

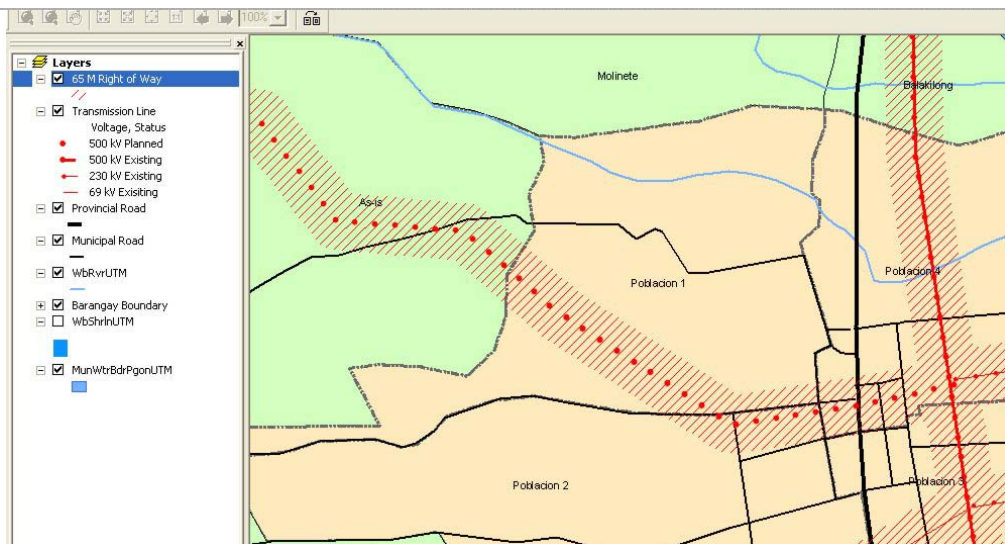


## 7.03.04 Buffering Tutorial

*Disclaimer: The objective of this tutorial is to get familiar with the GIS software. The tutorial only covers some parts that are being done In a real analysis. The results that are being displayed in the tutorial can't be compared with the results a real analysis would generate.*


### Introduction

*The objectives of this exercise are to arrange layers properly and to use the buffer wizard to create a buffer. The scenario is to prepare an analysis based on right of way for existing and planned electrical transmission lines and try to identify eventual conflicts to existing land-use, urban areas in particular.*



### 1 Getting started

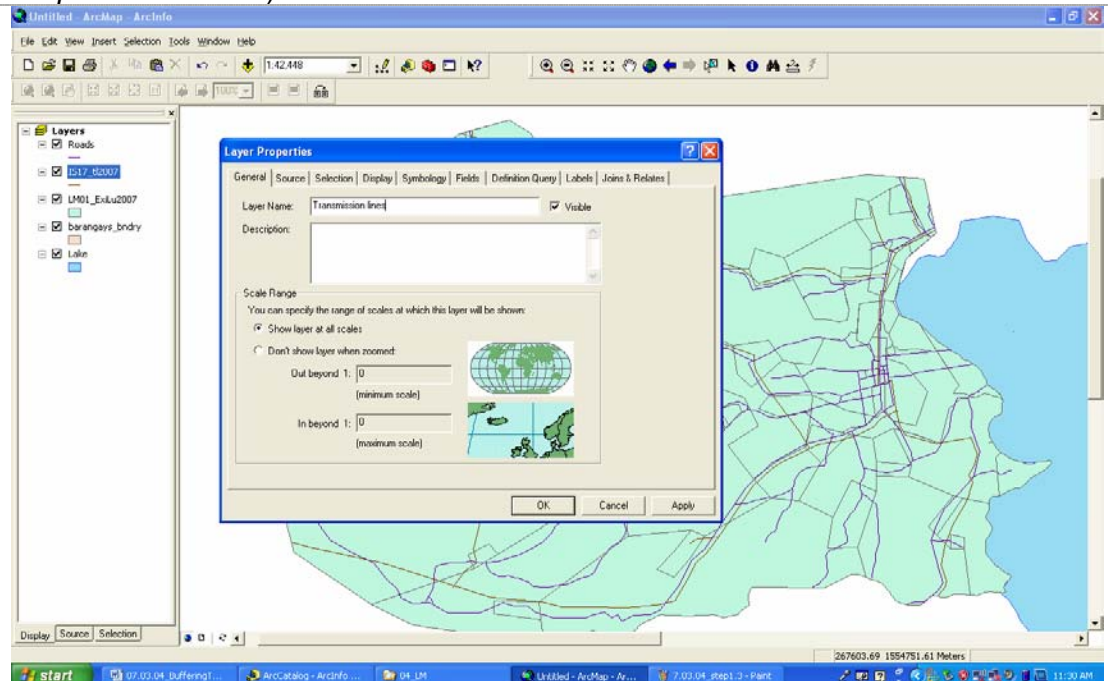
1.1 Open ArcMap. Select the *A New empty map* option.

1.2 Click on  to add the *IS17\_TI2007* (transmission lines) layer to the work space. It is found in *C:/CLUP\_EXERCISE\_DATA/02\_IS/* folder. Click **Add**.

