Introduction to Tableau

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Criminology 4949

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Northeastern University

NULab for Texts, Maps, and Networks

Feel free to ask questions at any point during the presentation!

Introduction

This presentation will help you:

- Learn about the Boston Area Research Initiative Data Portal
- Learn to interact with the BARI research map
- Learn about Tableau
- Understand how to import and modify data in the Tableau environment
- Filter data in a variety of ways to produce custom visualizations

To follow along, visit: **https://bit.ly/sp23-drakulich-tableau**

Feel free to ask questions at any point during the presentation!

Our Roadmap for Today

1. Look at BARI and explore the Boston Area Research Map
2. Learn the basics of Tableau
3. After this, we will leave the slides and go to a live demo examining how to graph Boston 911 call data in Tableau.
4. These slides also contain a comprehensive mapping tutorial featuring more BARI data—Boston Building Permits. Please refer to that tutorial for more information on how to interact with geocoded datasets.

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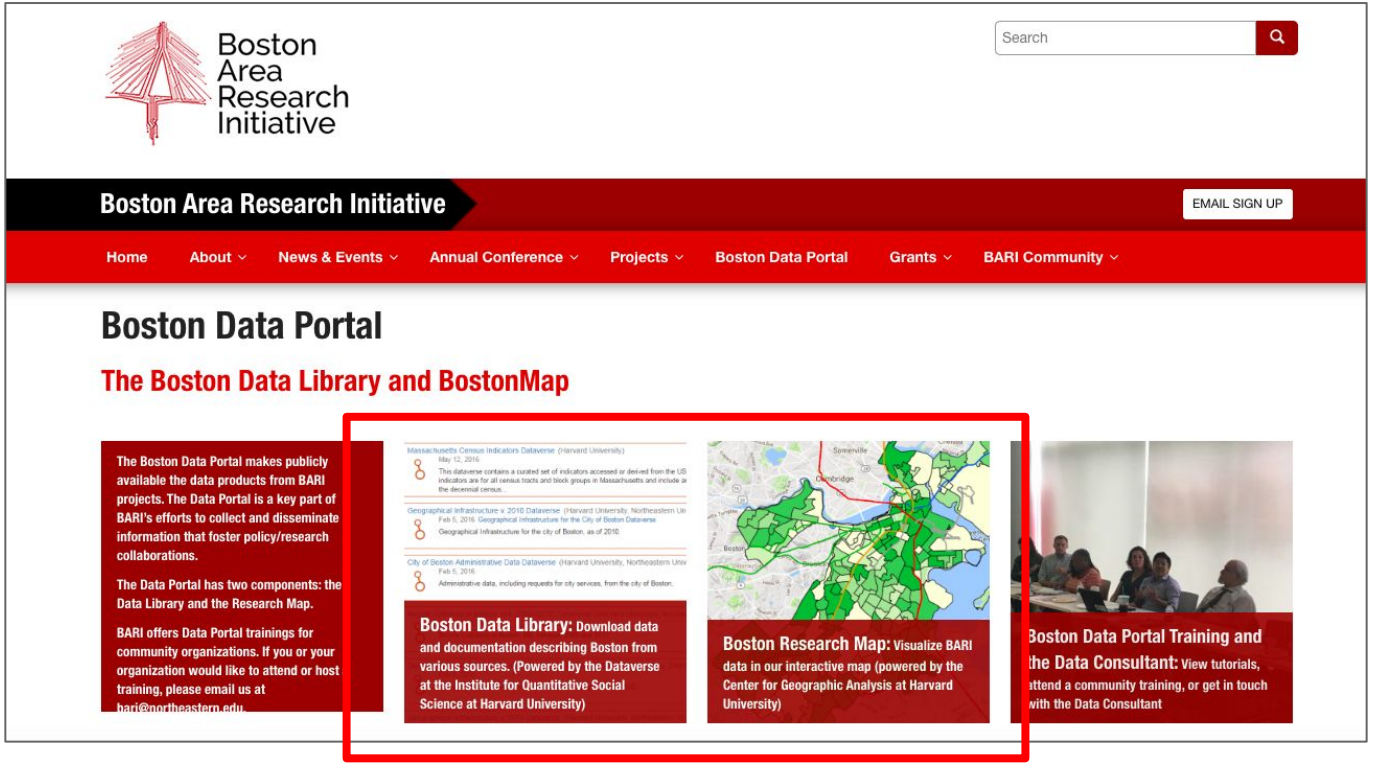
Boston Area Research Initiative: Data Portal



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Boston Area Research Map…Let's Explore!

