

Getting Started Using ArcMap 9.x: Basic procedures to download, open, manipulate and print spatial data

These procedures outline:

- A. Downloading spatial data (from the Ryerson University Library website)
 - B. Uncompressing files
 - C. Opening the spatial files in ArcMap 9.x
 - D. Changing the appearance of the newly added layers
 - E. Browsing through the attribute table
 - F. Preparing the layout for printing and exporting the map into various file formats.
- Appendix A: Setting the appropriate projection

In order to use these instructions, you must have ArcMap 9.x. In this example, we are going to use shape files depicting major roads and highways, golf courses and a City of Toronto boundary file that have been downloaded from the Ryerson University Library website.

A. Downloading spatial data from the Ryerson University Library Website

The files that will be used in this example are all found on Ryerson University's Geospatial Map and Data Centre website. The files are part of the DMTI Route Logistics (version 2005.3) series. These are detailed digital map files for the City of Toronto containing generalized land use, specific sites for food and lodgings, government services, recreation, shopping, building footprints, churches, schools, and transportation services. In this example three files will be downloaded: major roads and highways, golf courses, and a City of Toronto boundary file.

1. Browse to the Ryerson University Library website (www.library.ryerson.ca) and **click Map & Data Resources**. This will take you to the Geospatial, Map & Data Centre page.

The screenshot shows the Ryerson University Library website. At the top, there is a navigation bar with 'RYERSON UNIVERSITY' and 'LIBRARY' logos, a search bar, and social media icons. Below the navigation bar, there is a 'New to the collection:' section with several book covers. The main content area is divided into three columns. The left column contains a vertical menu with the following items: 'Catalogue', 'Articles and Indexes', 'Research Help', 'About the Library/FAQ', 'Interlibrary Loan', 'Map & Data Resources' (highlighted with a red border), and 'Archives'. The middle column is titled 'Library News' and contains several links: 'More Laptops Available', 'Research Skills Workshops', 'The Library and Facebook', 'Scan Documents in the Library', and 'Colour Printing Now Available'. The right column is titled 'Quick Picks' and contains links: 'Hours', 'Check Your File', 'Ask a Librarian Chat', 'Book a Room', 'Library Cards', and 'Faculty Links'. At the bottom of the page, there is a footer with the text 'Home | Site Index | Contact Us ©2007 Ryerson University'.

2. Click on **Geospatial Data**. This will take you to the Geospatial Data page where you can read about and link to tutorials such as this one that give step by step procedures of how to use and manipulate various spatial data.

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- 3a. In the search textbox, type in **canmap routelogistics**. Click Search.

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Search for Geospatial Resources

Keyword(s) Search

For a multiple word search use one of the formats below:

CanMap RouteLogistics Search

Use an **'and'** operator to search for resources that contain **BOTH** words. For example: toronto and orthophoto

Use an **'or'** operator to search for resources that contain **EITHER** word. For example: toronto or orthophoto

Use a **'not'** operator to search for resources that contain the **FIRST** word, but eliminate resources containing the second word in a search. For example: toronto not orthophoto

Use a **'*'** to search for resources based on incomplete search words or phrases: For example: ortho* would find orthophoto, orthophotos, orthophotography, and orthorectified

- b. Scroll to and *click* the record titled **CanMap RouteLogistics 2005.3 (City of Toronto)**. **Note:** Do not click the record ending in CMA Toronto.
4. This is the record information page that gives detailed information about the data that you are about to download. *Click Link to Data*.

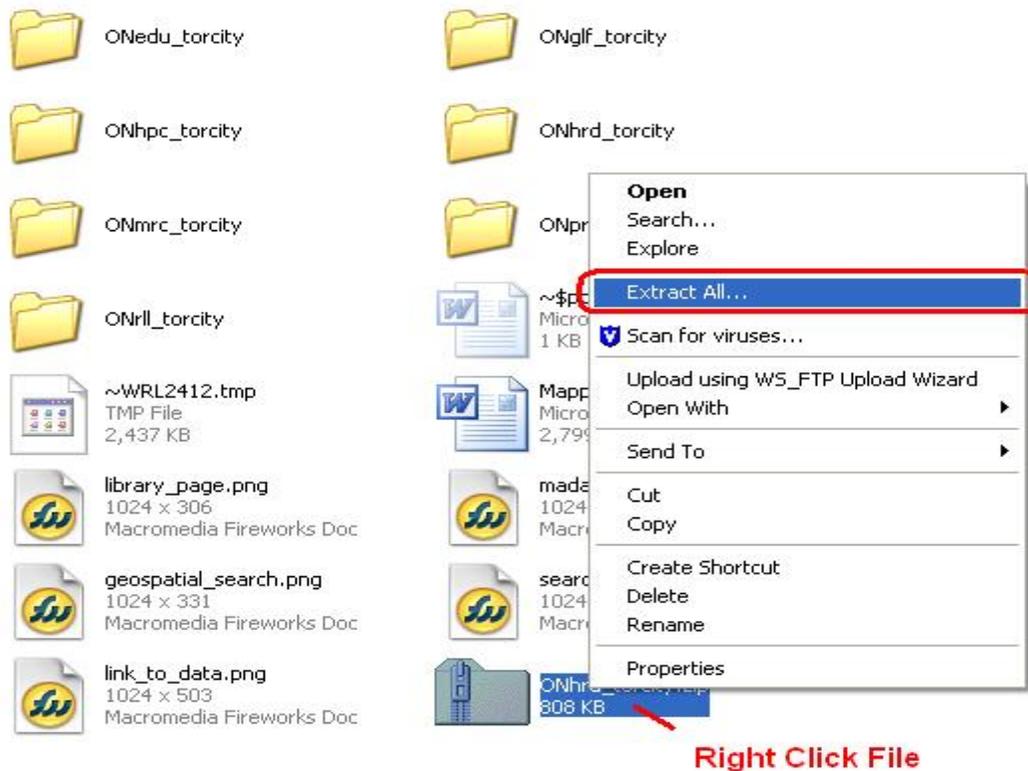
The screenshot shows the Ryerson University website's Geospatial Map and Data Centre. The header includes the Ryerson University logo, navigation links (Home, Web Mail, Site Index), a search bar, and buttons for 'CURRENT STUDENTS' and 'MY.RYERSON.CA (RAMSS)'. A secondary navigation bar lists various university services. Below this is a menu with categories like 'Current Students', 'Undergraduate', 'Graduate', etc. The main content area features a banner image of a computer lab and the text 'Geospatial Map and Data Centre'. A left sidebar contains a 'MADAR-Home' link and a 'GEOSPATIAL RESOURCES' section with sub-links for Toronto Resources, About GIS, Working with Geospatial Data, Internet Resources, and Licensing. Below this are sections for 'PAPER MAP RESOURCES', 'SOCIAL SCIENCE DATA', 'WHAT'S NEW', 'ABOUT US', and 'FAQs'. The main content area displays the record for 'CanMap RouteLogistics 2005.3 (City of Toronto)'. It includes a 'Change Text Size' control, the title, 'Publication Date : 2005', 'Edition : Version 2005.3', 'Geography : [City of Toronto](#)', and a 'Description' of detailed digital map files. At the bottom, 'Accessing the Data : [Link to Data](#)' is shown, with the link circled in red.

