

# Exercise

## Working with Label Classes and Advanced Label Settings

Section 4 Exercise 2

05/2020



# Working with Label Classes and Advanced Label Settings

## Instructions

Use this guide and ArcGIS Pro to reproduce the results of the exercise on your own.

*Note: The version of ArcGIS Pro that you are using for this course may produce slightly different results from the screen shots that you see in the course materials.*

## Time to complete

Approximately 40-50 minutes

## Software requirements

ArcGIS Pro 2.5

ArcGIS Pro Standard license (or higher)

*Note: The MOOC provides a separate ArcGIS account (user name and password) that you will need to use to license ArcGIS Pro and access other software applications used throughout the MOOC exercises. This account (user name ending with \_cart) provides the appropriate ArcGIS Online role, ArcGIS Pro license, ArcGIS Pro extensions, and credits. We strongly recommend that you use the provided course ArcGIS account to ensure that you have the appropriate licensing to complete the exercises. Exercises may require credits. Using the provided course ArcGIS account ensures that you do not consume your organization's credits. Esri is not responsible for any credits consumed if you use a different account. Moreover, Esri will not provide technical support to students who use a different account.*

## Introduction

As you have been learning, carefully planned text placement adds tremendous value, as it helps the reader quickly discern what a feature is while providing important locational information. Graphically, it helps set a tone for the map and provides balance.

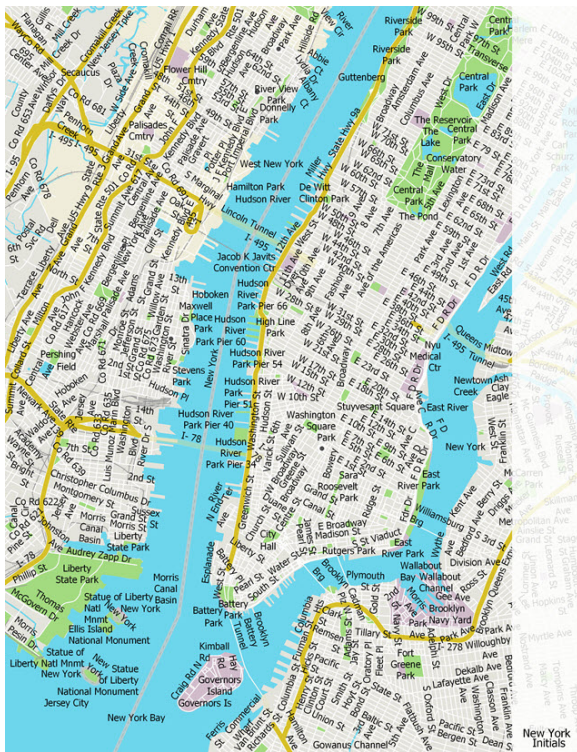
Extending beyond the map, the text in the marginalia should be considered in the overall construction of a map. Whether that be text in a title, a legend, or an app interface, that text is just as important as text placed in the map.

In this exercise, you will learn how to create separate label styles for features that are in the same layer using label classes, as well as how to use queries to label only specific subsets of features. You will use advanced label settings to refine the text even further. Finally, you will add text to a map layout.

## What will you learn?

In this exercise, you will learn how to go beyond the labeling defaults. You will label a street map and then create a layout for it. Along the way, you will learn some tips and tricks about labeling that will lay the groundwork for future mapmaking.

Original map



LabelingAMap\_Before.jpg

Map with refined label placement



LabelingAMap\_After.jpg

*Note: These image files are included in the exercise ZIP file.*

While your final map does not need to look exactly like the map on the right, this example can be used as a reference. You might want to try making yours look like this example the first time through the exercise. Then, you might want to make another version with your own styling when you feel comfortable with the concepts.

## Step 1: Create label classes

- a If necessary, start ArcGIS Pro and open the LabelingAMap\_<your first and last name>.aprx project file that you saved in the previous exercise.

In this map, the state border line runs through the Hudson River and shows the boundary between the states of New York and New Jersey. In this step, you will label this border line.

- b In the Contents pane, select the State Lines layer and turn on the labels.

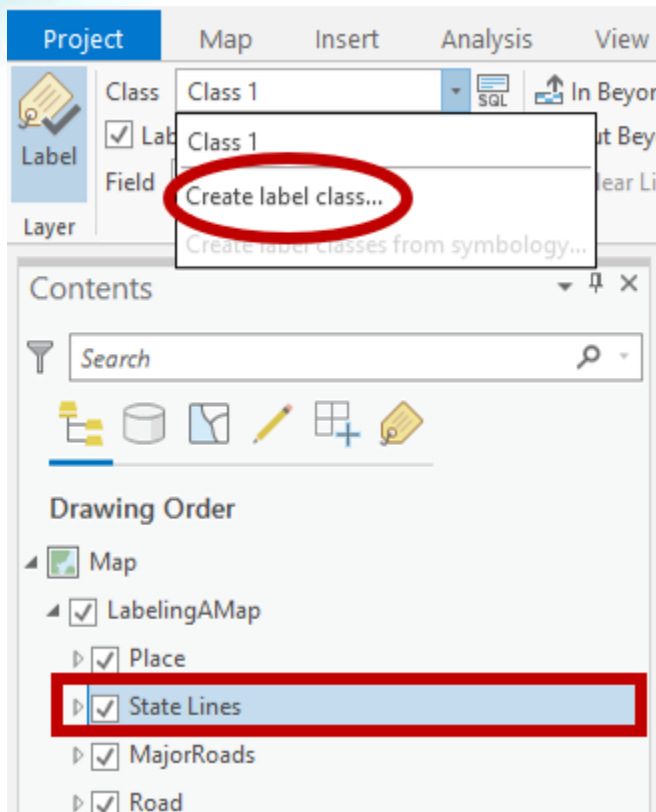
There is a single line feature running through the Hudson River representing the border between the two states in the map. You want to give the line a unique label to indicate which side of the line is the state of New York and which side is the state of New Jersey. You can use label classes to specify different labeling properties for features within the same layer.

Label classes can be used to restrict labels to certain features or to specify different label fields, symbols, scale ranges, label priorities, and sets of label placement options for different groups of labels. Up to this point, you have been working with a single label class for each layer. In this step, you will create two label classes, one for each of the state name labels associated with the state line feature.

