GEOREFERENCING AND DIGITIZATION

This assignment will help you learn about the following:

- Creating a geodatabase with feature datasets and feature classes
- Georeferencing (georegistration) in ArcGIS
- Digitizing features in a geodatabase

Objectives:

The scenario is that you have to build a geodatabase for a new section of a rapidly growing city. You have to create a geodatabase for this project and populate this geodatabase with:

- Features representing land use (e.g. parcel boundaries, parks, industrial areas, etc.)
- Features representing utilities, such as water and electrical lines.

For this purpose, your first task is to digitize the parcels of a new sub-division and estimate where water pipes will be placed. You are given a scanned paper map that represents the parcel property boundaries.

An additional task is to use a formula to estimate the property value of the new lots.

Main learning objectives are following :

➢ Geodatabase Design	➢ Calculation of Attributes
➢ Georeference the Scanned Map	➢ Digitize a Basic Pipe Network
➢ Digitization	

TUTORIAL 5.1

GEODATABASE DESIGN

5.1.1	Make a new file geodatabase	
5.1.2	Define feature datasets and feature classes	
	5.1.2.1	Create a Feature Dataset named “Utilities”
	5.1.2.2	Create Feature Class named “Pipes”
	5.1.2.3	Define Attribute for Pipes Feature Class
	5.1.2.4	Create another Feature Dataset named “LandUse”
	5.1.2.5	Create another Feature Class named “parcels”
	5.1.2.6	Define Attribute for ‘parcels’ Feature Class
5.1.3	Import an Attribute Table	

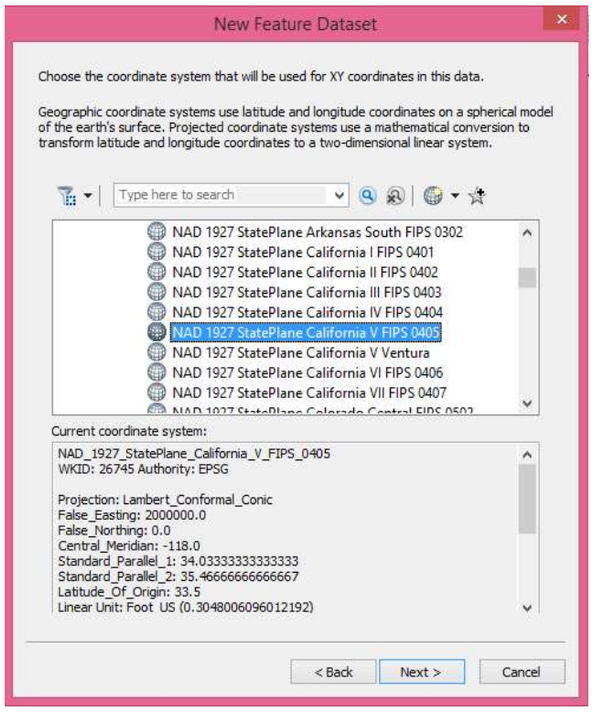
5.1.1 Make a new file geodatabase

1. Open ArcMap and Connect to the Tutorial 5 folder from D:\CE-210 location.
2. In Catalog, navigate to this Tutorial 5 folder and right-click, and then choose New → File Geodatabase.
3. Name the file geodatabase City. Set City as the default geodatabase, under File → Map Document Properties.

5.1.2 Define feature datasets and feature classes

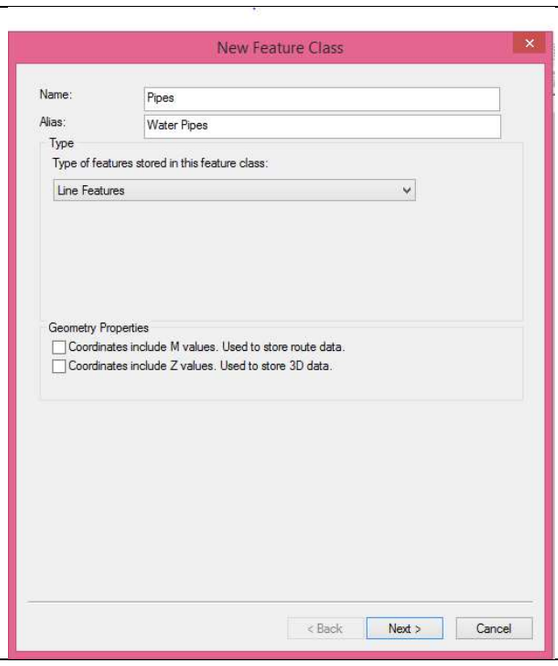
5.1.2.1 Create a Feature Dataset named “Utilities”

1. Right-click on the empty geodatabase and choose New → Feature Dataset (NOT Feature Class). In the dialog box that opens, specify the name as Utilities – this will create a feature dataset called “Utilities”.
2. Click Next to choose the coordinate system. Navigate to Projected Coordinate Systems → State Plane → NAD 1927 and select California Zone 5 (NAD 1927 StatePlane California V FIPS 0405).
3. Click Next, skip the vertical coordinate system by clicking Next again. Accept the default tolerances by clicking Finish.



