the primary unit

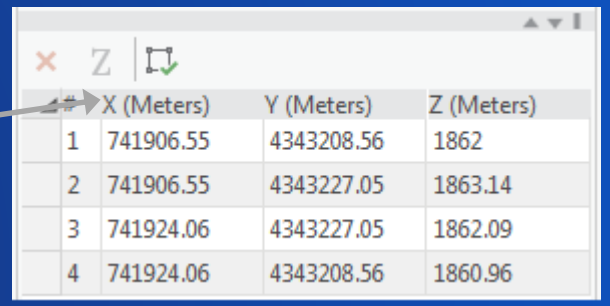


Units and Editing

- **Coordinate values are reported in the map's 'Map unit'**
- **Distance constraints are displayed in the project's Distance unit**

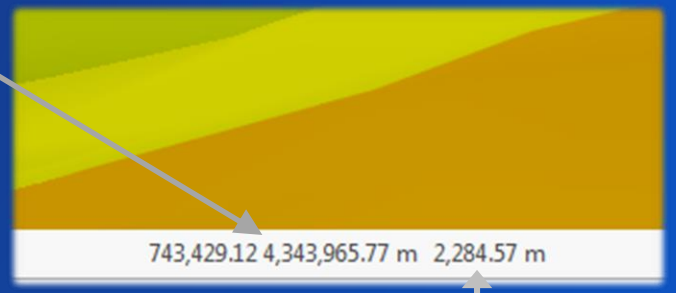


Vertex Coordinates



#	X (Meters)	Y (Meters)	Z (Meters)
1	741906.55	4343208.56	1862
2	741906.55	4343227.05	1863.14
3	741924.06	4343227.05	1862.09
4	741924.06	4343208.56	1860.96