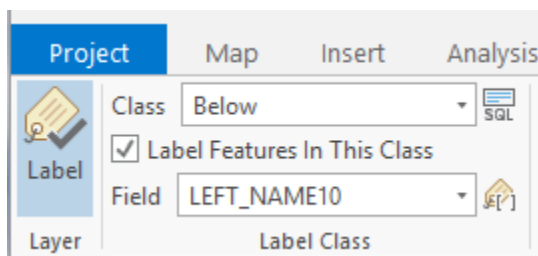
From the Labeling tab, in the Label Class group, for Class, you can see that Class 1 already exists, and the LEFT\_NAME10 field value is being used for the current New York label in the map. You will create a new label class for New York and then modify this label class for New Jersey.

- c From the Labeling tab, in the Label Class group, click the Class down arrow and choose Create Label Class.






- d In the Create New Label Class dialog box, for the name, type **Below** and click OK.

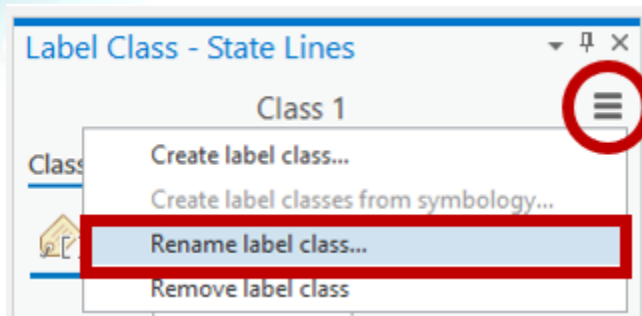


This is the class that will be used for the New York label.

Now, when you click the Class drop-down list, there are two classes listed: the original Class 1 and the new Below class.

You will change the name of the Class 1 class to make it more understandable.

- e In the Label Class pane, click the Class down arrow and choose Class 1.
- f Click the Class tab, if necessary, and then with Class set to Class 1, click the Menu button  and choose Rename Label Class.

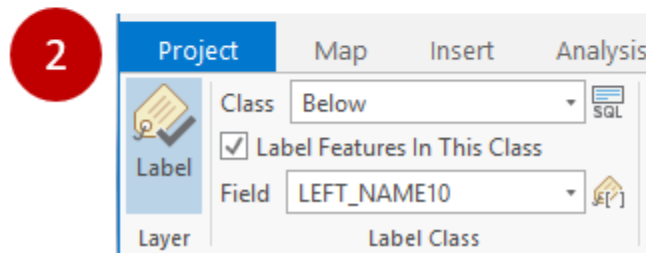
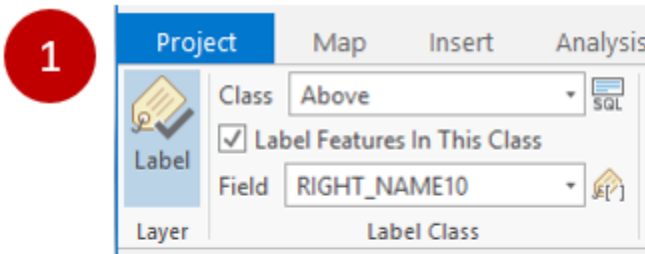


- g Name the new label class **Above** and click OK.

This is the class that will be used for the New Jersey label.

You now have two label classes, a State Lines - Below label class and a State Lines - Above label class.

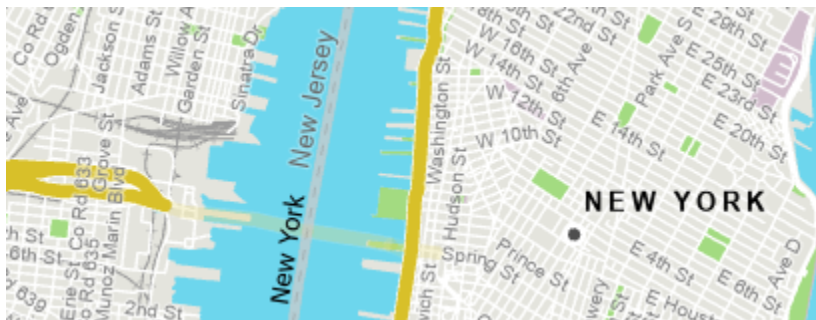
- h From the Labeling tab, in the Label Class group, ensure that the class is set to Above.
- i Click the Field down arrow and choose the RIGHT\_NAME10 field, as shown in the following graphic.



j With the Above class still selected, change the label as follows.

- Text appearance:
  - Font: Arial
  - Size: 10 point
  - Text style: Regular
  - Color: 60% gray
- Halo:
  - Color: White
  - Transparency: **75%**
  - Size: 1 point

k In the Label Class pane, click Apply to see the changes in the map.




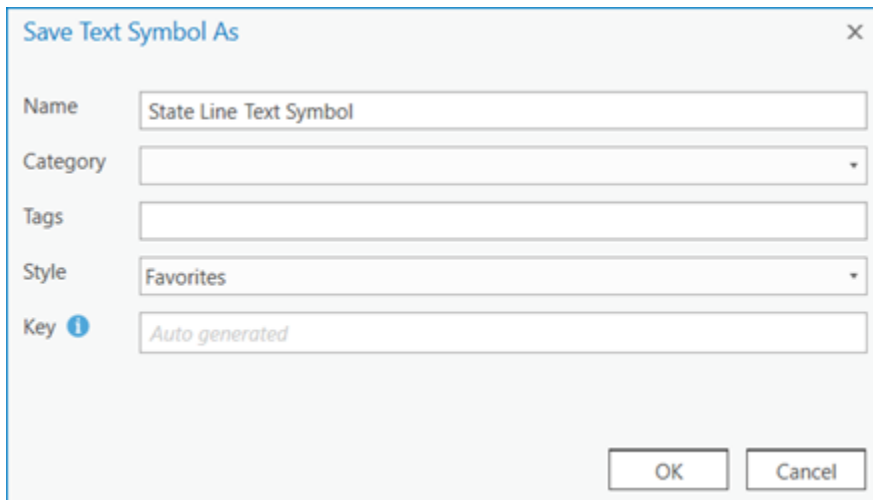
The New Jersey label (the Above class) reflects the changes. Instead of repeating these settings for the Below class, you can save the information in a style. Symbols can be optionally stored, managed, and saved for reuse in project resources called styles. Styles are databases that hold symbols, symbol primitives (like colors), and layout elements like north arrows (<https://bit.ly/2JmxaH6>) and scale bars (<https://bit.ly/2vTv4vk>).

l Save your project.

## Step 2: Save symbols to a style

This is a good opportunity to save a symbol style for the Above label class text symbol, as you will want to mimic it in the other State Lines class.