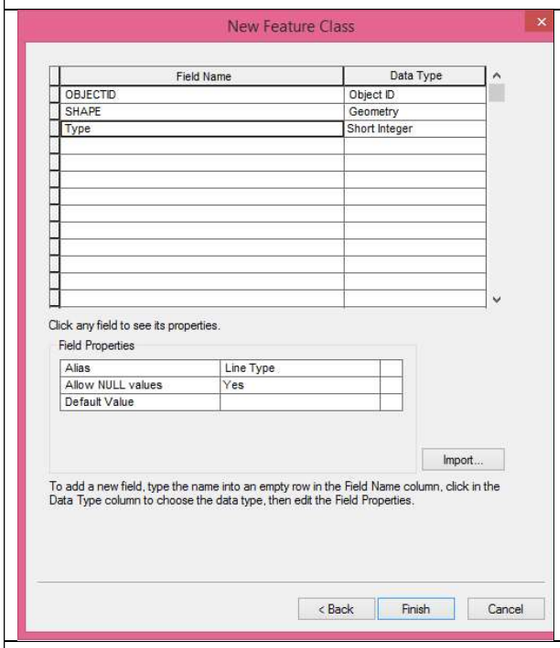
5.1.2.2 Create Feature Class named “Pipes”

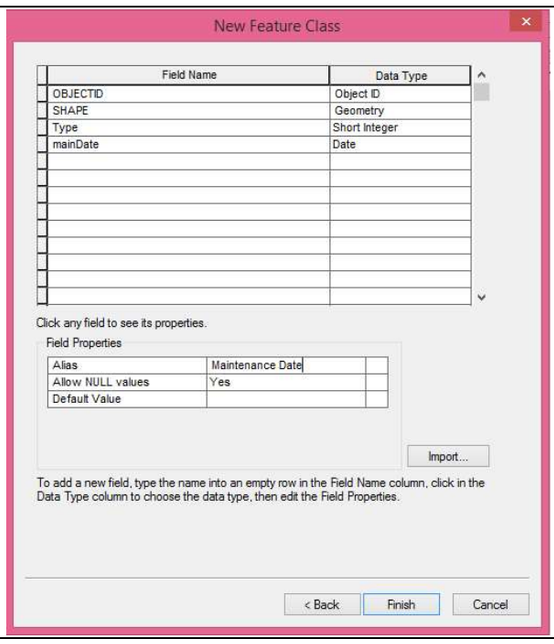
1. Right-click on the Utilities feature dataset and choose New → Feature Class. Name the feature class pipes and give in an Alias (alternative name) Water pipes. This will be a vector layer with lines representing a pipe network, so chose Line Features for the type of features. Be sure that the Geometry Properties boxes are unchecked.
2. Click Next.
3. For the Configuration Keyword page, accept the default by clicking Next, which brings you to the attributes page.



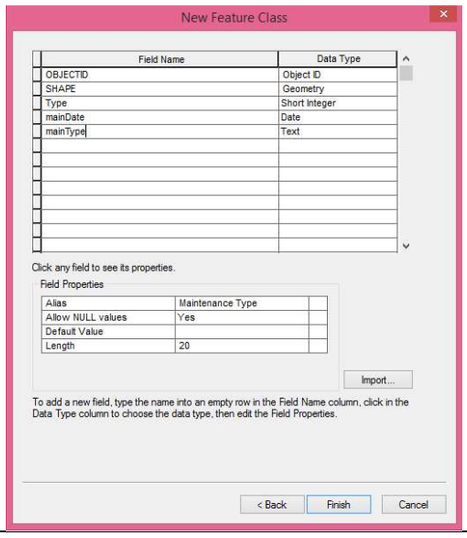
5.1.2.3 Define Attribute for Pipes Feature Class

1. In the Field Name column, first blank row (row 3), enter the value "Type". In the Data Type column, click the cell below Geometry (row 3) and use the pop-up menu to select “Short Integer”. Left-click the cell so that window of Field Properties is visible, and change alias to "Line Type".
2. Repeat the same steps to add a field called "maintDate” with a “Date” data type. In the Field Properties change the Alias to "Maintenance Date".