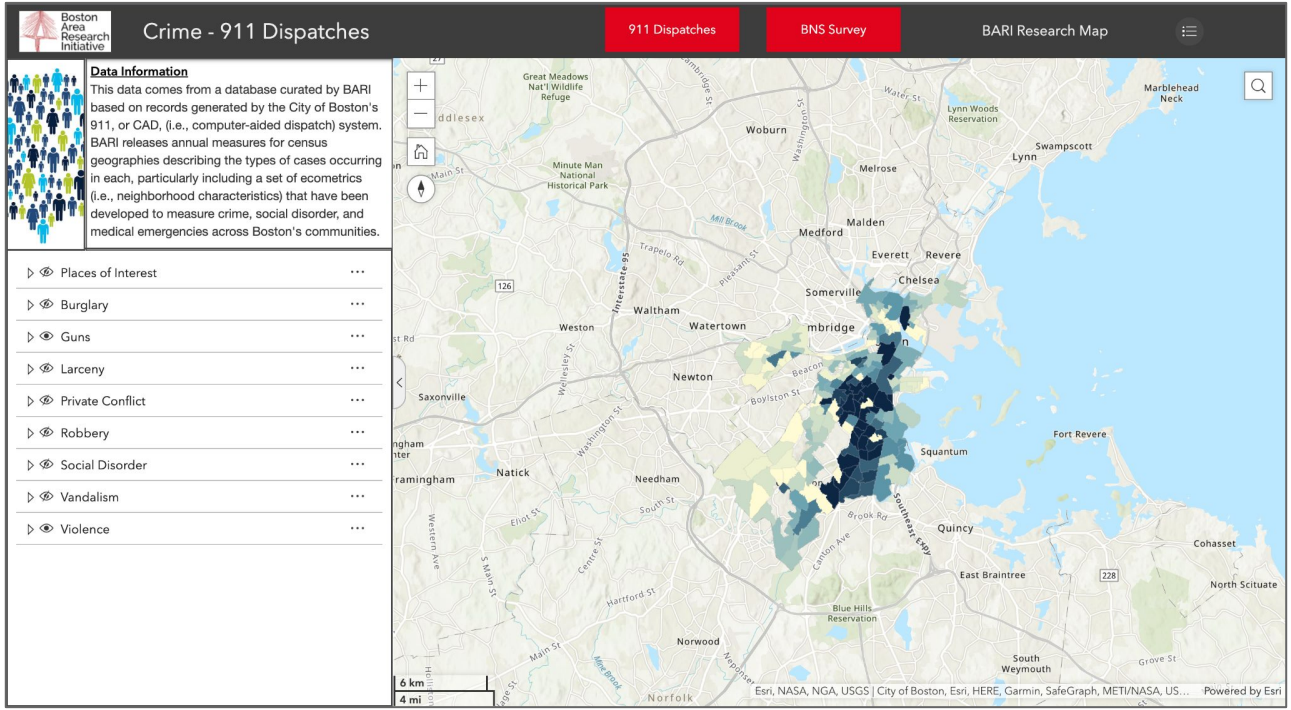

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Tableau Basics

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Tableau Basics

- Tableau is a powerful visualization tool. It can produce a variety of charts and graphs that look much nicer than basic Excel visualizations.
- We will be focusing today on Tableau's graphing functions.
  - However, this presentation will also include information on mapping, another prominent Tableau feature, for your reference as you begin to plan your own research.

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Tableau: Key terminology

- **X/Y Coordinates**: Numerical values that allow every location on earth to be pinpointed.
- **Latitude:** The north/south coordinate of a location based upon its distance from the equator.
- **Longitude:** The west/east coordinate of a location based upon its distance from the standard meridian.

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Tableau: Key terminology continued

- **Dimension:** Qualitative values (such as names, dates, or geographical data). You can use dimensions to categorize or segment your data.
- **Measure:** Numeric, quantitative values that you can measure. Measures can be aggregated. When you drag a measure into the view, Tableau applies an aggregation to that measure (by default).
- **Basemap:** The type of map that your coordinates are plotted on. Options include streets and satellite images, just like Google Maps.