5. You will then be asked for your user name and password (the same as your Ryerson e-mail and password), fill this information out then *click Login*.
6. Read the DMTI Data Release Agreement then *click I Agree*.
- c. The view data is a page listing all the various DMTI files associated with the **CanMap RouteLogistics 2005.3 (City of Toronto)**. In this example we want to use major roads and highways, golf courses and the City of Toronto boundary file.
4. Scroll down and locate the follow files **ONhrd_torcity.zip**, **ONglf_torcity.zip**, and **ONmun_torcity.zip**.
- d. Once each file is *clicked*, you will be prompted to Open or Save each file. **Save** the file to an appropriate location on your hard drive. Repeat this step until all three files have been successfully downloaded.

B. Uncompressing the Downloaded Files

As you may have noticed while downloading the files, the extension for all the files was **.zip**. This is a Zip file or compressed file. Files are stored in this format on the server to save space. The following section outlines the procedure for uncompressing these files.

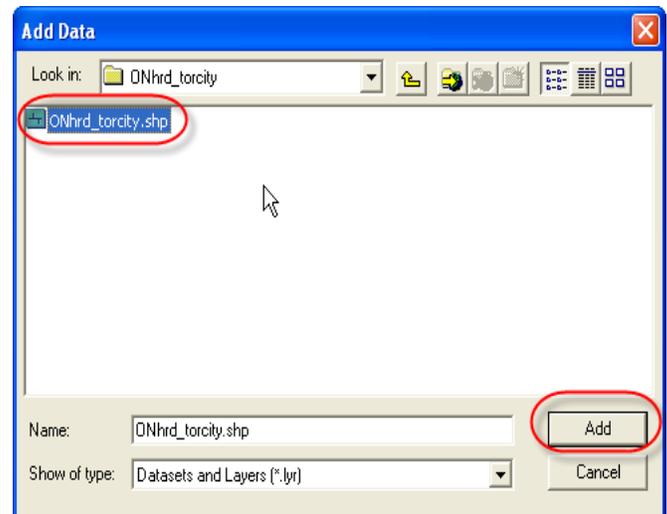
1. Browse to the location of the file.
2. *Right click* the desired file.
3. In the drop down menu, *click* **Extract All** and then follow the instructions in the **Extraction Wizard** for each file downloaded.



C. Opening the Spatial Files in ArcMap 9.x

ArcMap 9.x is software that allows the user to view, manipulate or create spatial data. ArcMap is part of the ArcGis software package created by ESRI. This section will demonstrate how to open and manipulate one or more files in ArcMap 9.x.

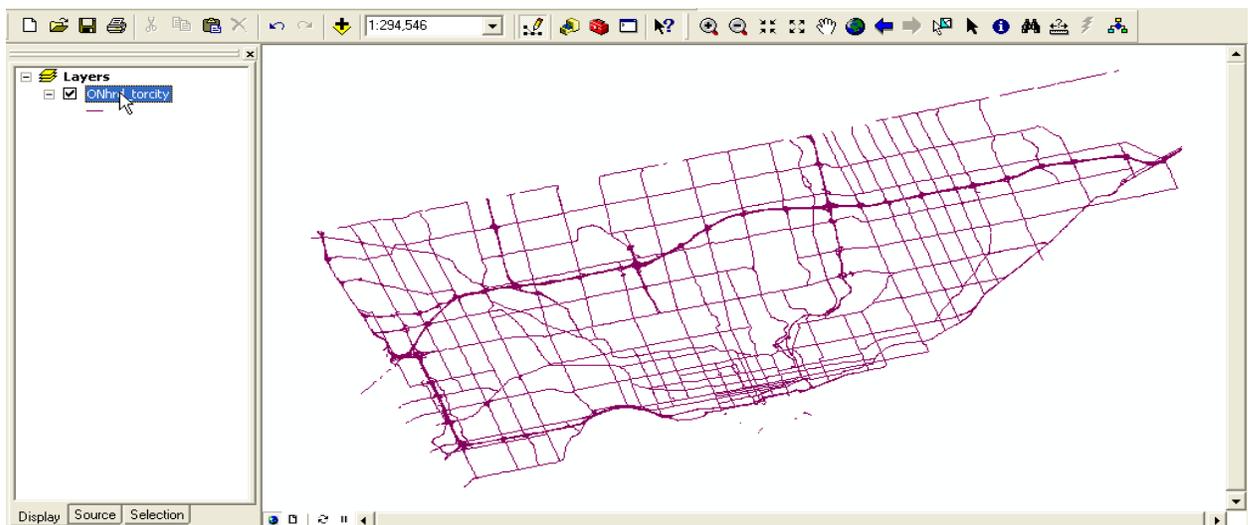
1. The first step is to open ArcMap. *Double-Click* on the **ArcMap 9.x** icon or *Select* **Start > Programs > ArcGIS > ArcMap**. ArcMap should automatically prompt the option to **Add Data**.