- a In the Label Class pane, from the Symbol tab, click the Menu button  and choose Save Symbol To Style.
- b Complete the Save Text Symbol As dialog box as follows:
  - For Name, type **State Line Text Symbol**.
  - For Category, leave the field blank, as categories are optional.
  - For Tags, leave the field blank. Tags are optional, and ArcGIS Pro will automatically apply tags based on the graphic properties of the symbol.
  - For Style, accept the default.



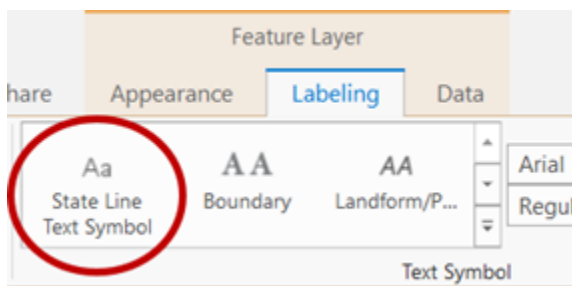
The dialog box titled "Save Text Symbol As" contains the following fields:

- Name:** State Line Text Symbol
- Category:** (empty dropdown)
- Tags:** (empty text field)
- Style:** Favorites
- Key:** Auto generated

Buttons: OK, Cancel

- c Click OK to close the Save Text Symbol As dialog box.

The new text symbol style appears in the Text Symbol group on the Labeling tab.

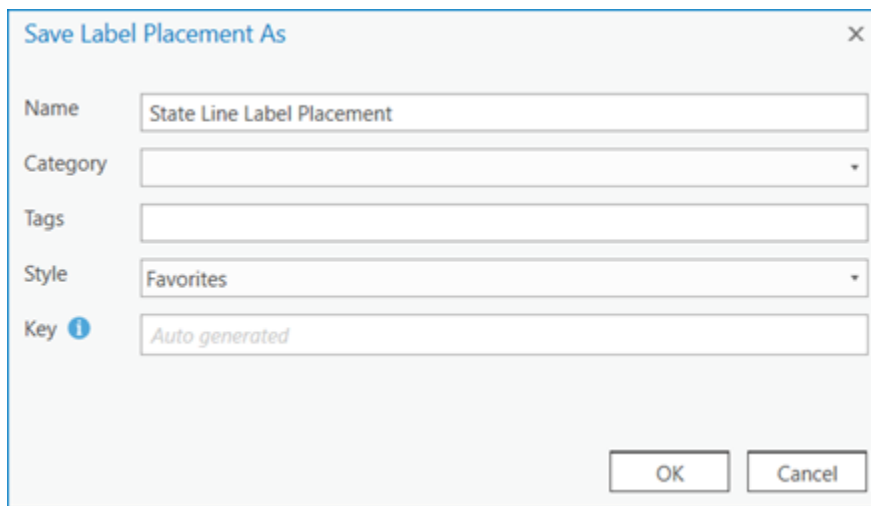


Now you will change some placement and position settings and save those settings to another style.

- d In the Label Class pane, for the Above label class, click the Position tab.



- e Set the following text position style parameters:
- Set Primary Offset to **3** Points.
  - Ensure that Constrain Offset is set to Above Line.
  - Turn the Stack Label option off.
  - Set Maximum Overrun to **0**.
  - Remove all duplicate labels.
- f Save the label placement position to a style named **State Line Label Placement**.

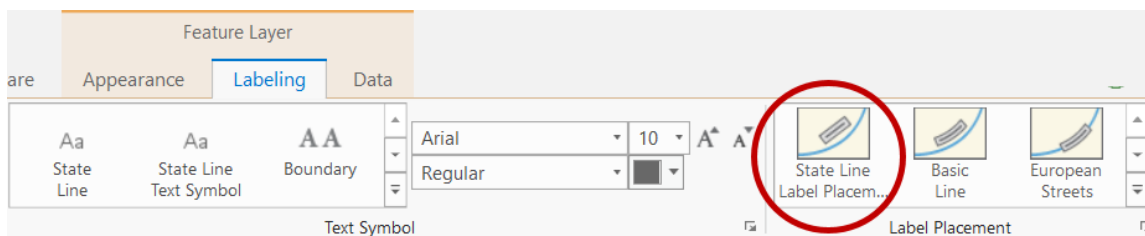


The dialog box 'Save Label Placement As' contains the following fields:

- Name:** State Line Label Placement
- Category:** (empty dropdown)
- Tags:** (empty text field)
- Style:** Favorites
- Key:** Auto generated

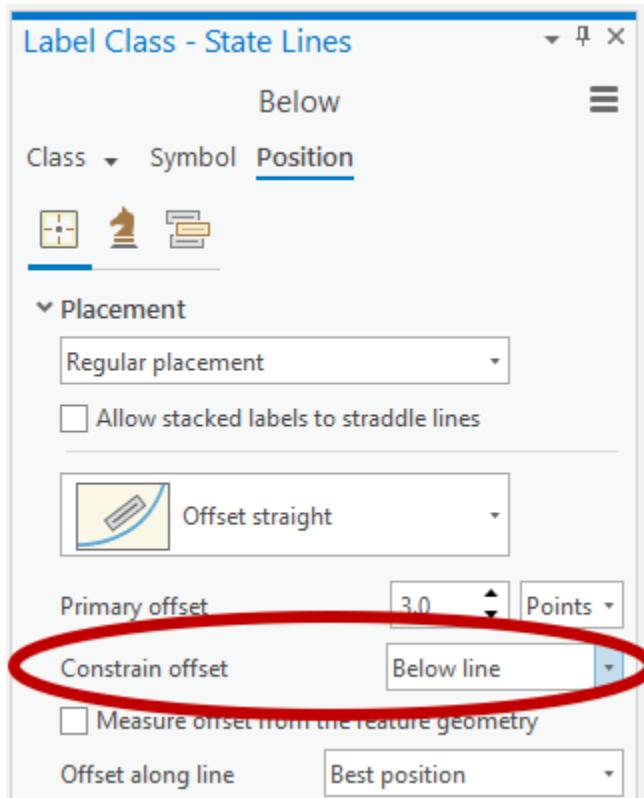
Buttons: OK, Cancel

The style will appear on the Labeling tab in the Label Placement group.



- g From the Labeling tab, in the Label Class group, change the Class field to Below.
- h In the Text Symbol group, choose the newly saved label style (State Line Text Symbol).
- i In the Label Placement group, choose the newly saved label placement style (State Line Label Placement).