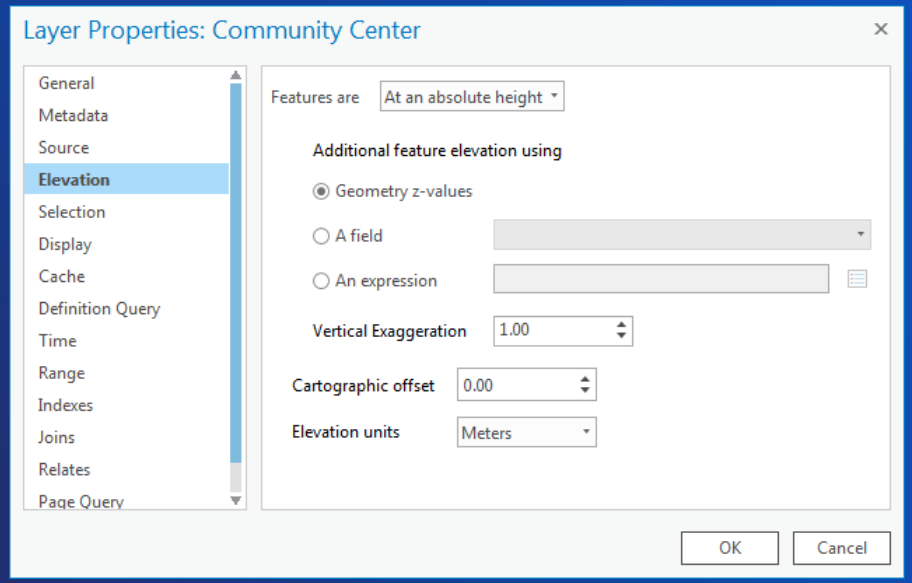
Map Coordinate Display

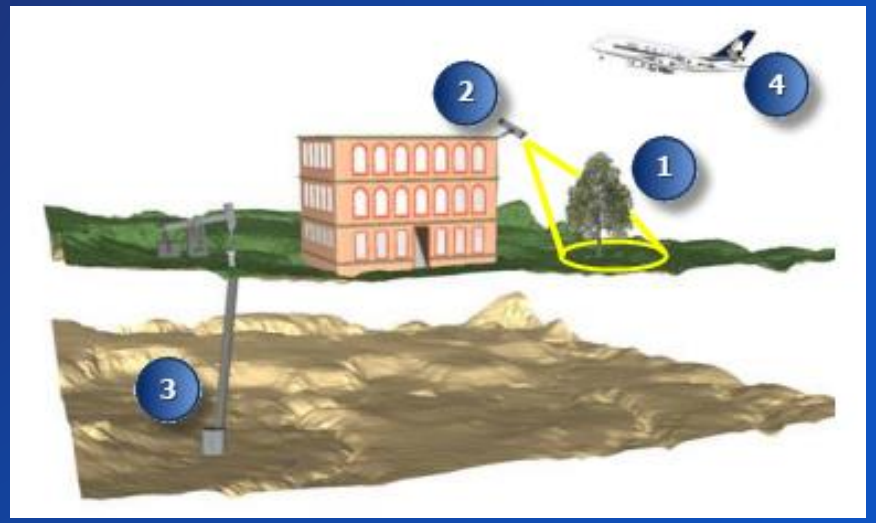


Layer Elevation – Base Heights

- 3D layers display at different elevations each with unique behavior/capabilities:
  - On the ground
  - Relative to the ground
  - At an absolute height

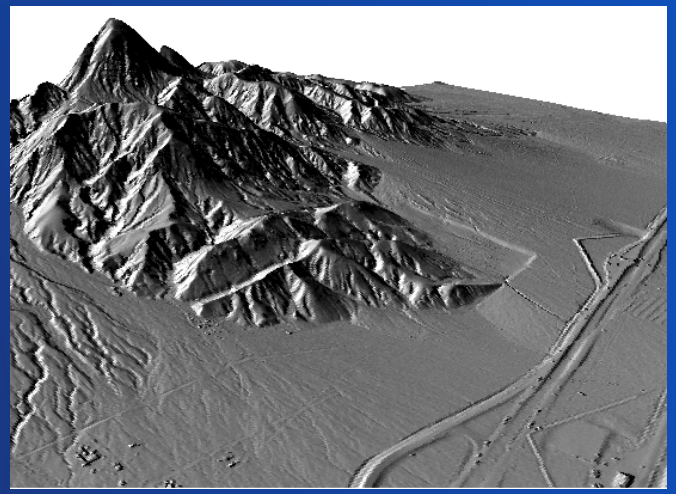
- Elevation surfaces enable you to view layers on, above, or below them

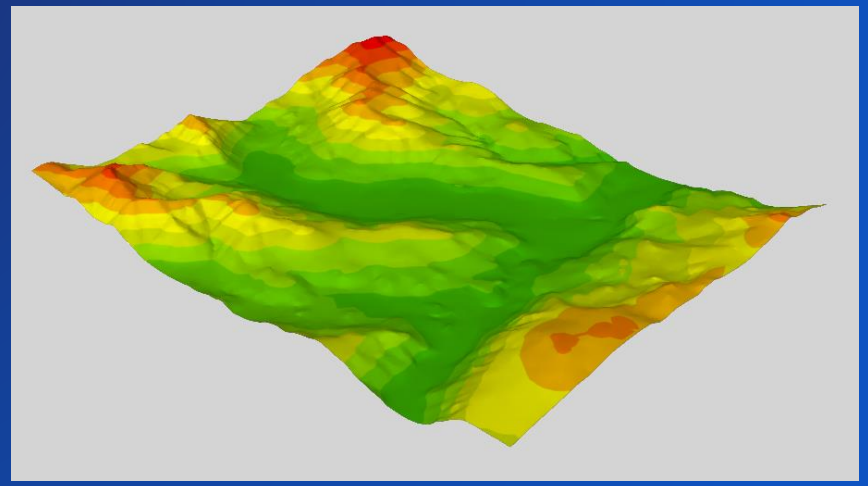




Working with Surfaces

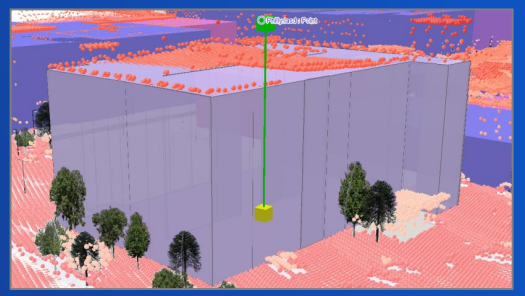
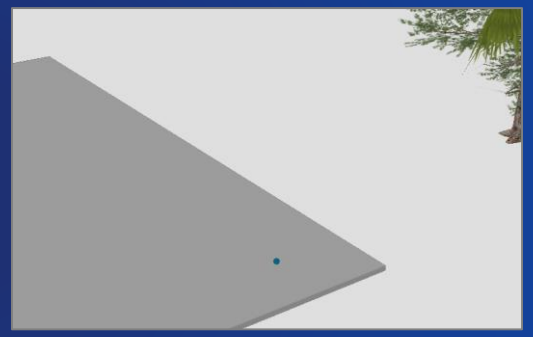
- Elevation surface is a digital representation of features in three-dimensional space
- For editing, a surface can be used to get accurate elevation values (Zs) when creating new features
  - Data can be on, above, or below the surface
- Scenes have ground surface by default from ArcGIS Online (Terrain 3D)
  - You can add your own custom surface
  - DEM, TIN, Terrain, LAS, Raster, LERC