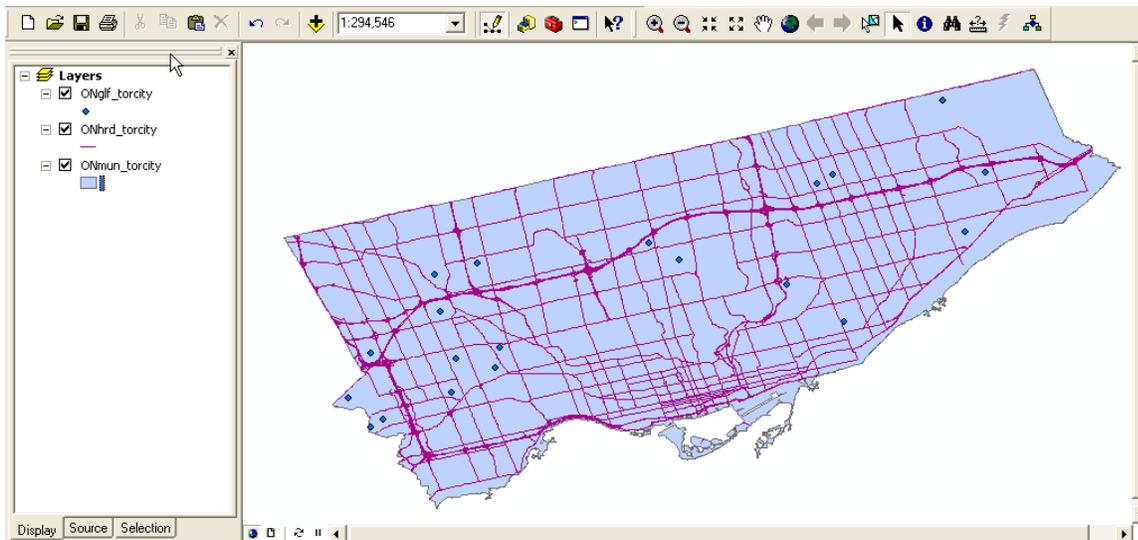
Otherwise, *Click* the **Add Data** button  .

2. In the **Add data** window, browse to the shape file that you wish to add. *Double click* the **Onhrd_torcity** folder to gain access to **Onhrd_torcity.shp**. **Note:** If there were more than one file in this folder, you can hold down the **CTRL** or **Shift** key to select multiple files and open them at the same time.
3. *Click* **Add**.

Your layout view (main viewing window) should show a file similar to the one below. **Onhrd_torcity** is a file depicting all of the major roads and highways in the City of Toronto.



4. Repeat steps 2 and 3 to open golf courses (**ONglf_torcity.zip**) and the City of Toronto boundary file (**ONmun_torcity.zip**) layers.
5. Your view should now look something like the image below. **Note:** Your colours may be slightly different as ArcMap 9.x chooses the colours at random when the files are initially opened. The next section will demonstrate how to change these colours.

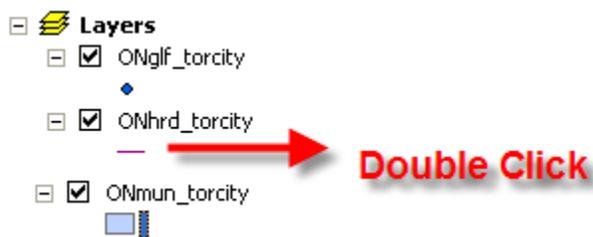


D. Changing the appearance of the newly added layers

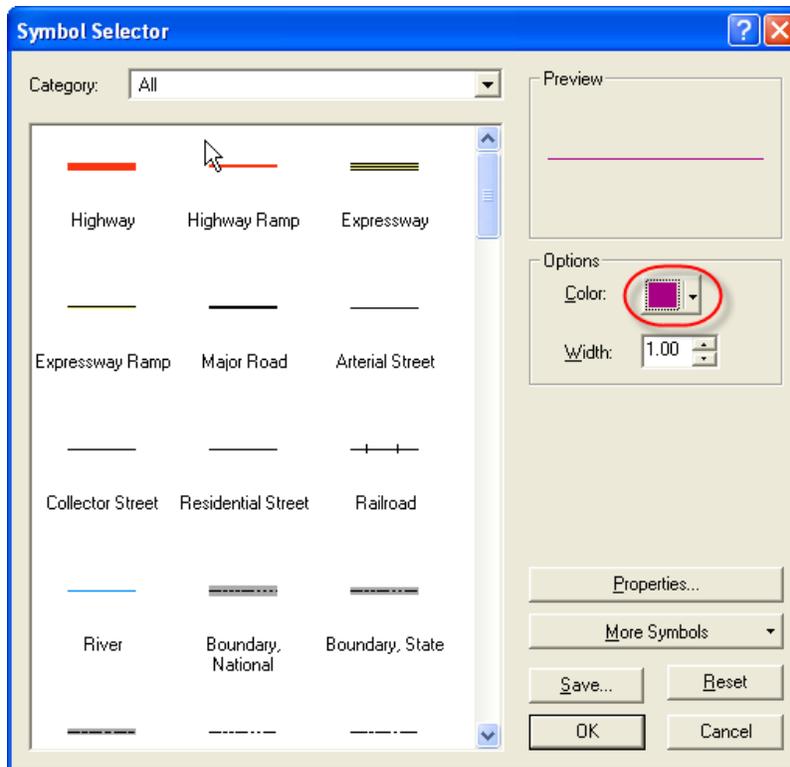
As noted above, ArcMap's colour selection is random, thus there is a probability that the files will open with an undesired colour. Changing the appearance of these layers is very simple.

Lets begin with major roads (**ONhrd_torcity**). Following common cartographic principles, road layers are usually black.

1. In the Layers window, *double click* the **line** representing the road layer.



2. In the **Symbol Selector** window you have the option of changing the type, colour, width or advanced properties of the symbol. In this example, we simply want to change the colour of the symbol.
 - a. In the **Options** area, *click* the colour pallet and change the colour to black (as shown below). *Click OK*.

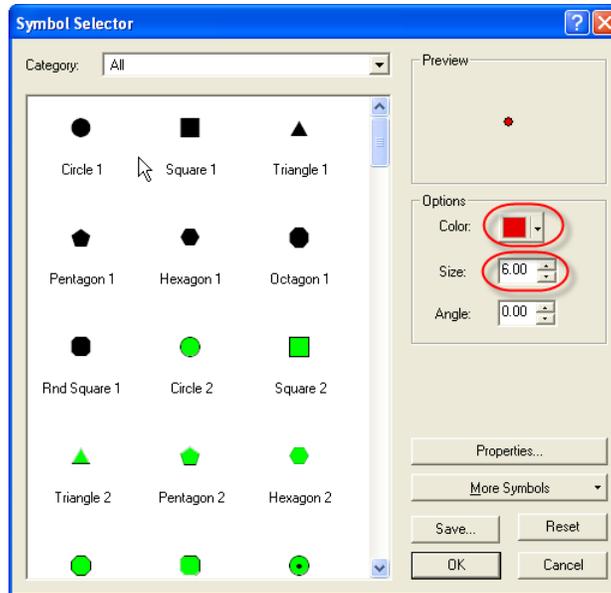


Your roads layer should now be black.