Also add some base map features from the *C:/CLUP\_EXERCISE\_DATA/00\_BM/* folder such as *barangays\_bndry*, *Lake* and *Roads*. To identify conflicts with residential/urban areas we need to add a land use layer. Add the *LM01\_ExiLu2007* layer from the */04\_LM/* folder.

1.3 Rename the *IS17\_TI2007* layer to *Transmission Lines*. To do this, right-click on the layer in the table of content, select **Properties**. The *Layer Properties* window opens. Go to the **General** tab and type the new name in the *Layer name* field.

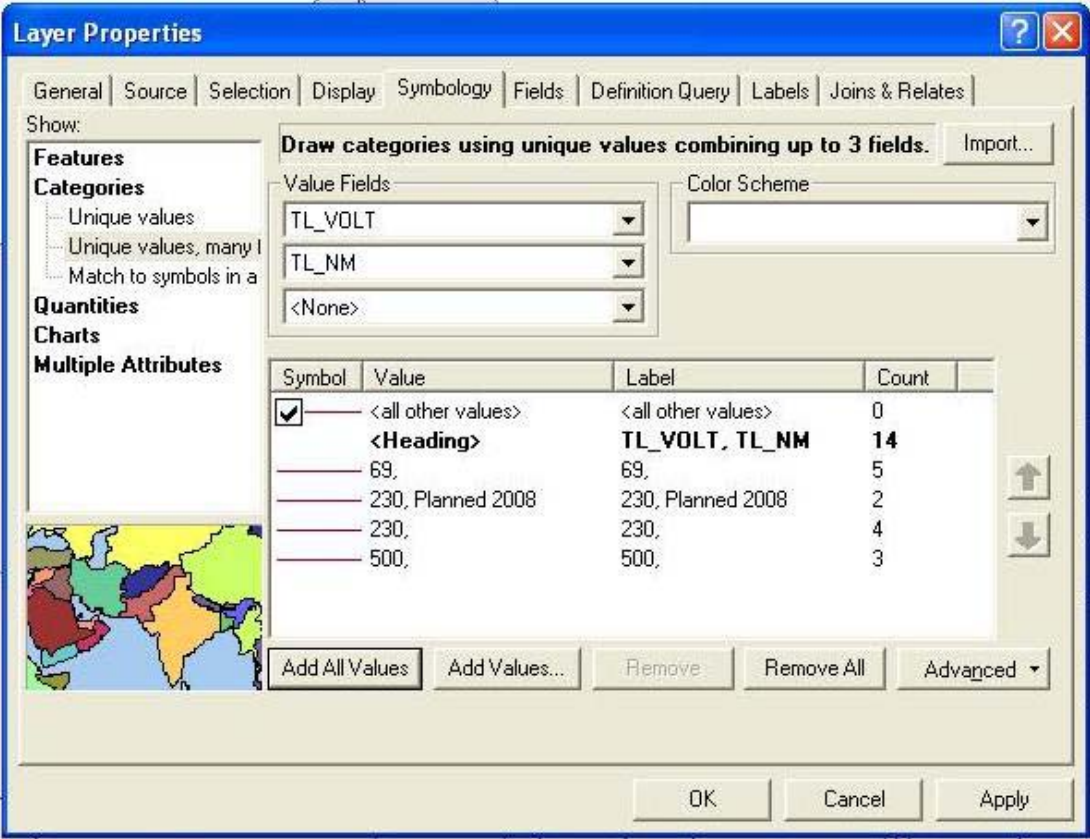
(See image below.) Click **OK**. (You can also click on the layer in the table of content and type the new layer in the table of content without opening the *Layer Properties* window.)



- 1.4 Also rename *LM01\_ExiLu2007* to 'Land use' and *barangays\_bndry* to 'Barangay boundaries'. (Repeat step 1.3 on these layers.)
- 1.5 In the menu bar click **File > Save As...** to save a map document as *buffering\_v1* in */CLUP\_EXERCISE\_DATA/06\_Workfolder/* Don't forget to save your progress now and then throughout the exercise.