3D Geometry vs 3D Symbology

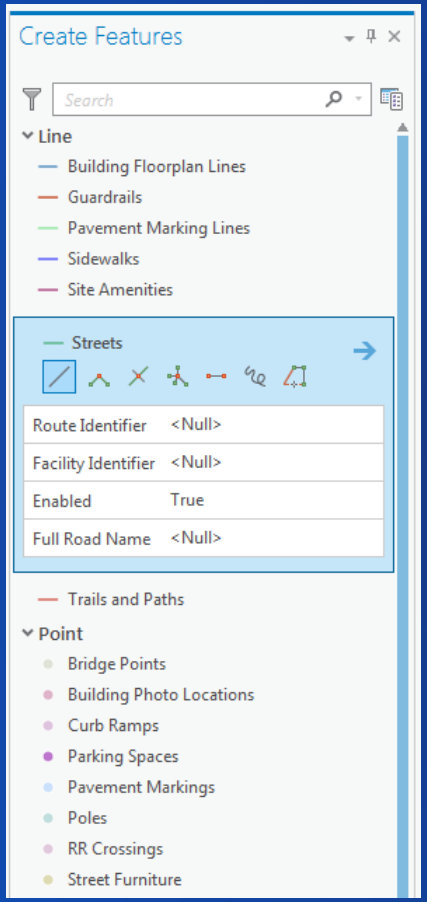
- All features can participate in 3D – even if they are not Z enabled
  - E.g., 2D points as Realistic Trees
- 3D symbology can be applied to 2D layers
  - Extrusion
  - 3D models (points)
  - Rule Packages (RPK)
- 3D symbols can be connected to attributes
  - Fields for height, width, size can drive appearance