3. Similarly to the roads layer, *double click* on the point (located under the file name **ONglf_torcity.zip**) representing the golf courses symbol.



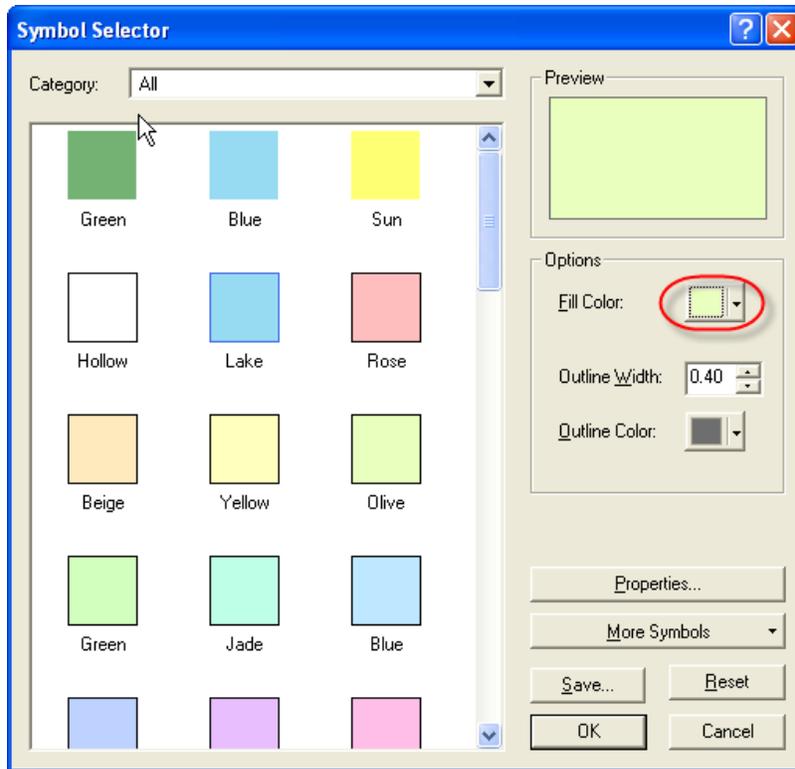
- a. As you may have noted, the points are relatively small. In the **Options** area, change the size to **6** and *click* on the colour pallet and change the colour to red.



- b. *Click* **OK**.
- 4. Finally, *double click* on the box (located under the file name **ONmun_torcity.zip**) representing the City of Toronto boundary file.

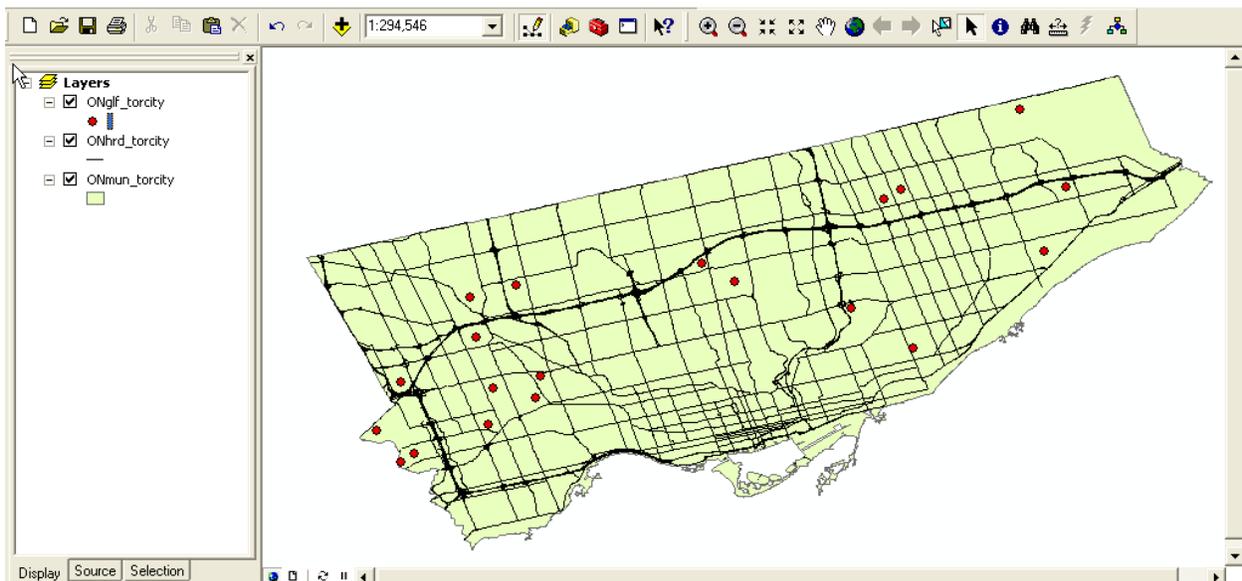


- a. In the **Options** area *click* the colour pallet and change the colour to a light green.



b. *Click OK.*

If done correctly, your map should look like the image below.

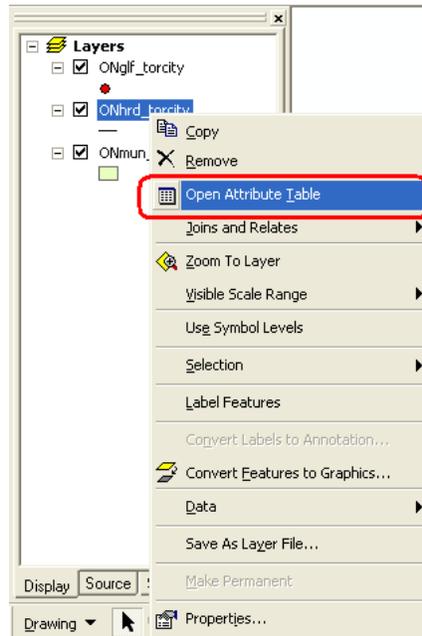


E. Browsing through the Attribute Table

With geospatial data it is very important to make sure that the data you are using is suitable for your project. For example, later on in the project, you may want to search for specific attributes and you may find that none exist. One way to check for missing

data is to browse through the attribute table and make sure that each layer has relevant attribute data. In this section the attributes for the major roads will be browsed.