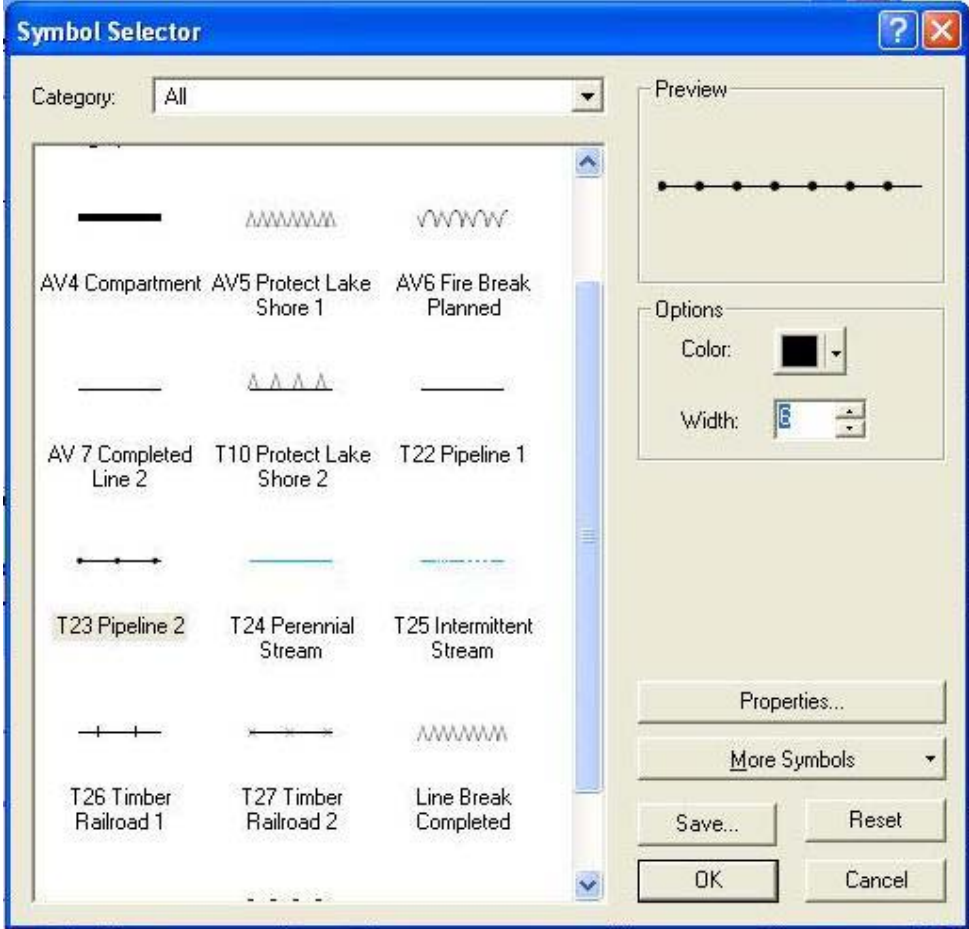
## 2 Applying symbology

- 2.1 First of all arrange the layers in the following order (from top to bottom): *Transmission lines, Roads, Barangay boundaries, Land use* and *Lake*. Simply drag the layers in the table of content so that they are positioned in the correct order.
- 2.2 Open the *Layer Properties* window (refer to step 1.3 if you forgot how to do this) and go to the **Symbology** tab for the *Transmission Lines* layer.
- 2.2 See image below. At the left, click on *Categories* and click *Unique values, many fields*. Then choose *TL\_VOLT* from the first *Value Fields* list menu and *TL\_NAME* from the second *Value Fields* list menu. Click the **Add All Values** button.



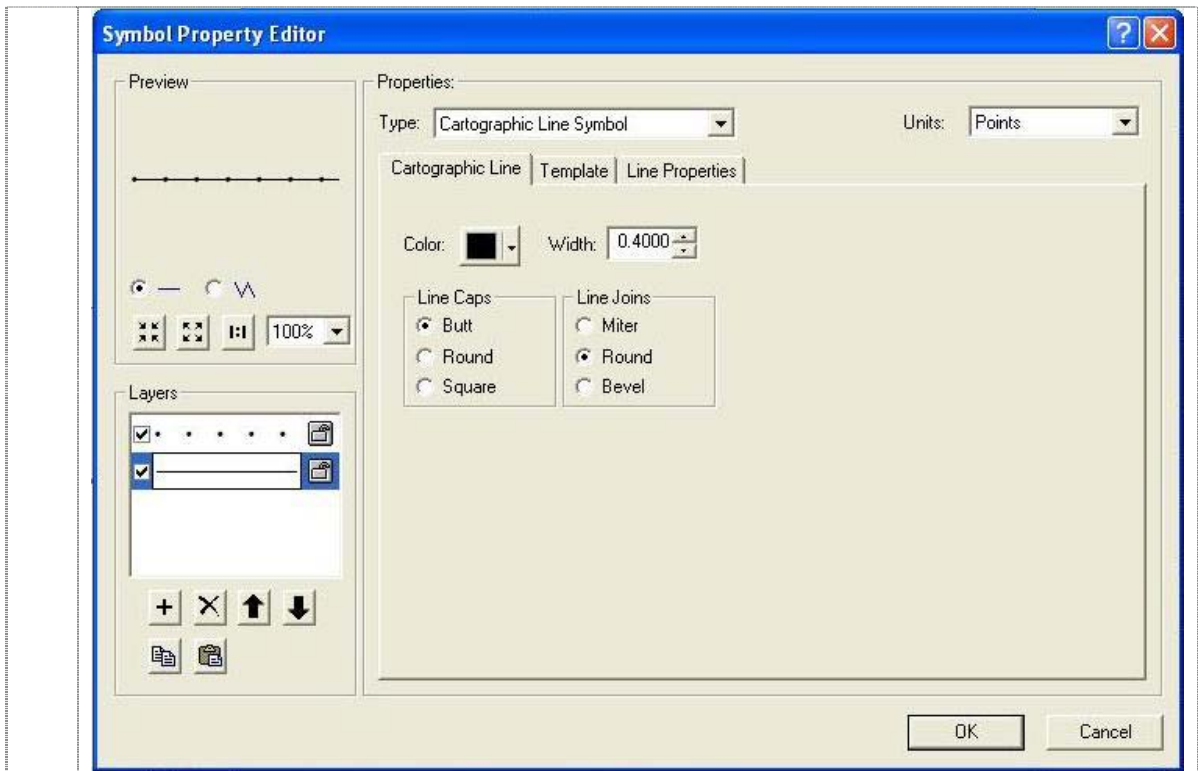
2.3 Uncheck the symbol for *<all other values>*. Place the cursor over the words *TL\_VOLT, TL\_NM* in the Label-column. Click once. You can now edit the label to 'Voltage (kV):'. In the same way rename the label for *230, Planned 2008* to '230 (planned)'. Delete the comma after *69, 230* and *500*. Click **Apply**.