- j In the Label Class pane, from the Position tab, change the Constrain Offset placement value to Below Line.



Now the state line labels resemble the following graphic, with the New Jersey label above and the New York label below the state line feature.



**Tips and Tricks:** Having labels read in the same orientation along a boundary eases the readability.

### Step 3: Use a query expression to label a subset of features

The MajorRoads feature class contains major roads, such as highways and other major thoroughfares. These line features include both a name, which is the name of the major road, and a shield, which is the highway shield number. Highway shields denote the number of a highway or major road (for example, I-495 or I-78 in this map). These signs are used for navigating routes.

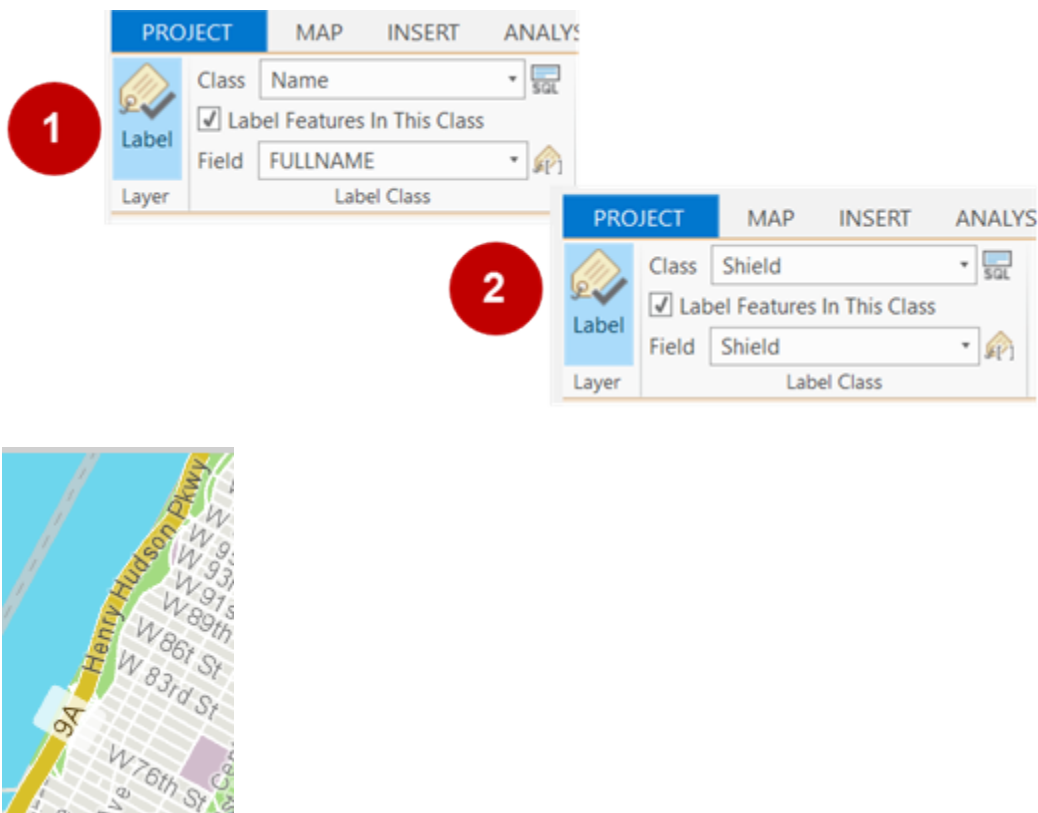
Again, you will use two classes to specify the different labeling properties for this layer.

- a** In the Contents pane, turn on labels for the MajorRoads layer.

b Use the following information to create two label classes.

- Label class 1
  - Class: **Name**
  - Field: FULLNAME
- Label class 2
  - Class: **Shield**
  - Field: Shield

*Hint: Follow Step 1c through Step 1f to create the new label classes.*




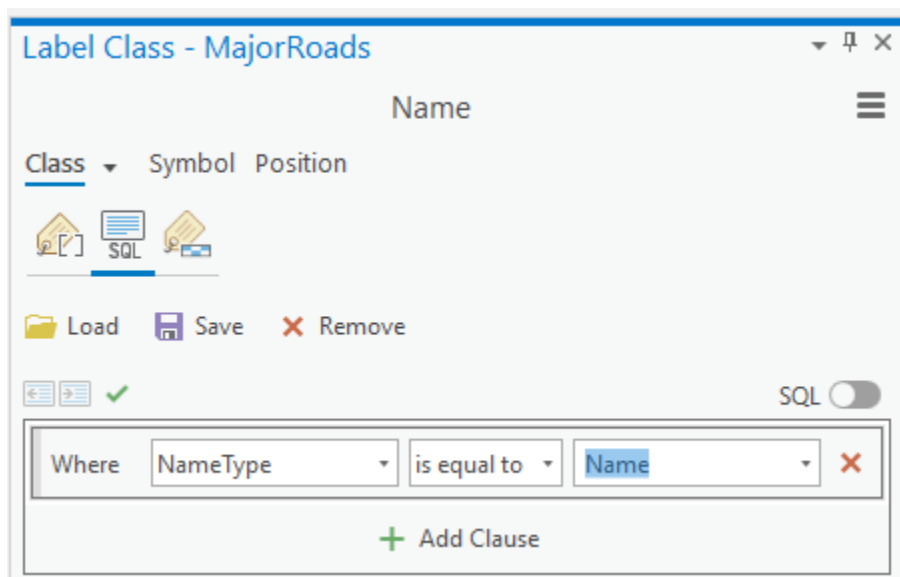
*Example road with highway shield number.*

SQL (Structured Query Language) query expressions provide an effective way to identify a subset of features that you want to label. You will write an SQL query for the MajorRoads features to separate road names and shield numbers so you can style the labels differently for each class.

*Hint: Use the layer attribute table to see what you are querying. In the Contents pane, right-click the name of the layer and choose Attribute Table.*

First, you will add the query expression for the road names.


- c From the Labeling tab, in the Label Class group, ensure that the Class is set to Name.
- d In the Label Class pane, from the Class tab, click the SQL Query button .
- e Click New Expression to begin building your query.
- f For the Name class SQL query, create the following query: Where NameType Is Equal To Name.



- g Click Apply.