1. In the **Layers** window, *right click* **ONhrd_torcity** then scroll down and *click* **Open Attribute Table**.



2. As you can see, the attribute table is populated with appropriate data. You can use the scroll bar locate at the bottom of the window to scroll left and right. Once finished viewing the attribute table, close the attribute table window (**Do Not** close ArcMap 9.x).

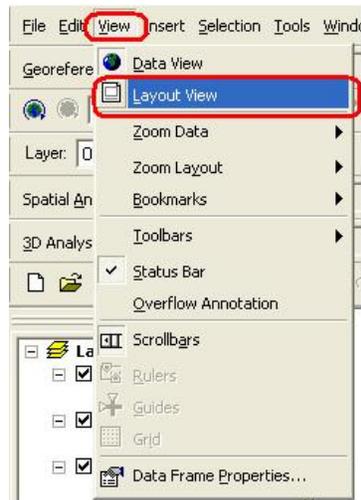
FID	Shape*	STREET	CARTO	
0	Polyline		1	MISSISSAUGA
1	Polyline	HIGHWAY 409	1	MISSISSAUGA
2	Polyline	EGLINTON AVE E	4	TORONTO
3	Polyline	HIGHWAY 401	1	TORONTO
4	Polyline	HIGHWAY 401	1	TORONTO
5	Polyline	BRIMLEY RD	4	TORONTO
6	Polyline	SHEPPARD AVE E	4	TORONTO
7	Polyline	KINGSTON RD	4	TORONTO
8	Polyline	DUNDAS ST E	4	MISSISSAUGA
9	Polyline	HIGHWAY 427	1	MISSISSAUGA

Record: 1 Show: All Selected Records (0 out of 10675 Selected.) Options

F. Preparing the Layout for Printing or Exporting to PDF and other Formats

Compared to other GIS software, creating a layout in ArcMap is a simple task. The following section describes how to create a basic layout including the fundamental map elements.

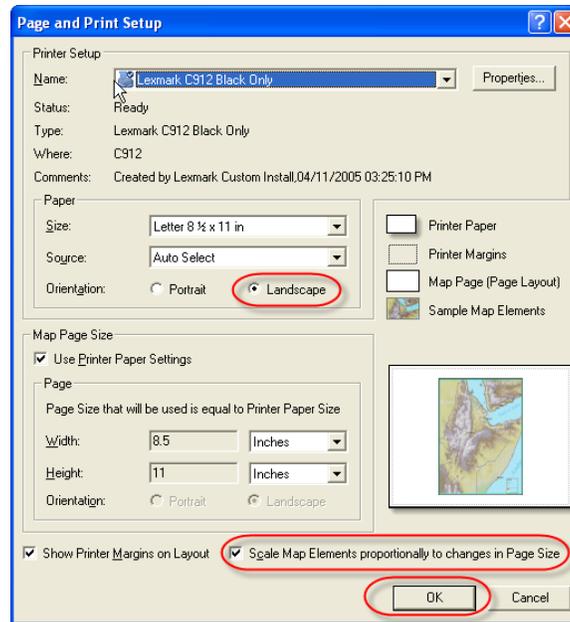
1. To change the View from **Data View** to **Layout View**. *Click View* from the main menu and *Select Layout View* from the drop down menu.



2. The City of Toronto map is elongated horizontally, thus it would be more appropriate to display the map on a landscape image. From the main menu, *click File* then *click Page and Print Setup*.



- a. In the **Page and Print Setup** window *click on the Landscape* radio button and *check on the Scale Map Elements ...* button. Then *click OK*.



You should notice that your layout view has changed to landscape.

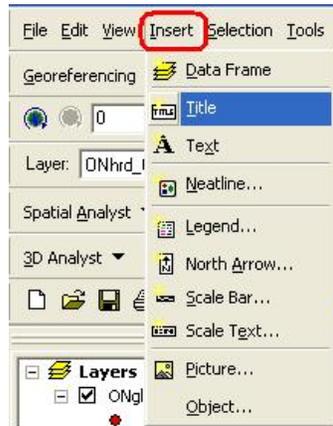
3. Neatline – A neatline is automatically added to the layout view, however, in the previous step we changed the layout to landscape and now the neatline must be adjusted to fit the print layout. In order to do this, grab one of the corners of the neatline and drag it to the corresponding corner of the page layout (**Do not** pull the corner farther than the dotted lines because anything outside of that region will not be printed). Example below.



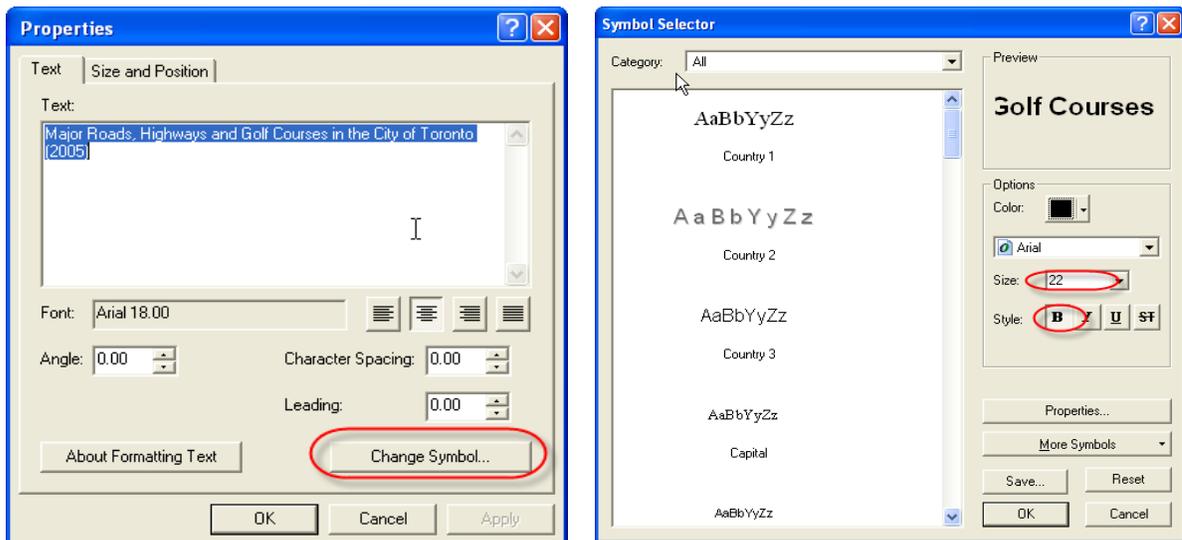
Note: if you would like to add a neatline to other objects in the layout, *click* the object, *click Insert* from the main menu, then *click Neatline*. The **Neatline** window will appear allowing you to change the properties of the neatline. *Click OK*, when you are satisfied with the neatline.