2.4 Now right-click on *500* (in the *Value* column), select **Properties for selected Symbol(s)**. The *Symbol Selector* window will open. (see image below). Click **More symbols** and select *Forestry*. To the left, search and select the *T23 Pipeline 2* symbol. Choose width 9,00. Click **OK**.

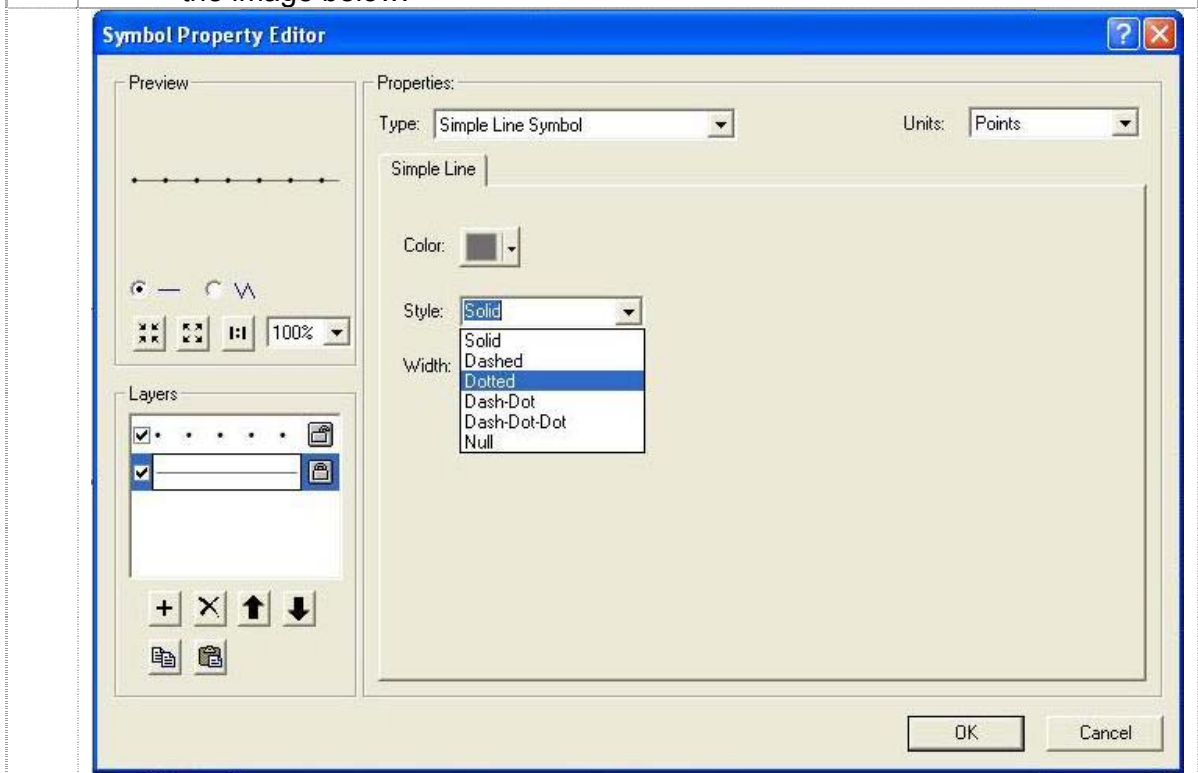


2.5 (Back in the *Layer Properties* window, click **Apply** if you want to update the map.) Repeat step 2.4 on the other categories (other voltage). Use the same symbol but the size '7,00' for 230 and 230 (*Planned*) and size '5,00' for 69. Click **Apply**.

2.6 To be able to separate the planned distribution lines from the already existing ones, open the *Symbol Selector* window for 230 (*Planned*) once more. Click **Properties**. The *Symbol Property Editor* window appears. In the *Layers* box at bottom-left, select the line symbol (see image below).