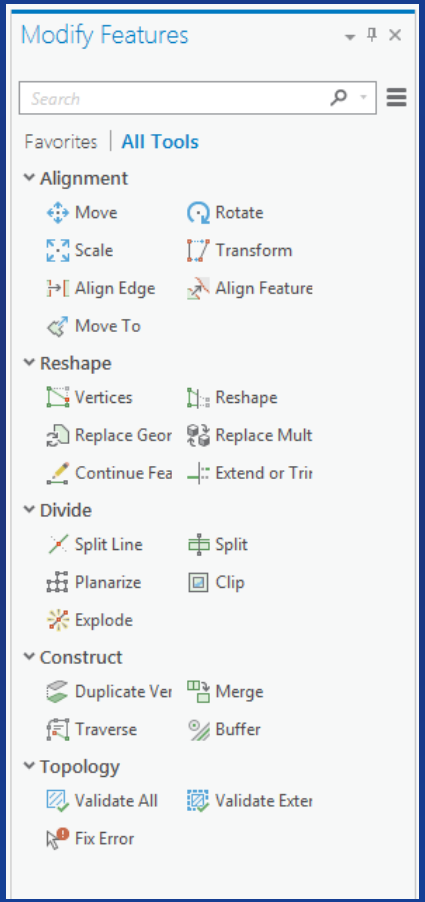

3D Editing Capabilities

Section Subhead

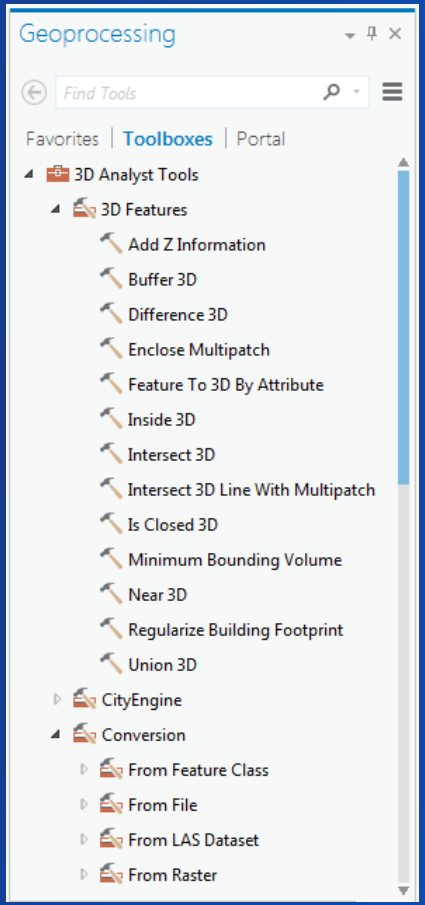
Using 3D Layers in Pro



Data Creation

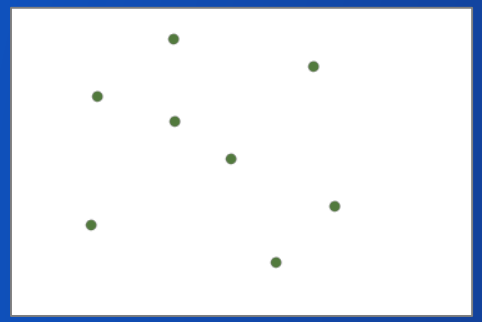
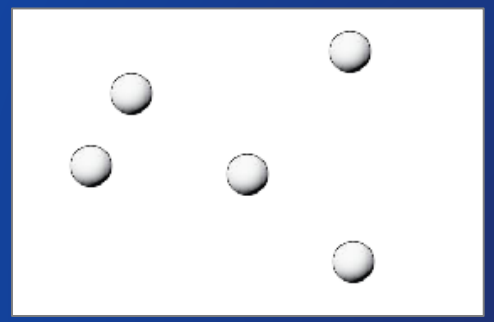