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In Short, Tableau…

- Tableau is very powerful at creating a variety of charts and graphs.
- Tableau is also a powerful tool for quickly mapping coordinate points onto a simple map.
- Now, we'll leave the slides and work through a demo on graphing. Remember that this slide deck does also contain a comprehensive mapping tutorial for your future reference.

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Tableau Mapping Walkthrough

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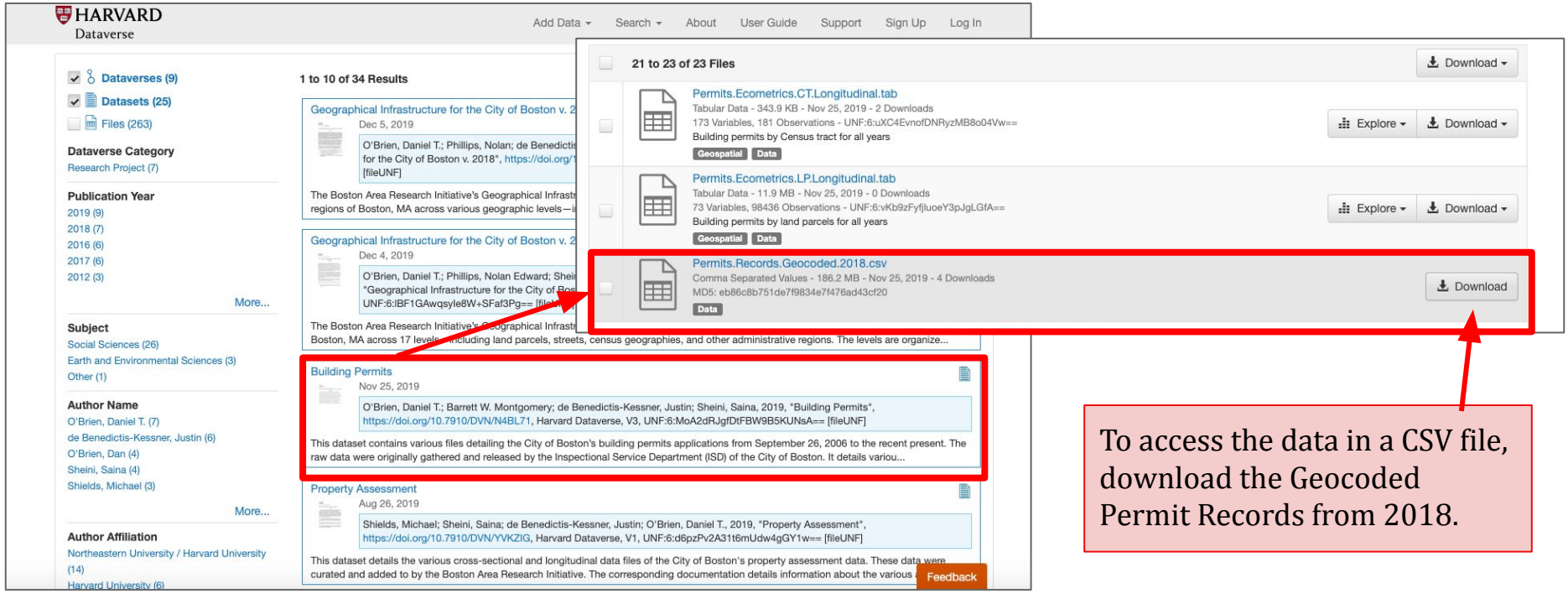
Our BARI Data for the Mapping Walkthrough



To access the data in a CSV file, download the Geocoded Permit Records from 2018.

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Our Mapping Dataset

- Boston's 2018 Permit and Record Spreadsheet, which tracks construction permits.
- Includes information such as
  - Type of permit (addition, renovation, etc.).
  - Address of permit (including geographic coordinates) and neighborhood name.
  - Permit holder and fee information.
- As the dataset covers several years, it can help us see change over time in the city as a whole and in specific neighborhoods.