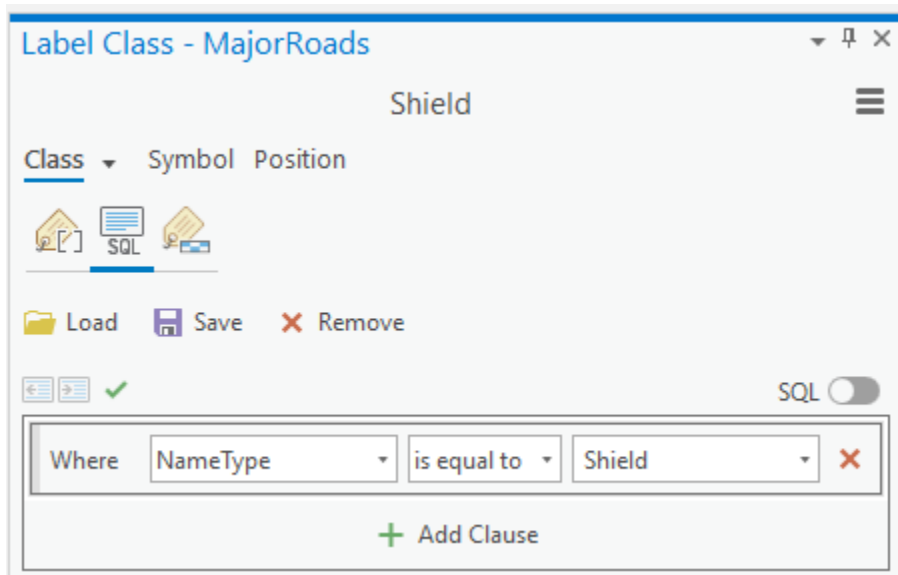
Now, you will do the same thing for the Shield label class.

*Note: Because there are so many labels in the map, they may draw slowly. You can pause or turn off features that you are labeling, if you would like.*

- h From the Labeling tab, in the Label Class group, change the Class to Shield to switch to the Shield label class.
- i If necessary, in the Label Class pane, from the Class tab, click the SQL Query button .
- j Click New Expression to begin building your query.



- k For the Shield class SQL query, create the following query: Where NameType Is Equal To Shield.









- l Click Apply.

Next, you will modify the label for each class.

*Hint: Use the Class and Field values in the Label Class group to switch between the label classes. You can also use the Class drop-down list in the Label Class pane.*




- m Use the following information to format the Name label class in the Label Class pane:

## Step 3: Label Class pane



Tab	Group	Section	Options
Symbol	General 	Appearance	<ul style="list-style-type: none"> <li>Font Name: Arial</li> <li>Font Style: Regular</li> <li>Size: 8 pt</li> <li>Color: Gray 70% <ul style="list-style-type: none"> <li></li> <li>R: 78</li> <li>G: 78</li> <li>B: 78</li> </ul> </li> </ul>
		Halo	<ul style="list-style-type: none"> <li>Halo Symbol: White Fill</li> <li>Color: White (HEX #: FFFFFFFF) <ul style="list-style-type: none"> <li></li> <li>Transparency: <b>75%</b></li> </ul> </li> <li>Size: 1 pt</li> </ul>
Position	Position 	Placement	<ul style="list-style-type: none"> <li>First drop-down list: Street Placement</li> <li>Second drop-down list: Centered Curved</li> </ul>
	Fitting Strategy 	Stack	<ul style="list-style-type: none"> <li>Stack Label: unchecked</li> </ul>
	Conflict Resolution 	Buffer	<ul style="list-style-type: none"> <li>Label Buffer: 15%</li> <li>Hard Constraint: Checked</li> </ul>

- n Use the following information to format the Shield label class in the Label Class pane:

### Step 3: Label Class pane

Tab	Group	Section	Options
Symbol	General 	Appearance	<ul style="list-style-type: none"> <li>• Font Name: Arial</li> <li>• Font Style: Regular</li> <li>• Size: 8 pt</li> <li>• Color: <ul style="list-style-type: none"> <li></li> <li>• HEX #: D8C029</li> <li>• CMYK: <b>55% K</b></li> </ul> </li> </ul>
		Callout	<ul style="list-style-type: none"> <li>• First drop-down list: Balloon</li> <li>• Balloon Style: Rounded Rectangle</li> <li>• Balloon Symbol: White Fill (No Outline)</li> <li>• Color: White (HEX #: FFFFFFFF) <ul style="list-style-type: none"> <li></li> <li>• Transparency: <b>25%</b></li> </ul> </li> <li>• Left Margin: 2 pt</li> <li>• Right Margin: 2 pt</li> <li>• Top Margin: 2 pt</li> <li>• Bottom Margin: 2 pt</li> </ul>



Tab	Group	Section	Options
Position	Position 	Placement	<ul style="list-style-type: none"> <li>• First drop-down list: Regular Placement</li> <li>• Second drop-down list: Centered Straight</li> <li>• Offset Along Line: Best Position</li> </ul>
	Conflict Resolution 	Remove Duplicate Labels	<ul style="list-style-type: none"> <li>• Drop-down list: Remove Within Fixed Distance</li> <li>• Search Radius: 2 Inches</li> </ul>
		Repeat	<ul style="list-style-type: none"> <li>• Minimum Interval: 3 Inches</li> </ul>
		Buffer	<ul style="list-style-type: none"> <li>• Label Buffer: 15%</li> <li>• Hard Constraint: Checked</li> </ul>
		Minimum Feature Size	<ul style="list-style-type: none"> <li>• Minimum For Labeling: 0 Map Units</li> </ul>

At this point, your map should look something like the following graphic if you have used the specific information in the tables.



**Tips and Tricks:** It is fine not to label everything. Label features that help the map. The railway, for example, does not need a label in this map, nor do features that are too small.

🔵 Save your project.

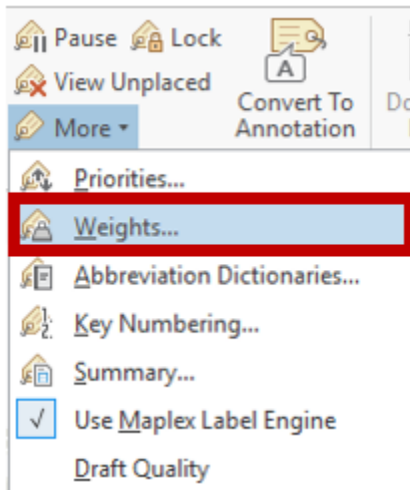
## Step 4: Configure advanced settings to refine the map

There are some advanced settings that will help refine the map display even more. The two that you will examine are label weights and label priorities.