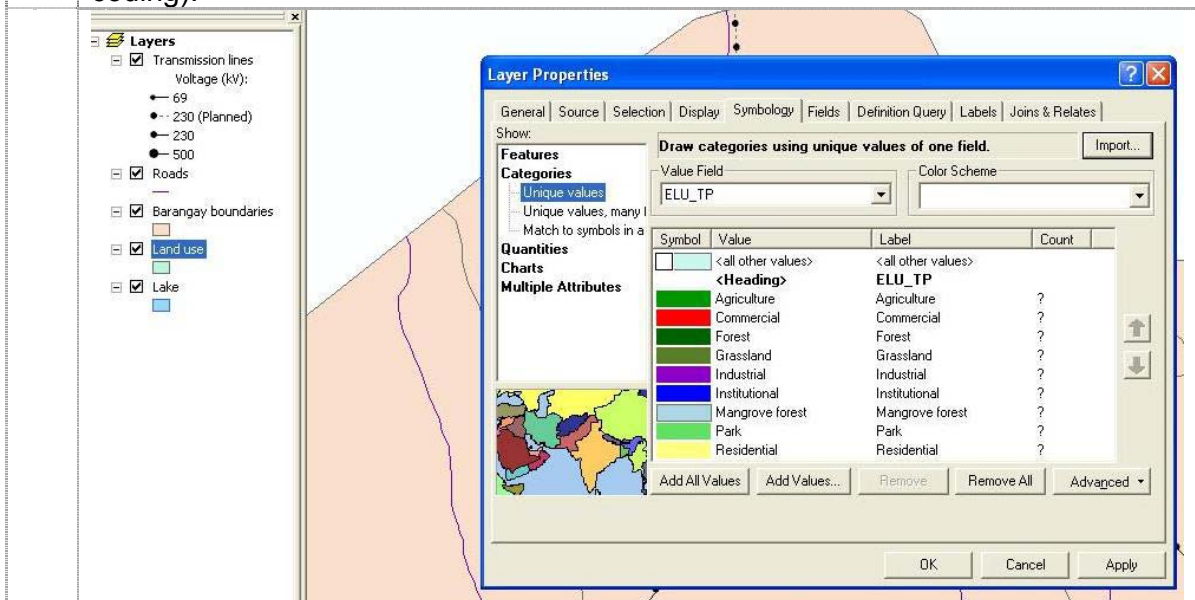


- 2.7 Select *Simple Line Symbol* from the *Type* list menu. The settings in the window changes to Simple line. From the *Style* list menu, select *Dotted*, as seen in the image below.



- 2.8 Click **OK** and **OK** again.
- 2.9 Now go to the **Symbology** tab in the *Layer Properties* window for the *Land Use* layer. Click **Import**. The *Import Symbology* window opens. Select the first option “...from a layer file” and browse for *landUse.lyr* (found in /LM\_04/ folder and click **Add**. Click **OK** in the *Import Symbology* window. The *Import Symbology Matching Dialog* window opens. Select *ELU\_TP* from the *Value Field* list menu. Click **OK**.

If this worked well the *Symbology* tab should now look like in the image below. If it didn't work out, follow the procedure as in step 2.2 but select only *Unique values* and assign symbols based on the *ELU\_TP* field (refer to 4.21.03 for proper color coding).



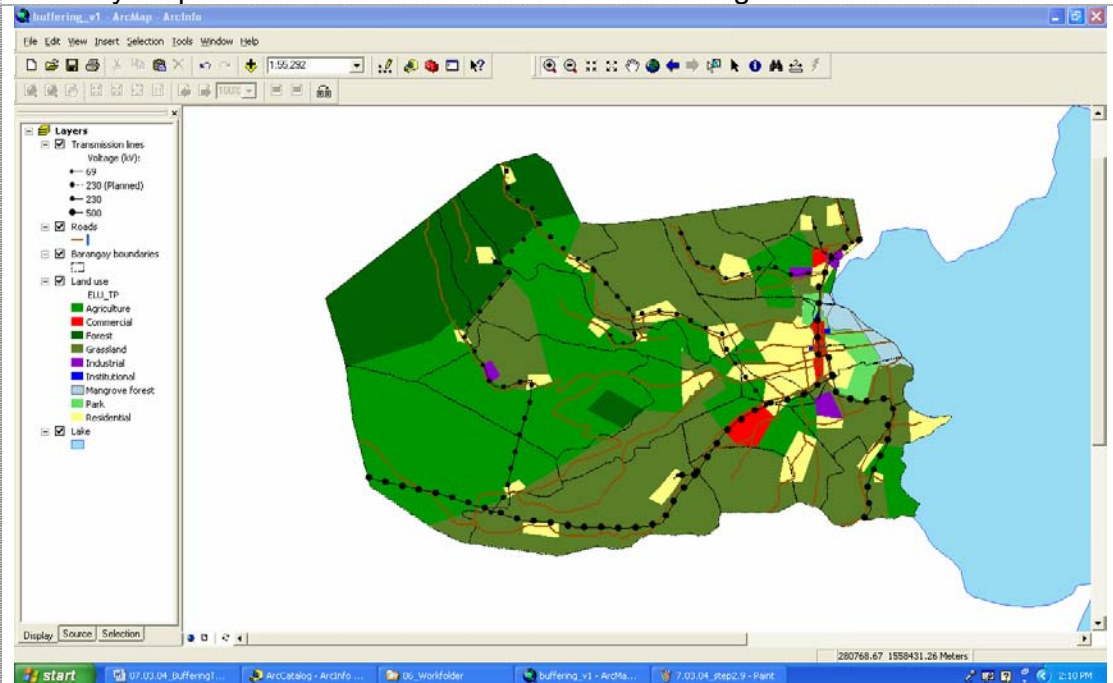
- 2.1 As you can see in the map, and from the order of the layers in the table of content, the *Barangay boundaries* layer covers the *Land use* layer (the nice palette in the land use layer cannot be seen in the map). Now, assign proper symbology for the *Barangay boundaries* layer – that is no fill-color (select *No color* and *Boundary, neighborhood* as outline symbol (click **Properties** in the *Symbol Selector* window and **Outline** in the *Symbol Selector Editor* window).