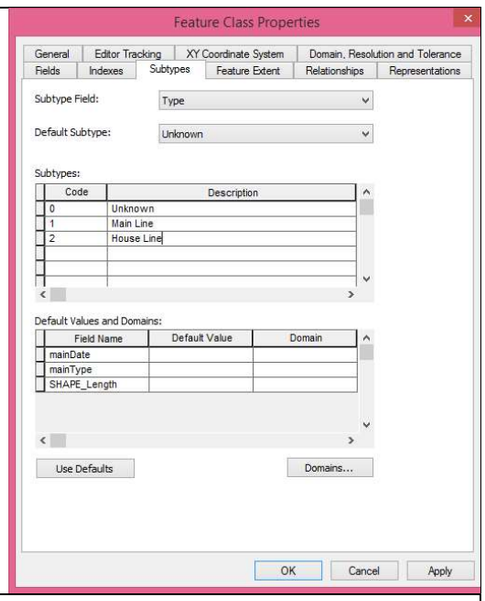


3. Repeat the same steps to add a field called "maintType” with a “Text” data type. In the Field Properties change the Alias to "Maintenance Type". Specify the Length field as "20”.
4. Click Finish. Notice that the pipes feature class is added to your TOC. There is nothing drawn in the map, though, because this feature class is empty – you will have to digitize the features.



5. Right-click on pipes (under the Utilities feature dataset) and open Properties. Click the Subtypes tab. We will set up “subtypes” that link integer codes in a field to text descriptions via a lookup. For Subtype Field, use the pop-up menu to select the "Type" field. Only “Type” is available because it is the only field that we created that has integer values. Set up the subtypes for the Type field in pipes using the table below. You do this by clicking in the Code and Description boxes and then type their values.

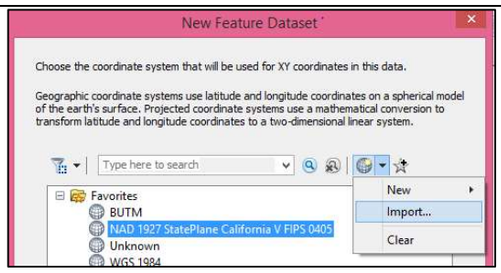
Code	Description
0	Unknown
1	Main line
2	House line

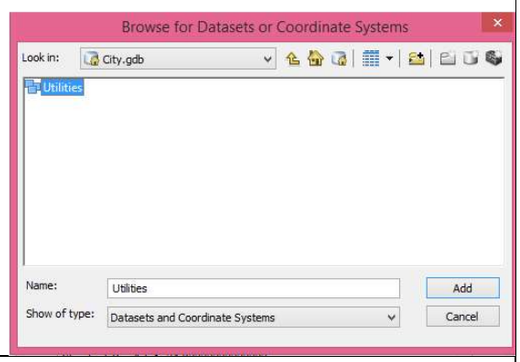


This process will allow you to choose between 3 types of pipes when you have digitized new a line segment (Unknown, Main line or House line). No other values will be permitted for the Type attribute. When you are done, click OK to close the window and finish creating your new pipes feature class.

5.1.2.4 Create another Feature Dataset named “LandUse”

1. Right-click on the City geodatabase and choose New → Feature Dataset, and name it LandUse. Click Next. The spatial reference must also be set. It needs to be the same projected coordinate system as we used for the Utilities feature dataset. This time you can simply import these parameters from Utilities rather than setting them manually again.
2. Click on the Import button, browse through the files for your Utilities feature dataset inside the City geodatabase, and Add it. The Coordinate System is updated to match Utilities.
3. Click Next, then click Next again and Finish to finish creating the LandUse feature dataset.