Maintenance

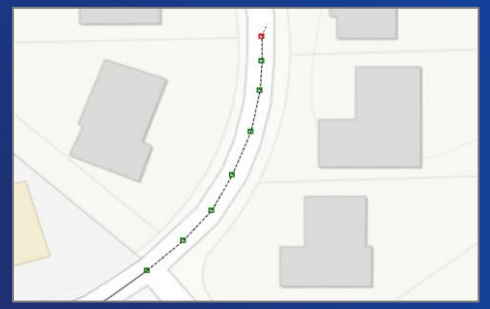


Analysis

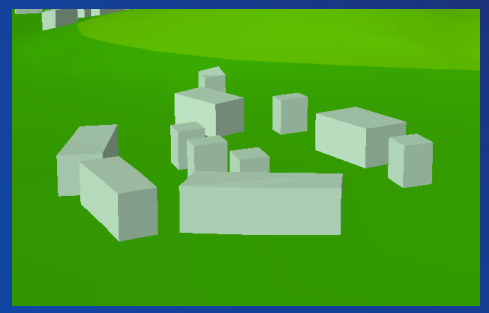
Feature Geometries

Points




Lines

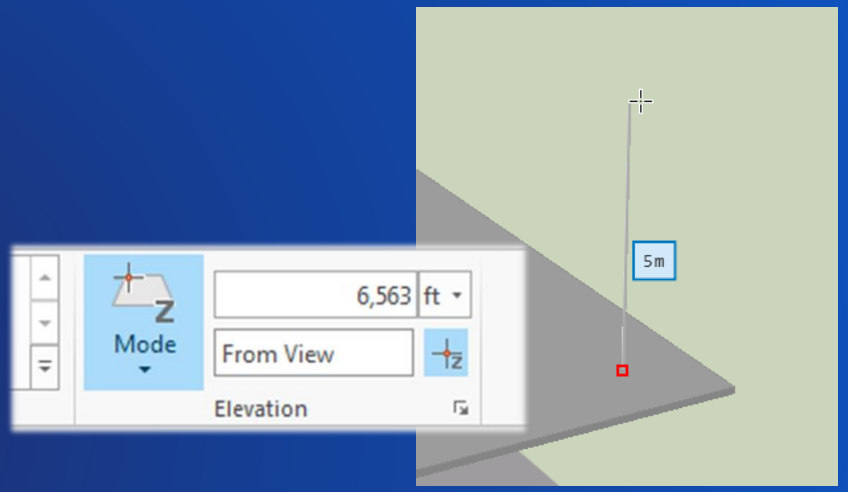



Polygons

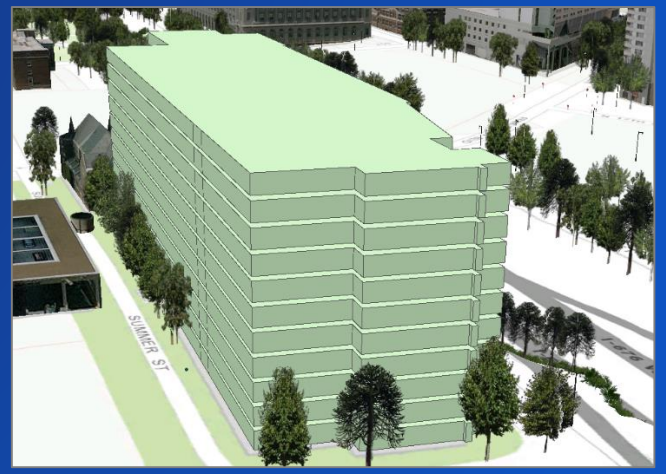

Multipatches

3D Data Creation Tools

- Constant Z allows you to set the elevation so new features inherit Zs
  - Can get Zs from surface or vector features
  - Set elevation by entering a value and units



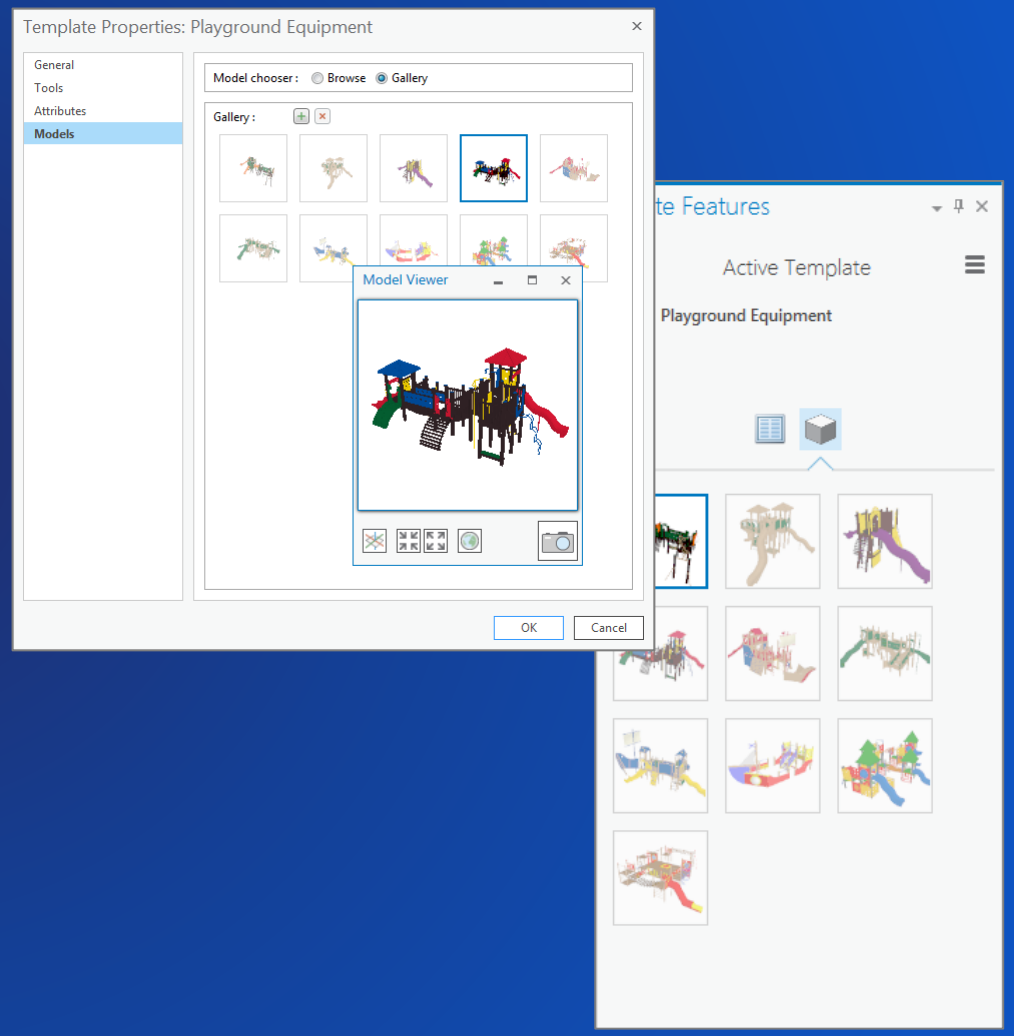
- Draw lines in 3D space
  - Vertical or with a pitch
  - Snapping to other 3D features in scene