A tip! Since you don't need to categorize the symbology as in step 2.2-4 here, use this shortcut: Simply double-click on the symbol next to the layer's name in the table of content, and the *Symbol Selector* window will appear right away. Assign the proper symbology from here.

*If you add a polygon layer such as land use/coverage or built-up areas, this should be at the bottom. Then, polyline layers such as roads and rivers can be displayed atop on the polygon layer. This is also the reason why we assigned no fill-color to the Barangay boundary layer – the boundaries will now be shown atop of the other layers, whereas the barangays' areas (or more correct: surfaces) will be completely*

transparent.

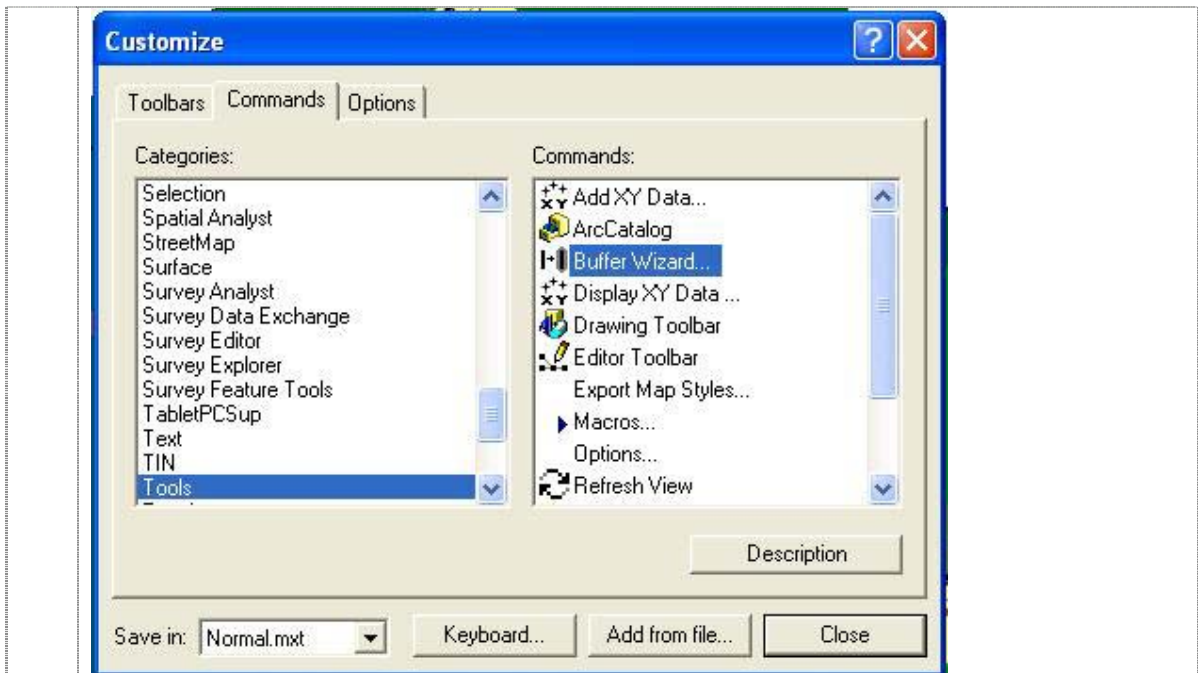
- 2.1 Verify that your layers are in a correct order (so that all features are displayed properly) and also have proper symbology. To change the order, simply drag each layer up or down in the table of content. See image below.