4. **Click Insert** from the main menu. In the ensuing drop down menu, you can add a Title, Legend, North Arrow, and Scale Bar. Once inserted into the layout view,

each item can be manipulated by *Double-Clicking* on it. Examples are listed below:



5. Title – Click **Insert** from the main menu. Select **Title**. In the **Text** textbox type in the title *Major Roads, Highways and Golf Courses in the City of Toronto (2005)* then push **Enter** on your keyboard. *Double-Click* the Title to open the **Properties** window.



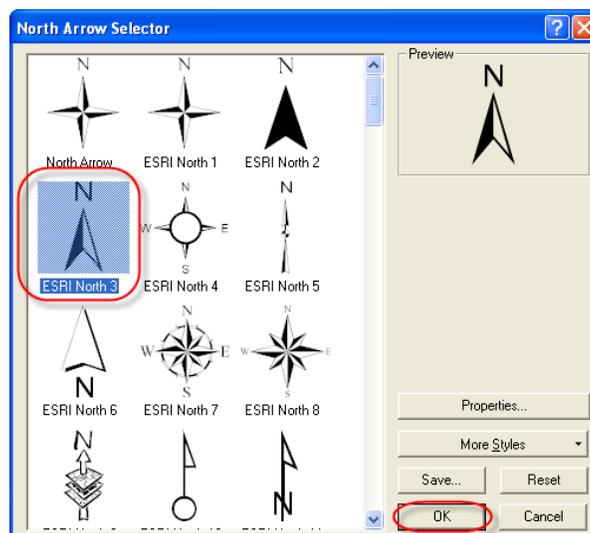
Click Change Symbol. In the **Symbol Selector** window, you can change the properties of the text. *Click* the bolded **B** in order to make the text bold. Change the font size to **22**. *Click OK*, then *click OK* again.

6. Legend - Click **Insert** from the main menu. Select **Legend**. The **Legend Wizard** window will appear. *Click Next*. Change the legend title if you wish, otherwise *click Next*. *Click Next* two more times, then *click Finish*. *Click* and *drag* the legend from the centre of the layout and move it to the bottom right corner.

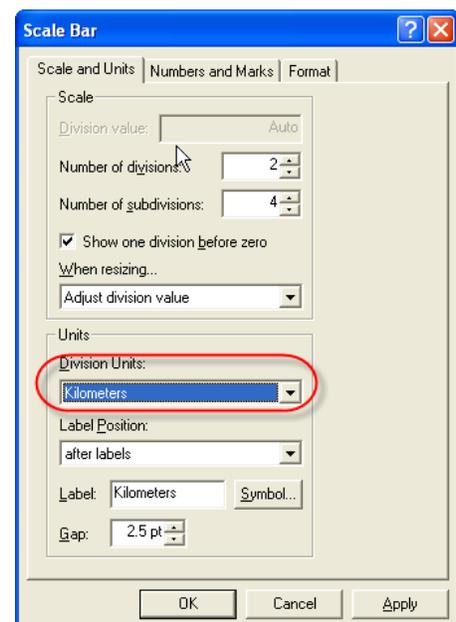
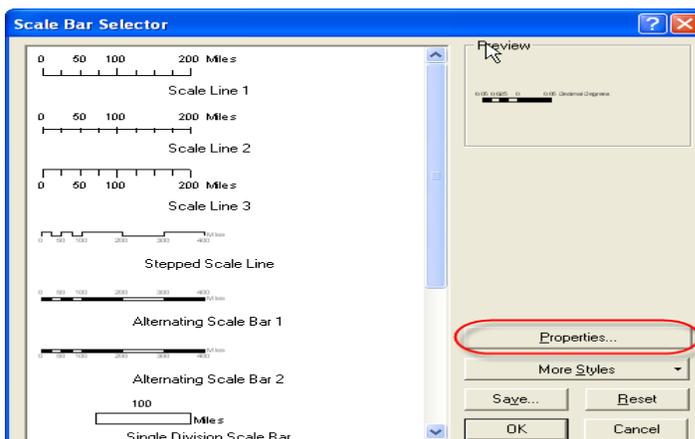
To customize the legend labels, *left click* the appropriate layer in the **Layer** window then wait two seconds and click it again, you should now be able to change the name. Change **ONhrd_torcity** to *Major Roads*, **ONGlf_torcity** to *Golf Courses* and **ONmun_torcity** to *City of Toronto*.



7. North Arrow - Click **Insert** from the main menu. Select **North Arrow**. In the **North Arrow Selector** window, chose an appropriate north arrow then *click* **OK**. *Click* and *drag* the north arrow from the centre of the layout and move it to the bottom left corner.

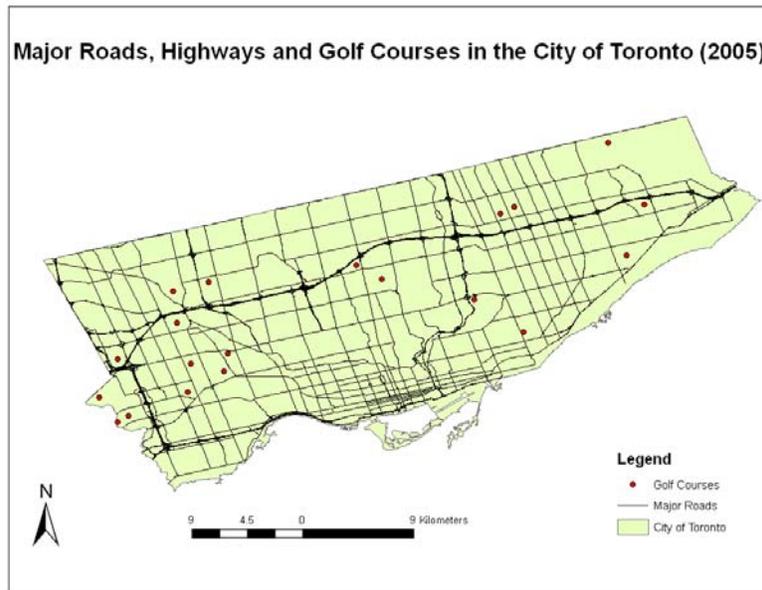


8. Scale Bar - Click **Insert** from the main menu. Select **Scale Bar**. Click **Properties** to open the **Scale Bar** window. In the **Division Units** textbox, select **kilometers**. Click **OK**. Click **OK**. Click and *drag* the scale bar from the centre of the layout and move it to an appropriate position below the map.