- Duplicate features vertically to easily create multiple instances at various heights
  - Specify number of copies and distance between them

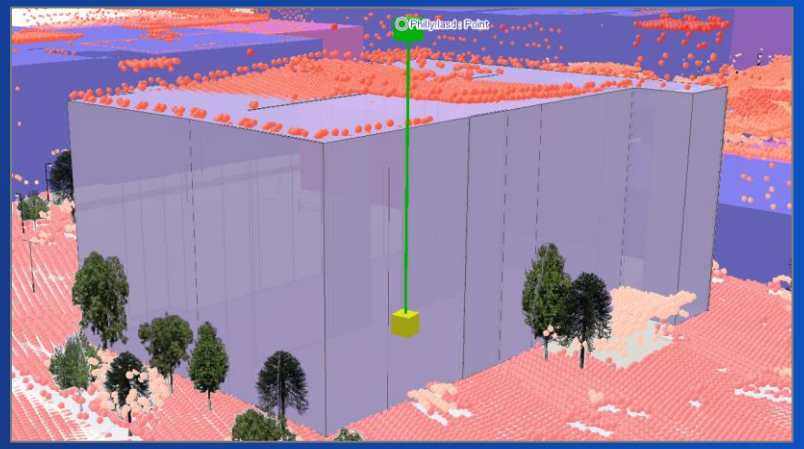
Working with 3D Models

- Multipatch layers can store 3D models through feature templates
  - .dae, .3ds, .flt, .wrl
- Two methods for adding models through the Create Features pane
  - Single model through a file browser
  - Choose from a gallery of models
- Template properties window allows you to add models to the gallery
  - Can change the size and orientation and update snapshot

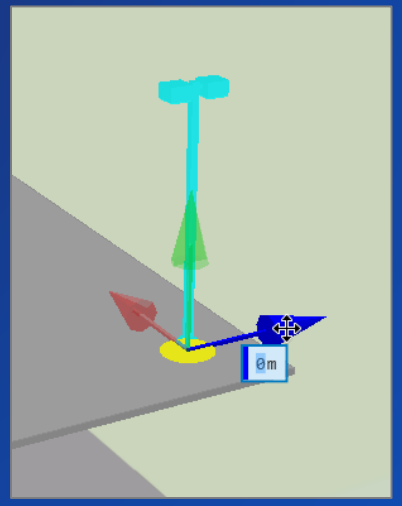


Feature Modification

- Move, rotate, and scale features
  - Interactively with handles or by value with constraints
  - Perform a 3D affine transformation of features or entire layers



- Edit vertices of features
  - Interactively with the Edit Vertex tool (Move, Add, Delete)
  - Update XYZ vertex coordinate values in grid