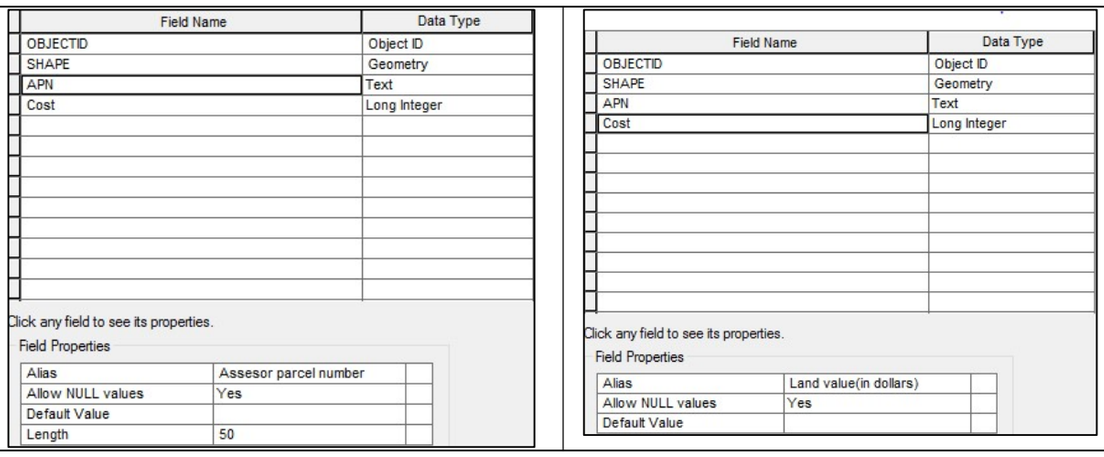


5.1.2.5 Create another Feature Class named “parcels”

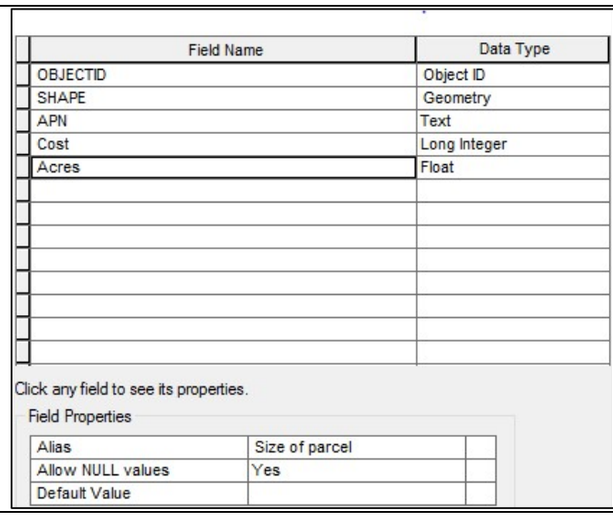
1. Right-click on the LandUse feature dataset you just created, go to New → Feature class, and name it parcels. This will be a vector layer with polygons representing parcels, so chose Polygon Features for the type of features. Be sure that the Geometry Properties boxes are unchecked. Click Next.

5.1.2.6 Define Attribute for ‘parcels’ Feature Class

1. Add a field called "APN” with a “Text” data type. In the Field Properties change the Alias to "Assessor parcel number". Specify the Length field as "15”.
2. Add a field called "Cost” with a “Long Integer” data type. In the Field Properties change the Alias to "Land value (in dollars)".



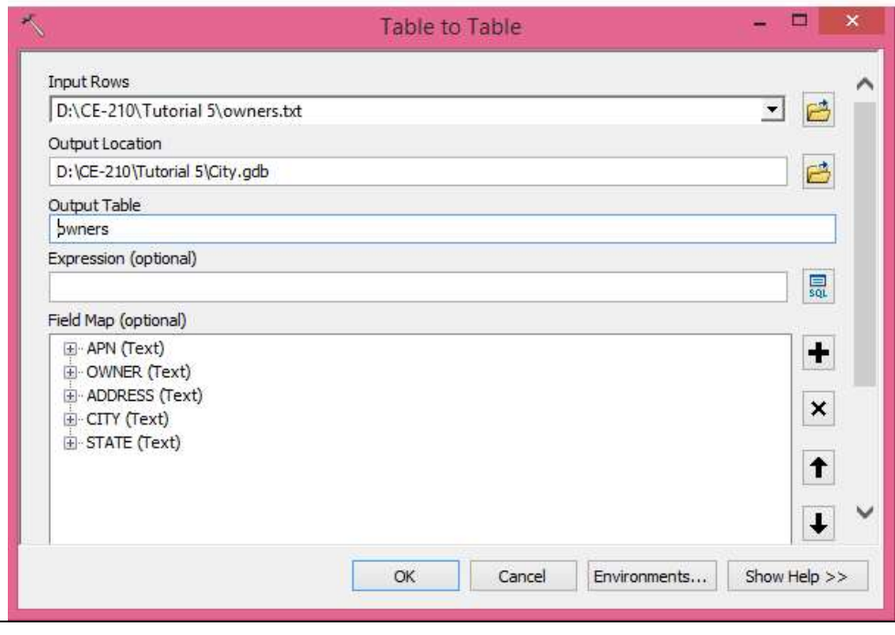
3. Add a field called "Acres" with a "Float" data type. In the Field Properties change the Alias "Size of parcel".
4. Click Finish



5.1.3 Import an Attribute Table

Now we will import a table from the owners.txt file, which is an ASCII text file.

1. Right-click on City geodatabase file.
2. Choose Import → Table (single). This brings up the Table to Table window. The Output Location should be your City geodatabase.
3. Type in owners as the Output Table name.
4. Click OK.



TUTORIAL 5.2

ADD PROJECTED DATA AS REFERENCE MAP

1. From Add Data window, add Parcel.tif from D:\CE-210\Tutorial-5 folder.