If done correctly, your map should look like the image

below.

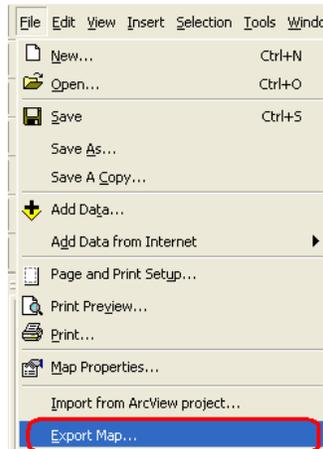


9. To print the map, **Click File** from the main menu and **Select Print** from the drop down menu. After selecting the appropriate printer and print specifications, **Click OK**.

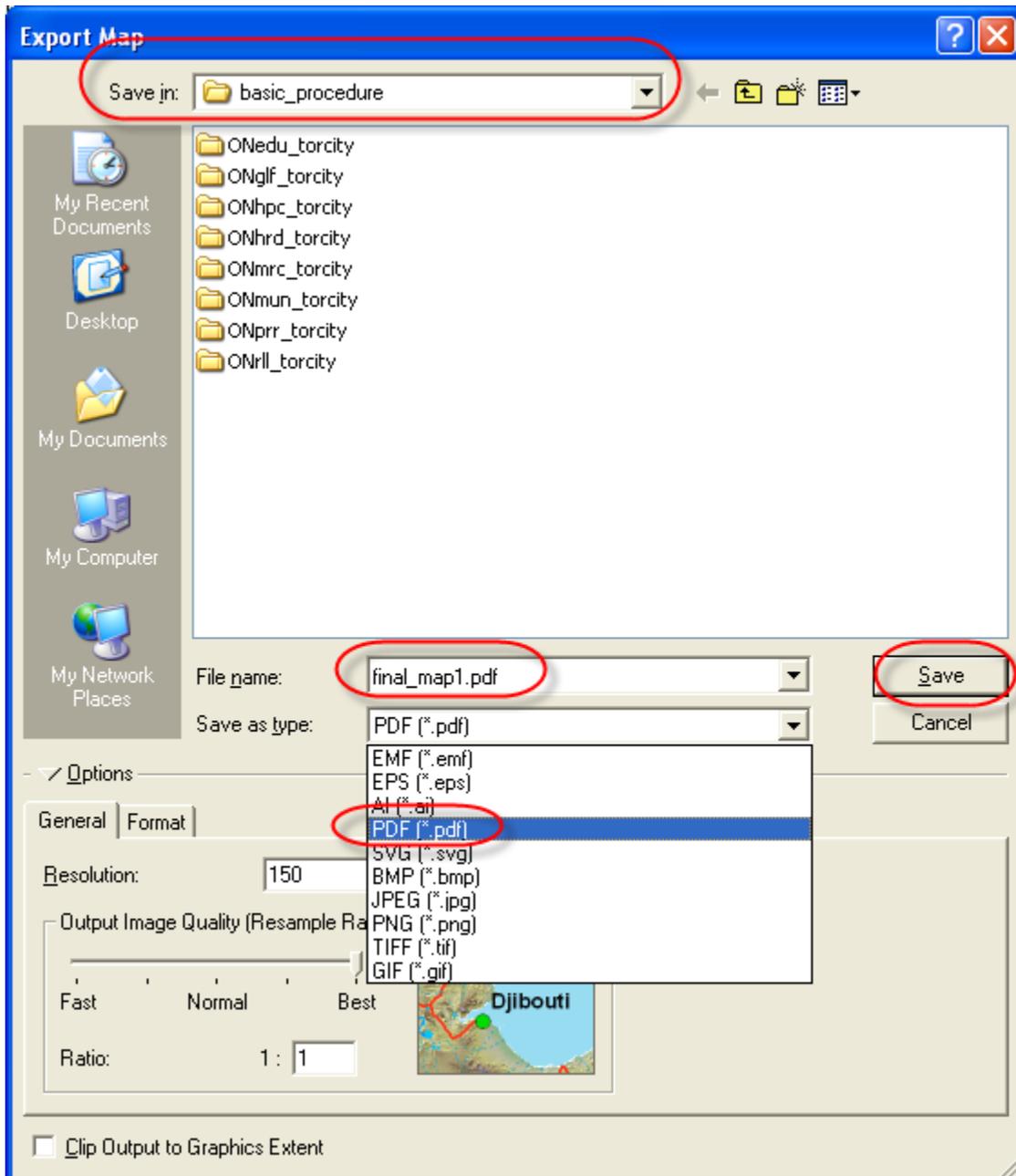
Exporting to PDF or Other Formats

Alternatively, you may opt to export your map and save it for later use rather than printing your map. ArcMap offers a variety of file types that you can save your map as. The following procedure will show you how to export your map, using one of the various file types.

1. Once you have completed *Steps 1* through *8* above or you are satisfied with your map, you may begin the export procedure. **Click File** from the main menu and **Select Export Map**.



- The **Export Map** window will open. In the **Save In** window, *browse* to the location that you wish to save your map. In the **File Name** text box, chose an appropriate name for your map. In the **Save as Type** textbox *select* the format that you would like to save your map in.



- Click **Save**.

Appendix A. Setting the Appropriate Projection

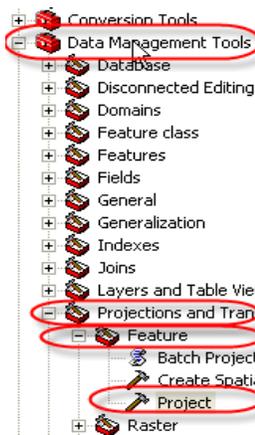
A map projection is any method used in cartography (mapmaking) to portray the surface of the earth or a portion of the earth on a flat surface. Essentially, flat maps could not

exist without map projections. Distortions of conformality, distance, direction, scale, or area always result from this process.