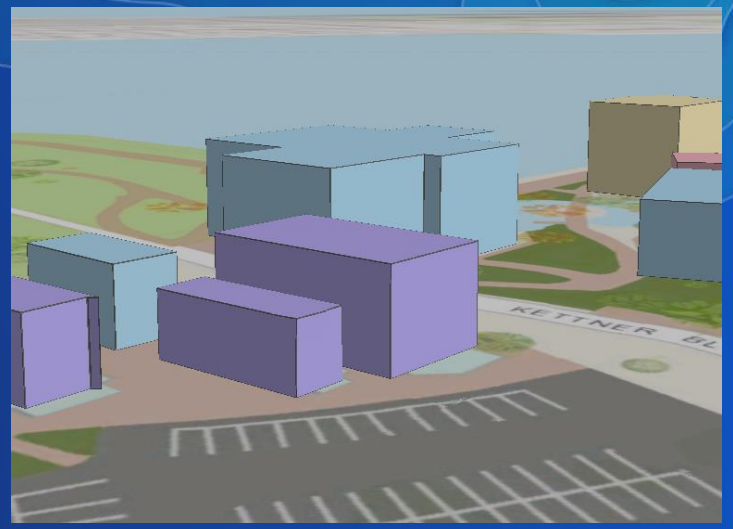


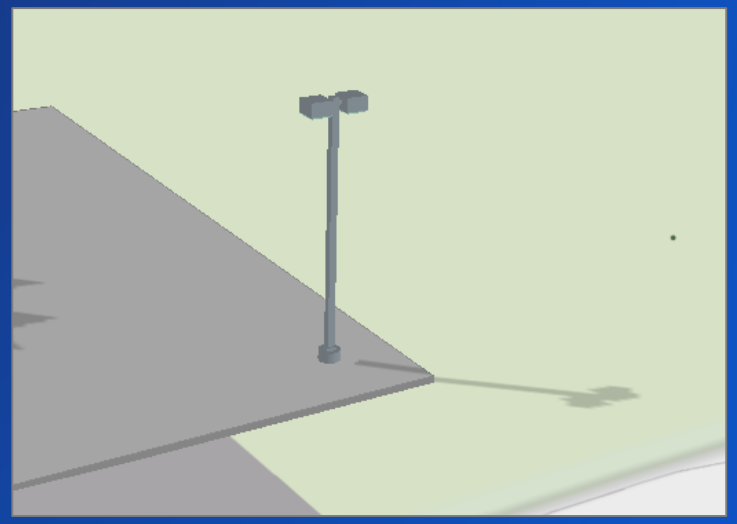
- Replace models directly in a scene
  - Choose a different model from disk with the Replace Multipatch tool

Layer Effects

- Extrusion is one of the easiest ways to create 3D visualization
  - Specify height value
  - Calculate height
  - Use field values

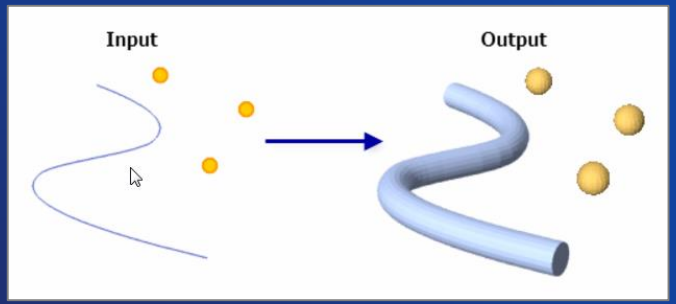
- 3D visualization
  - Enhanced with shadows
  - Available in the Map Properties window

