

## Creation and Editing of Vector Data Layers

A quick tour of editing: <https://pro.arcgis.com/en/pro-app/latest/help/editing/a-quick-tour-of-editing.htm>  
Creating and editing a shapefile: <https://www.youtube.com/watch?v=NmQ3acDeFm8>

**Assignment:** A development company is planning to install new water pipelines connected to the existing network and a hydrant in the new residential construction area of Manhattan (Kansas, USA). The company also intends to delineate and prepare new parcels for construction. These parcels need to be added to the existing database of building parcels using field geodetic measurements.

### Data:

water\_connections.dbf

parcels.shp, hydrants.shp (NAD 1983 StatePlane Kansas North FIPS 1501 (US Feet))

### Task 1: Localization of the New Water Pipeline

Four new pipeline segments need to be laid between the following connections: 207 - 224, 224 - 231, 224 - 232, 232 - 244, and from connection 232 to the nearest hydrant. Engineers used GPS to survey the positions of the new water connections, and these data are available as XY coordinates in a local coordinate system along with the connection ID number in the file water\_connections.dbf.

1. Import the file water\_connections.dbf – this type of data containing positional information can be stored as a point layer using:

Map → Add Data → **XY Table to Point**

Input – water\_connections.dbf

Output – water\_connections

X field – X\_COORD

Y field – Y\_COORD

Coordinate system – NAD 1983 StatePlane Kansas North FIPS 1501

2. Create a new line layer (new shapefile – water\_pipes), in which the water connections and hydrant will be linked. When creating it, specify the same coordinate system as for the imported layers.
3. Edit → Create → Create Features (edit the newly created layer water\_pipes.shp) – manually connect the following pairs of connections: 207 - 224, 224 - 231, 224 - 232, 232 - 244, and then connect connection 232 to the nearest hydrant (resulting in five line features).
4. Determine the length of each pipeline in the attribute table. After finishing the editing session (Edit → Save), add a new field to the attribute table:

Add Field → Field Name: length

Data Type: Float

Number Format: Numeric

Decimal Places: 2 → Save

After adding the field, calculate the length of the pipelines in the desired units using Calculate Geometry → Length.

## Task 2: Delineation of New Parcels

In the western part of the new residential development area, where a new water connection is planned, engineers have delineated three new parcels. Therefore, it is necessary to update the existing parcel database and assign them the identification numbers 3460, 3461, and 3462.

### Parcel 1 – 3460

The boundary of the new parcel runs parallel to the northwest boundary of parcel 913 and is 118 ft long. It shares the southeast boundary with parcel 891.

1. Edit → Create, and in the Create Features window, select Autocomplete Polygon.
2. Create the first point at the northern corner of parcel 913 – right-click on the northwest boundary of parcel 913, choose Parallel, and specify the length of 118 ft (right-click → Distance, or press D on the keyboard). From there, continue the boundary toward the northern point of parcel 891, and double-click to close the polygon.
3. Assign the newly created parcel the ID number 3460 – enter this value in the PARCELS\_ attribute field

### Parcel 2 – 3461

This parcel does not adjoin any existing parcels. One of its corners is located 61.1 ft from the north corner of parcel 852 and 119.4 ft from the northeast corner of parcel 762. The second corner lies 54.87 ft away at a bearing of 73°47'57" from the first point. The third corner lies 117 ft away at a bearing of 344°16'48" from the second point. The fourth corner is the intersection of the perpendiculars drawn from the line between the first and second points and from the line between the second and third points.

1. In Create Features → Polygon, use the Distance–Distance tool to create a sketch by intersecting two circles. Click the corner of parcel 852, press D, and set the radius to 61.1 ft. Then, from parcel 762, set a radius of 119.4 ft. At the right-hand intersection of the two circles, place the first point.
2. On the lower toolbar, switch to the Line tool → right-click in the map view → Direction/Distance, and create the next vertex using a combination of direction and distance from the current vertex: Direction: P 73-47-57 Distance: 54.87 ft  
Next vertex: Direction: P 344-16-48 Distance: 117 ft
3. To finish the polygon: right-click → Square and Finish – the sketch will close into a rectangular shape, completing the polygon creation. Then, enter the appropriate parcel ID attribute.

### Parcel 3 – 3462

The next building parcel will be created by splitting parcel 762. The dividing line is the segment between the northern corner of parcel 852 and the point with coordinates (X, Y): 1,699,500.27; 321,456.00.

1. Unlike the previous operations, this time we are not creating a new polygon, but splitting an existing one. Therefore, before splitting, select parcel 762 (using Select or by selecting it from the attribute table).
2. From the Edit toolbar, choose the Split tool.
3. Create a point at the corner of parcel 852 – right-click → Absolute X,Y: 1,699,500.27; 321,456.00 (ft) → Enter – this will create the point. Double-click to finish. Finally, assign an attribute to the resulting new polygon – enter the parcel number.