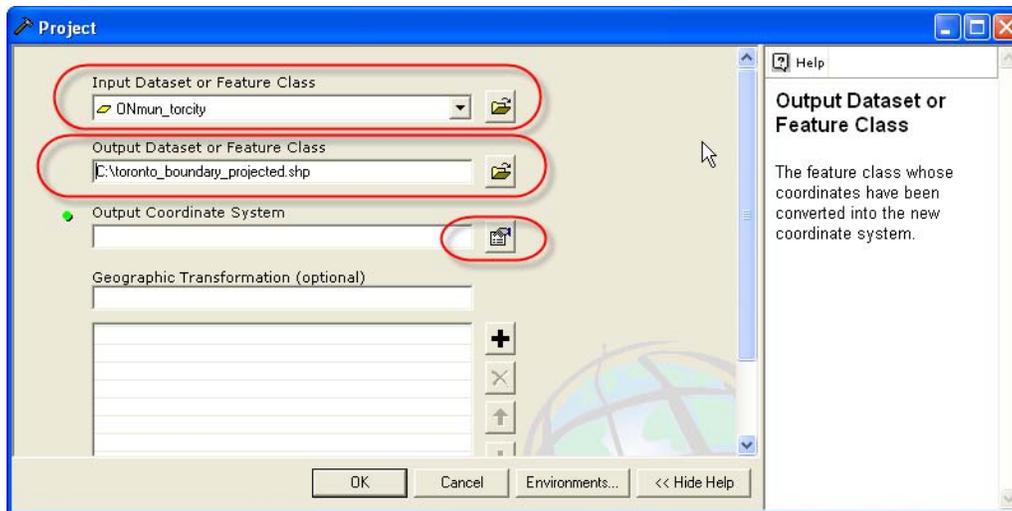
The City of Toronto is generally viewed using the UTM NAD (Universal Transverse Mercator North American Datum) 1983 zone 17 N projection. The files (major roads, golf courses and the City of Toronto boundary file) used in the procedure above were automatically opened in ArcMap 9.x in the unprojected NAD 1983 projection. The following steps will outline how to correctly project the data.

Note: This procedure should be carried out after ArcMap is opened. Follow the steps outlined in section C: *Opening the Spatial Files in ArcMap 9.x* (Steps 1 through 3) to open and add data to your layout view. This procedure should be carried out for all files that you wish to project. In this example, we will correctly project the City of Toronto boundary file.

1. Click the **ArcToolbox** button  to open the **ArcToolbox** window.
2. In **ArcToolbox** window *double click* **Data Management Tools > Projections and Transformation > Feature > Project**.

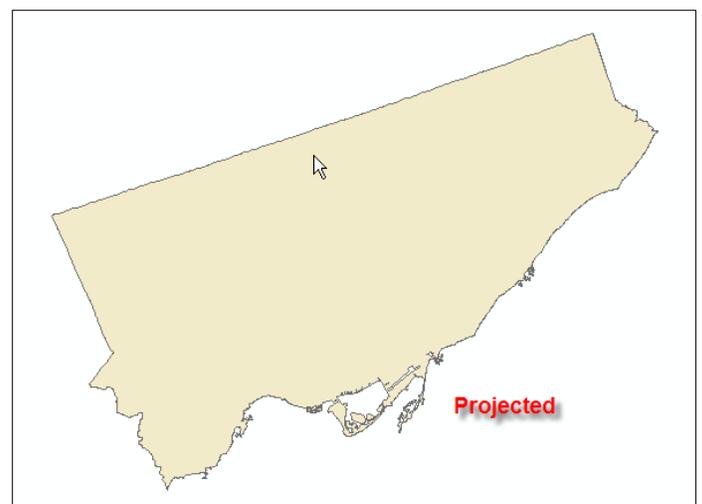
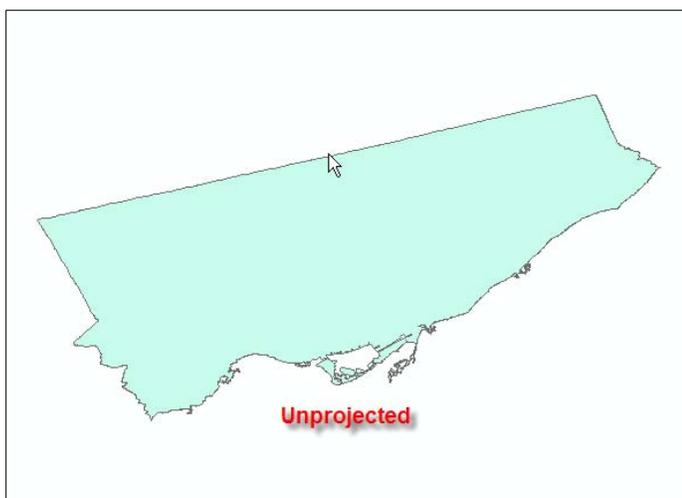


3. In the **Input Dataset or Feature Class** textbox use the small down arrow  or the open folder  button to select the layer you want to project (**ONmun_torcity**).
 - a. In the **Output Dataset or Feature Class** window use the open folder  button to browse to an appropriate location to store your projected layer. **Note:** When choosing a name for a file in ArcMap, never use spaces or abnormal characters such as %&*@. If you need to space your words, use the underscore character: “_”.
 - b. Click the **Data Frame Properties** button .



4. In the **Spatial Reference Properties** window *click Select*.
 - a. *Double click the Projected Coordinate Systems > Double click UTM > Double click NAD 1983 > Double click NAD 1983 UTM Zone 17N.prj.*
 - b. In the **Spatial Reference Properties** window *click Apply* then *click OK*.
 - c. In the **Project** window *click OK*.
5. Once the dialog box indicates that the projection transformation has been completed, *click Close*.

Your newly projected boundary file will be added to the main data view. Initially there is no difference between the two files because the data frame is still set to the projection of the unprojected boundary file. However, if you close and reopen ArcMap with the newly projected City of Toronto boundary file, you will notice a significant difference as seen below:



May 17, 2006
Noel Damba