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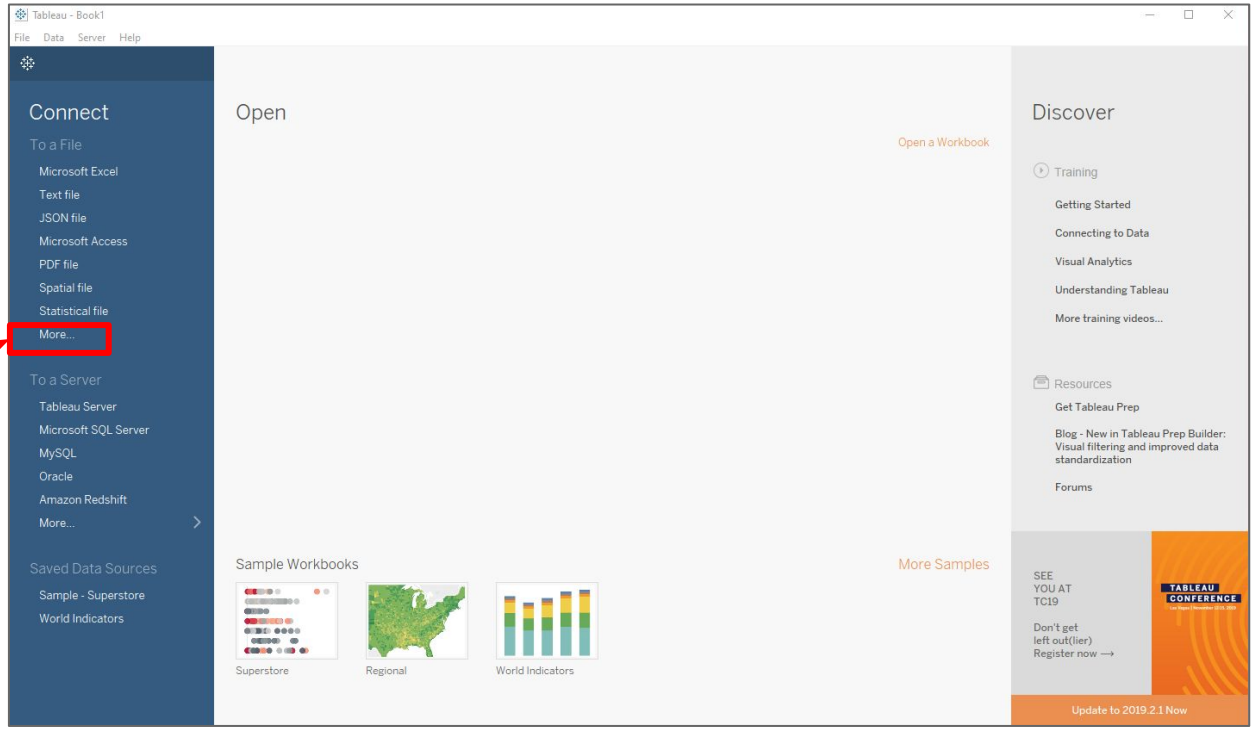
Step One: Connecting to data

First, we need to connect to our data.

We will be using building permit data for the City of Boston in .csv format.

Select **More…** and navigate to the data file that was sent via email.