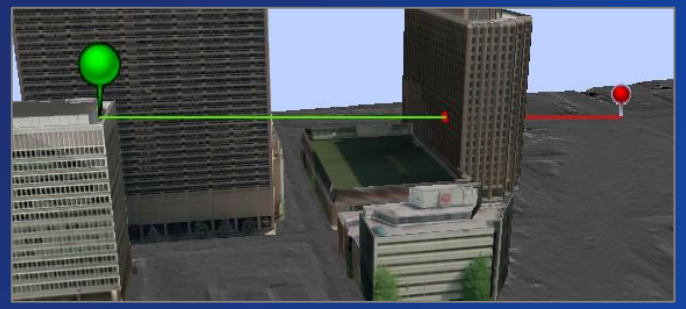


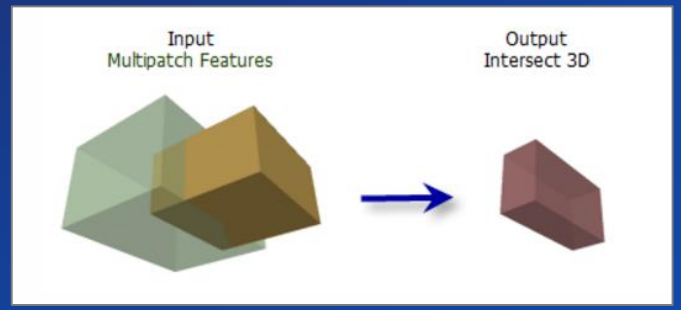


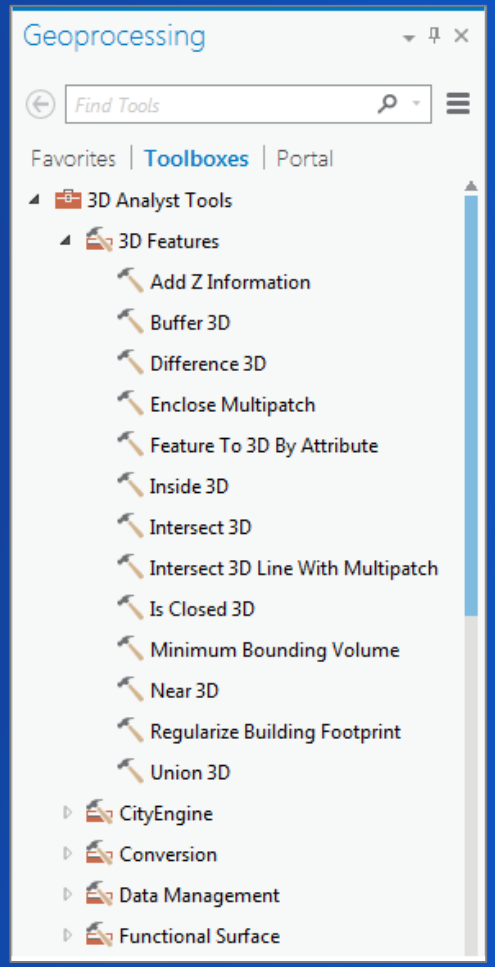
3D Geoprocessing Tools

- Many 3D Analyst tools available in Pro
  - Proximity
  - Conversion
  - Data Management
  - Surface-based









Demo – Multipatch Editing

Michael Contreras

Questions

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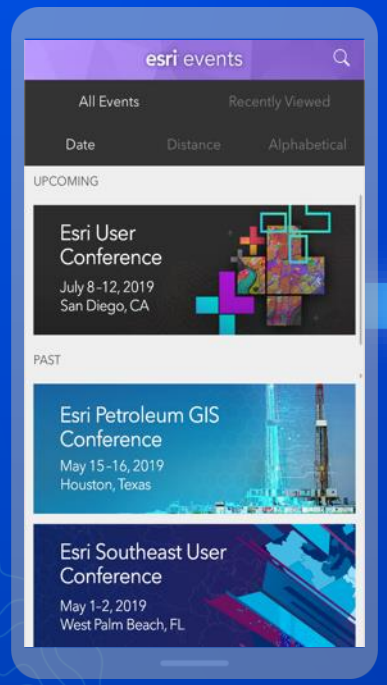
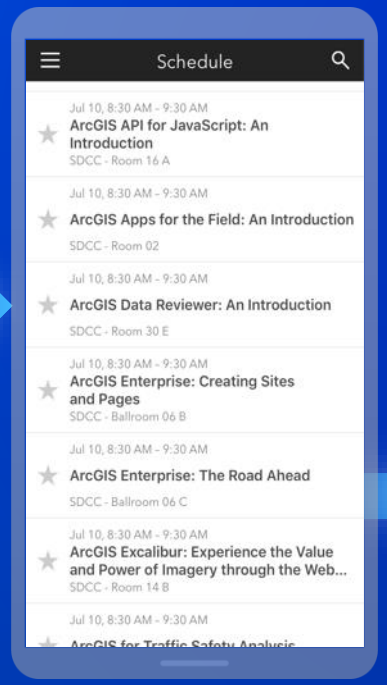
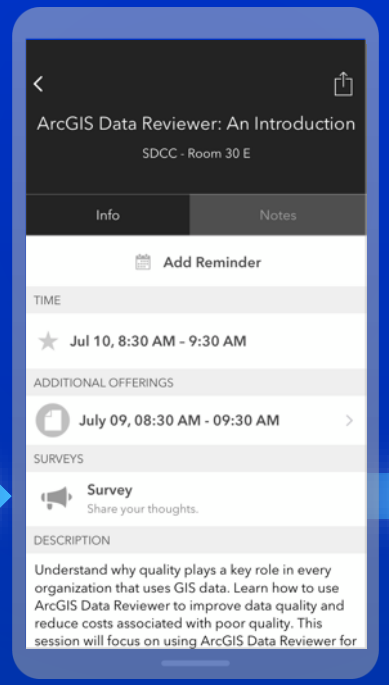


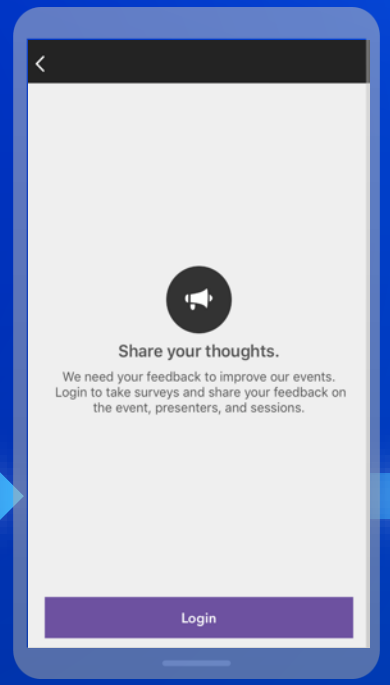
Select the session you attended



Scroll down to "Survey"



Log in to access the survey



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