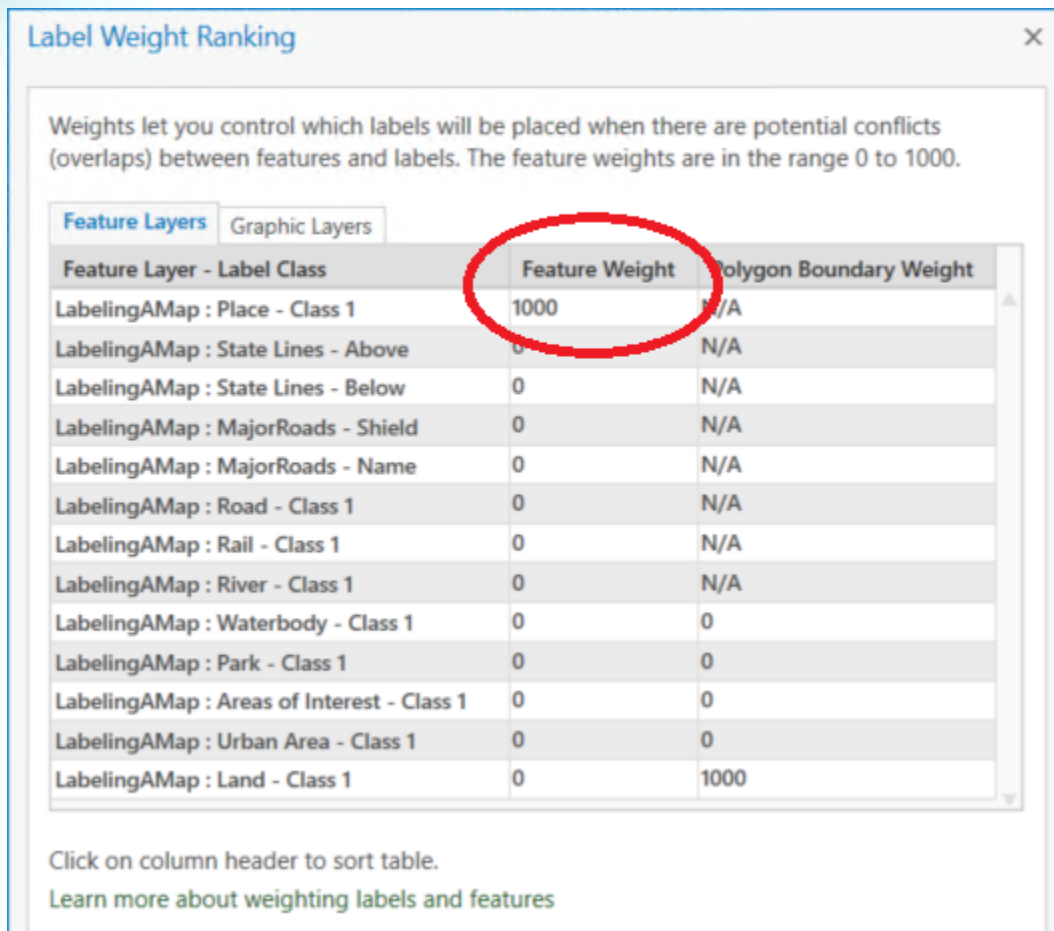
Label weights let you control which labels will be placed when there are potential conflicts (overlaps) between features and labels. As you learned earlier, weights are ranked 0 to 1000. If you weight a feature at 1000, nothing will draw on it.

*Note: Refer to ArcGIS Pro Help for more information about label and feature weights (<https://bit.ly/2JDby8y>).*

- a To work with weights, in the Contents pane, select the Place layer.
- b From the Labeling tab, in the Map group, click More and choose Weights.



In the Label Weight Ranking window, for the Place - Class 1 label class, the value in the Feature Weight column is set to 1000.



- c For the Place - Class 1 label class, try changing the Feature Weight value to see the effect in areas where there are feature and label overlaps.
- d Click Apply, and then click OK to see the weighting take effect (for example, if there were some labels on the place point, now there will be none).

Ultimately, the final positioning of labels on your map is dependent on label and feature weights. In addition, when working with weights, remember that when you allow labels to overlap some features, generally more labels will be placed on your map because the label engine has more room to place them.

You will now take a look at another advanced setting. Priorities allow you to suggest to the map which labels are the most important.

- e In the Contents pane, with the Place layer selected, from the Labeling tab, in the Map group, click More and choose Priorities.

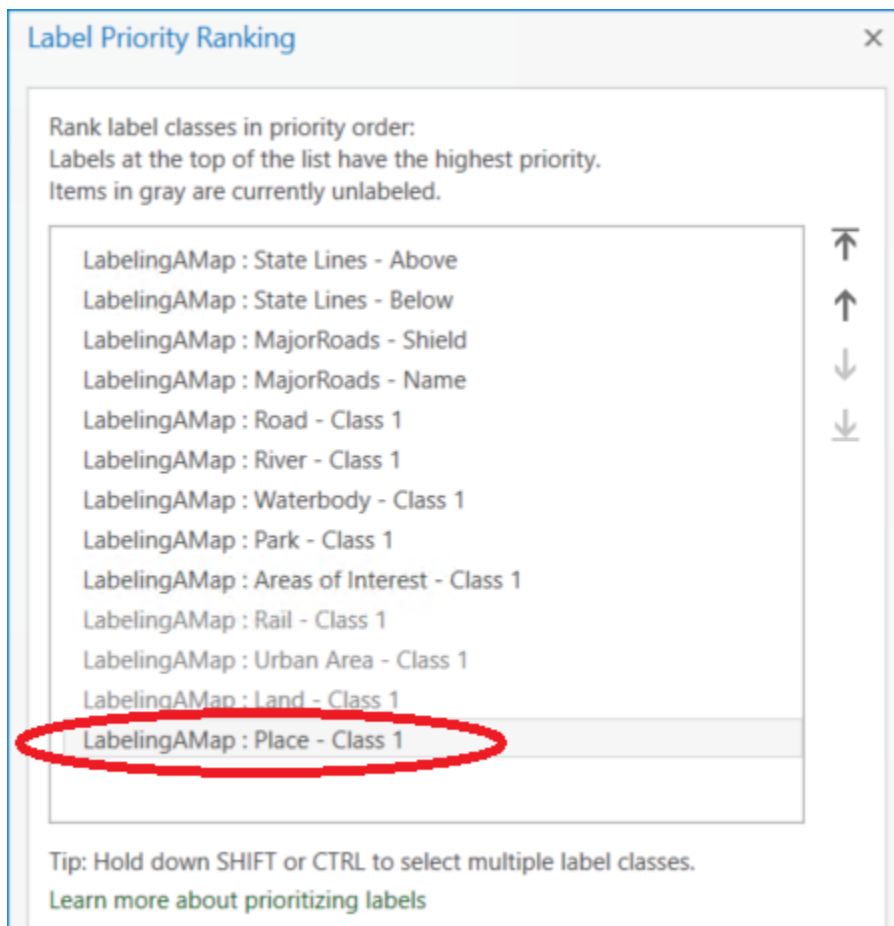
The Label Priority Ranking window opens.