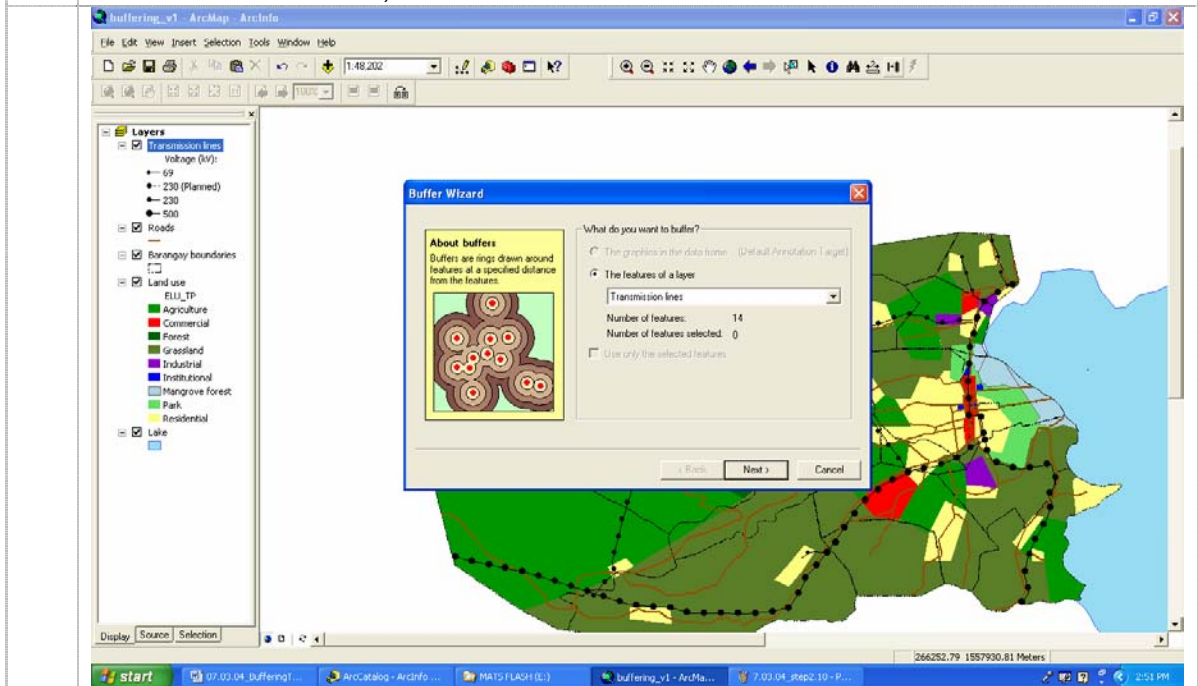
### 3 Creating a Buffer

*From the map we can see that the proposed new power line will cross through urban areas and it could be interesting to analyze the negative impact on existing urban settlements. The next step is therefore to do the buffering. Creating a buffer provides a visual representation on the map of the area within a certain distance of one or more features. We can also use the buffer to select features in other layers that fall within the buffered area.*

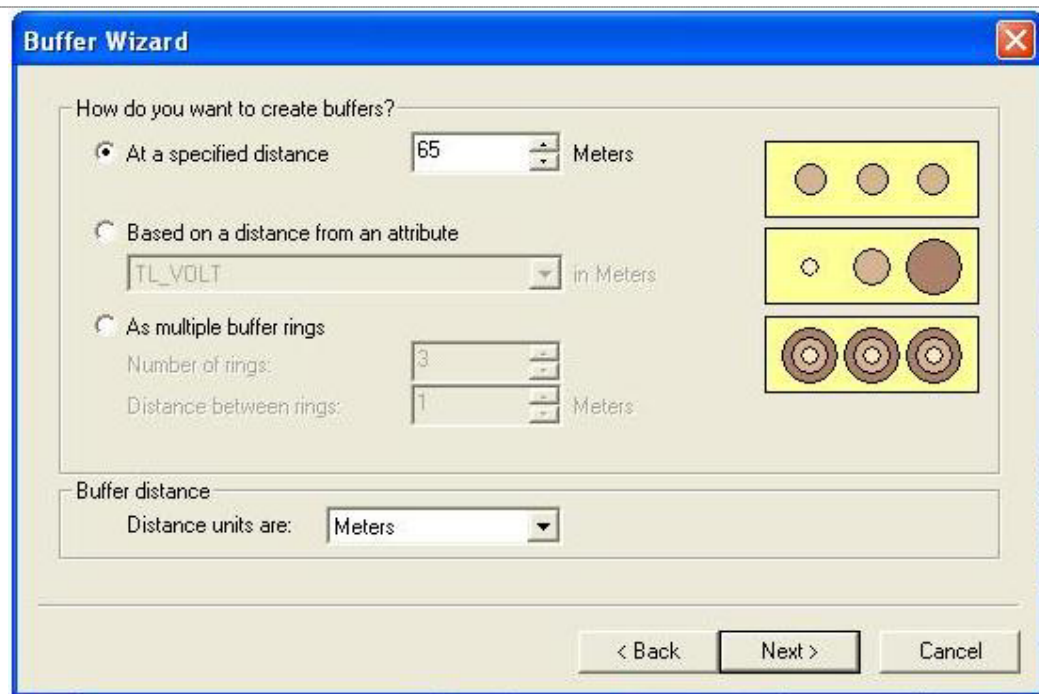
- 3.1 In the menu bar click **Tools > Customize**. The *Customize* window opens (see image below). Go to the **Commands** tab and select **Tools** in the *Categories* box at the left. Click the *Buffer Wizard* icon in the *Commands* box to the right. Drag the icon and drop it in the *Toolbar*. Click **Close**.