To move a label class, you will select it and then use the arrow keys on the right side of the window to move the label class up or down.

- f In the Label Priority Ranking window, click the Place - Class 1 label class once, and then click the Bottom arrow to move the label class to the bottom of the priority list.

Top → ⇅  
Up → ↑  
Down → ↓  
Bottom → ⬇



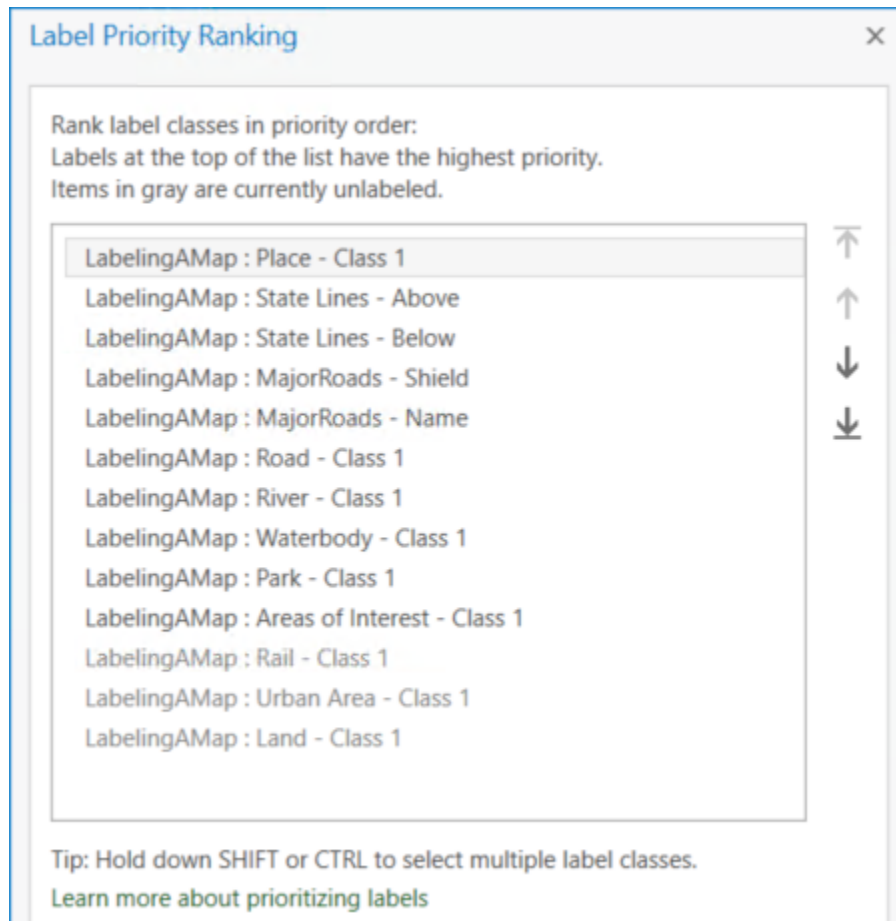
- g Click Apply, and then click OK.

It may take a moment for the map to redraw. Do you notice any changes? Labels associated with the Place class are now ranked as lowest priority.

- h Open the Label Priority Ranking window again.



- i Use the Up and Down arrows to reorganize the order of the classes so that Place - Class 1 is at the top.
- j If necessary, move MajorRoads - Shield above MajorRoads - Name and move both of these above Road.



- k Click Apply to see the changes take effect.
- l Click OK to close the Label Priority Ranking window.