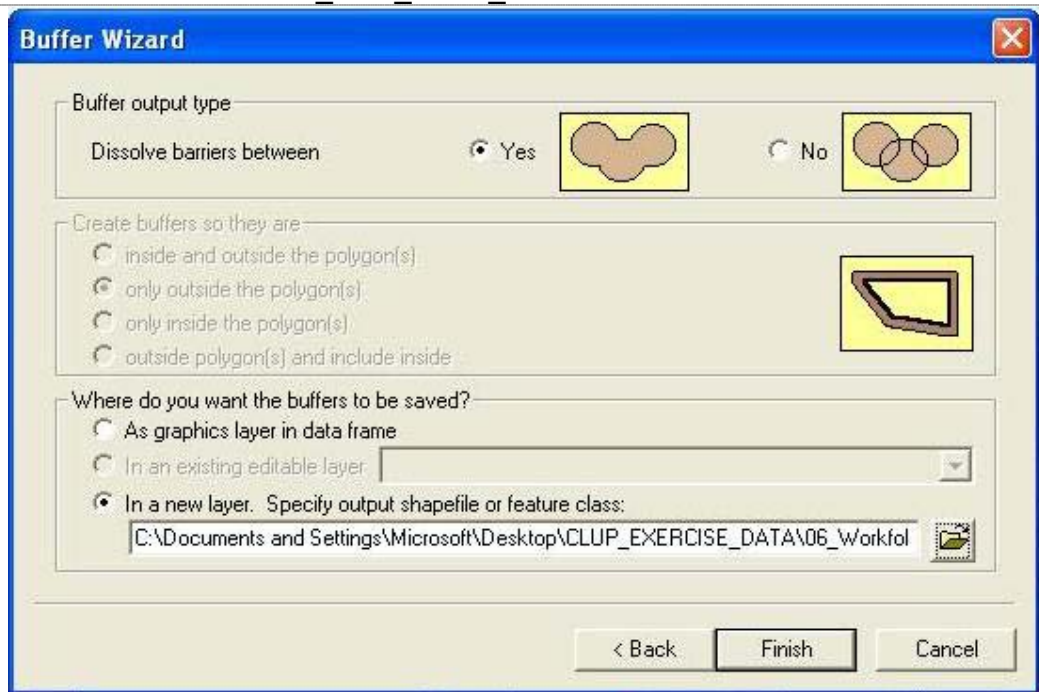
- 3.2 Now click the Buffer Wizard icon that you just dropped in the toolbar (⌘). The *Buffer wizard* window appears (see image below). Select *The features of a layer*. In the list menu below, select *Transmission Lines*. Click **Next**.



- 3.3 Refer to the image below. Select *At a specified distance* and type the distance. The buffer for a 500 kV transmission line is 65 m. Select *Meters* from the *Distance units are* list menu. Click **Next**.

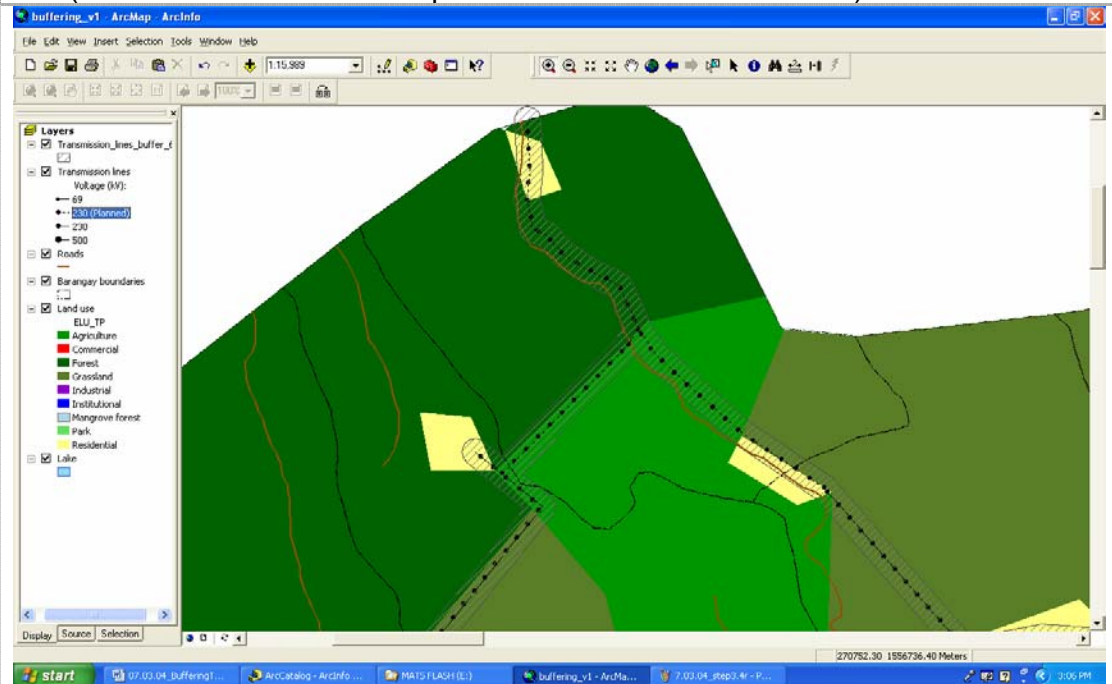


- 3.4 Refer to the image below: Select *Yes* to *Dissolve barriers between*. Select *In a new layer*. Specify output shapefile or feature class. Click on  to define the output folder */CLUP\_EXERCISE\_DATA/06\_Workfolder/* and type the filename *'Transmission\_lines\_buffer\_65m'*. Click **Save** then **Finish**.



- 3.5 Change symbology on the *Transmission\_lines\_buffer\_65m* layer to a hatching

symbol. You are now done with the exercise. The result will look something like this (zoomed in a bit where the planned transmission line starts):



*It seems that the alignment of the new distribution line will cause impact on substantial parts of the urban settlements. If an aerial photo or a cadastre dataset would have been available it would have been quite easy to point out what lots/parcels that will be affected. Maybe it is a good idea to try an alternative route for the new transmission line?*