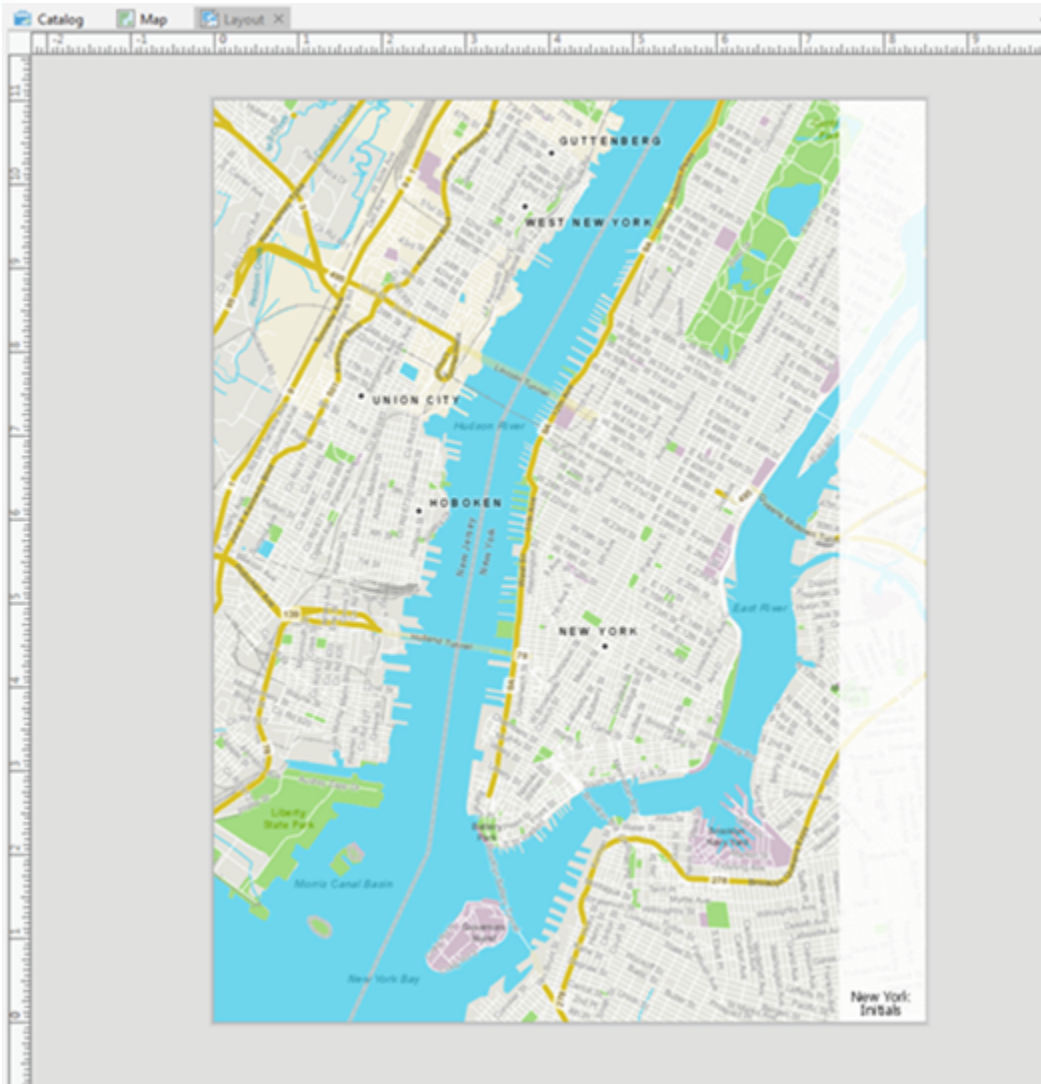


## Step 5: Style labels in the map surround

The layout elements (<https://bit.ly/2ycm3OH>) are another aspect of your map to consider when labeling.

The exercise project for this section includes a Layout view, where an extent has been set for you. A page layout (often referred to simply as a layout [<https://bit.ly/2HcT7ZH>]) is a collection of map elements organized on a virtual page designed for map printing.

- a At the top of the map window, click the Layout view tab.



You will give this map a title to describe its subject.

To the right of the map is a transparent white box. At the bottom, it says New York and Initials. You will stylize the text so that it runs vertically within the box.

- b Right-click the text that says "New York" and choose Properties.

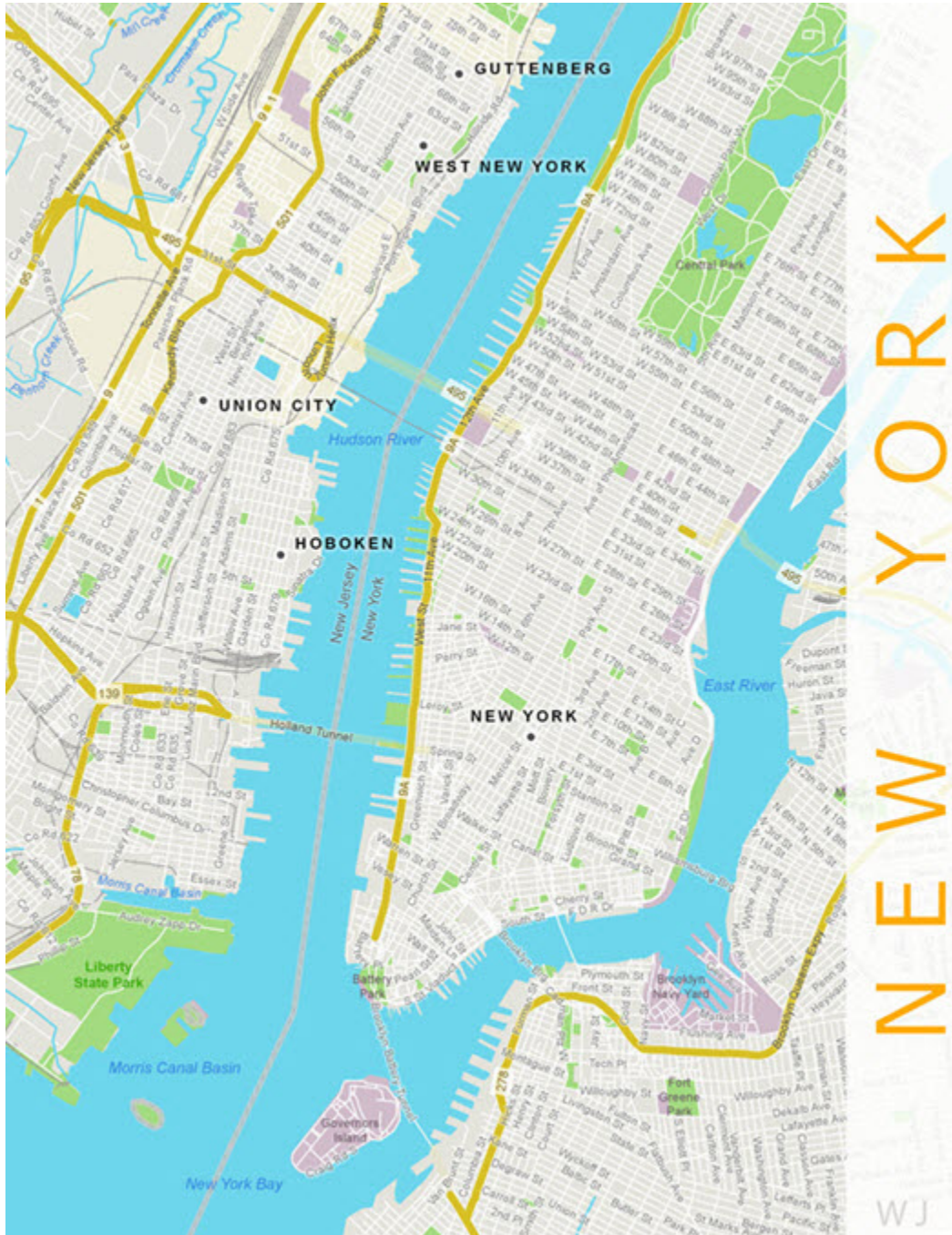
The Element pane opens. Here, you can adjust text options, such as size and position.

- c Using the options in the Element pane and on the Format tab of the Text contextual group, apply what you have learned and experiment with the text to make it look like the following example.



The following example includes font in all caps, a large size, a 90-degree angle, and spaced-out letters. The font color is orange with a white halo. This was done to unify the look and tie the labels to the map.

- d Add your initials or name to the page to finalize your layout.



- e When you are satisfied with the results, save your project.
- f If you are continuing to the next exercise now, leave ArcGIS Pro open.
- g If you will continue to the next exercise at a later time, exit ArcGIS Pro.

### Conclusion

In this exercise, you had the opportunity to explore options for label appearance, placement, formatting, and sizing. We encourage you to continue experimenting on your own.

Use the Lesson Forum to post your questions and observations.

If you do some experimenting on your own beyond the steps of this exercise, we would love to hear about and see what you did! On the other hand, if you completed a map based on the exercise steps, that is awesome! But there is no need to share it in the Forum.