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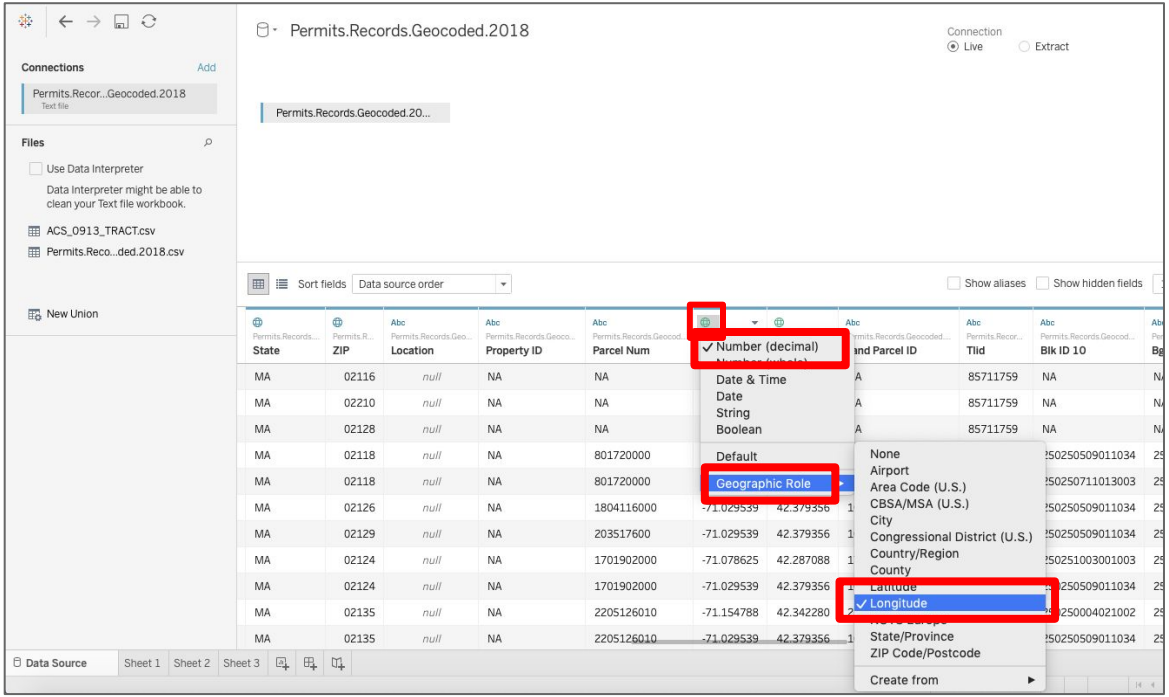
Step Two: Convert coordinate column to geo data

- To map our data, we have to first convert the X/Y data into coordinates.
- Click on the **Abc**, and change the data type from **String** to **Number (decimal)**.
- Click on the # and select over **Geographic role**, and then select **Latitude** or **Longitude**. Convert:

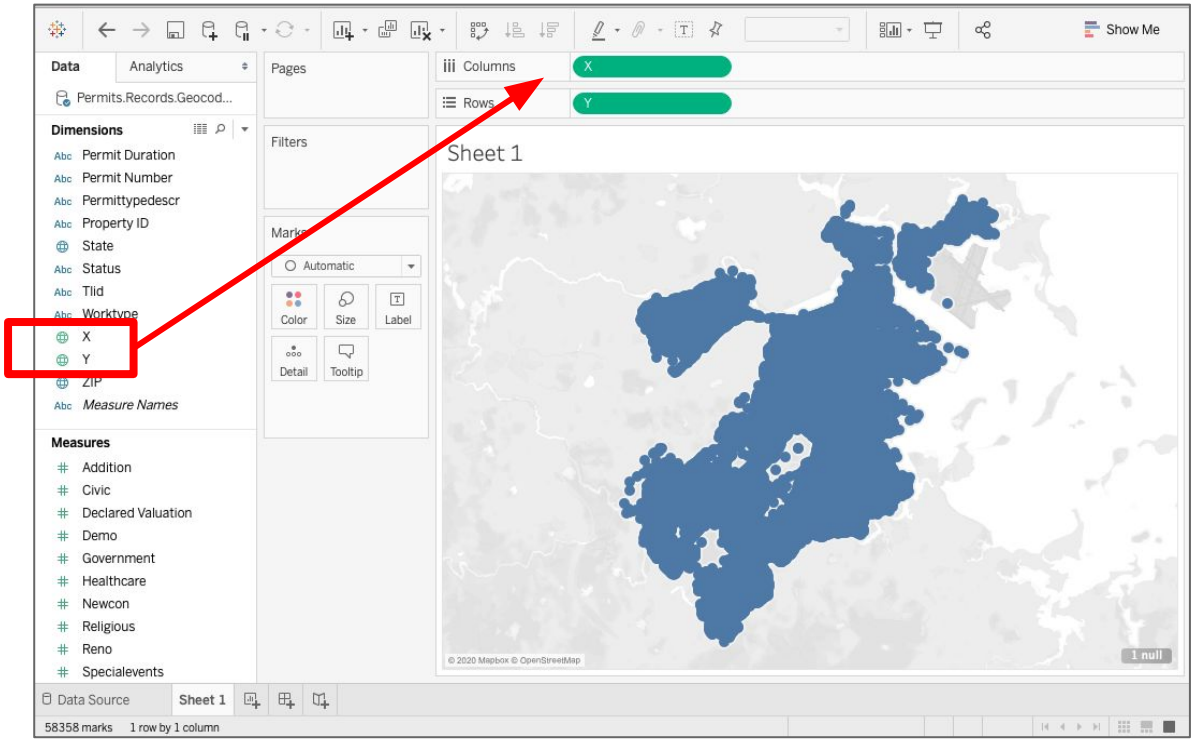
  X -> Longitude
  Y -> Latitude



Step Three: Plotting points

To map the data points, drag the Y data into the **Columns** area, and the X data into the **Rows** area.

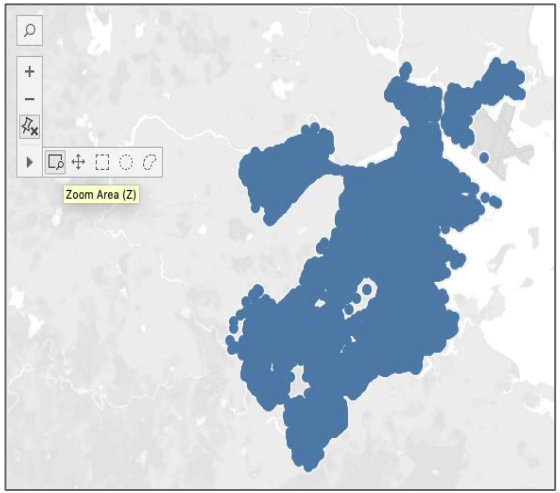
Tableau will automatically plot points based upon those X/Y coordinates.

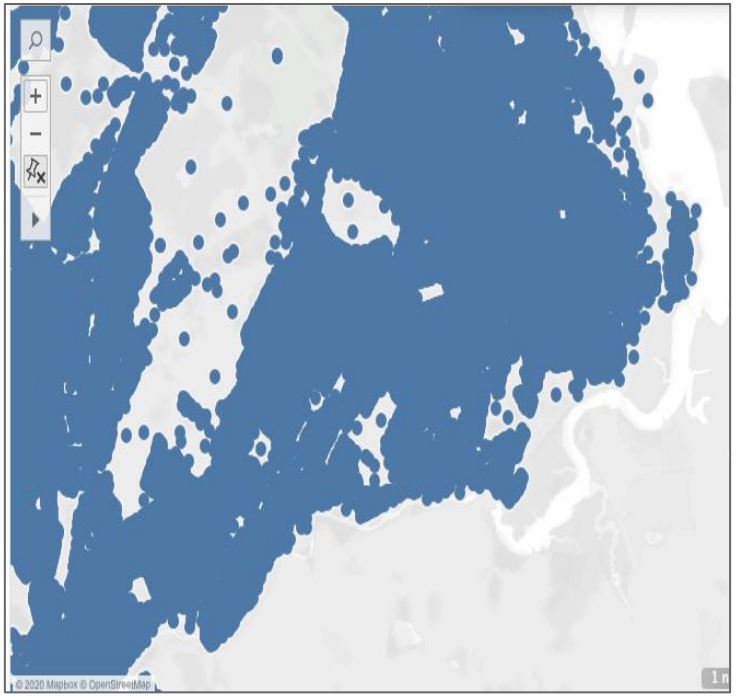


Step Four: Zoom controls

The navigation and zoom controls are in the top left of the plot area.

We have zoomed into the Downtown Boston, Fenway/Kenmore, Jamaica Plain, Roxbury areas.





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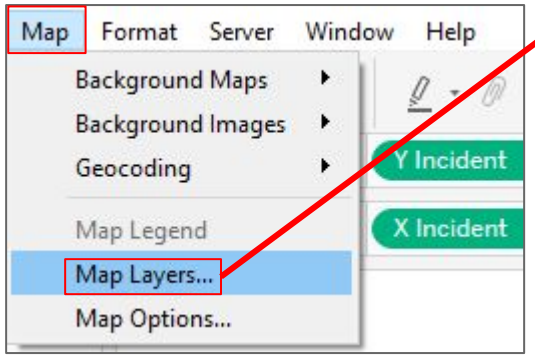
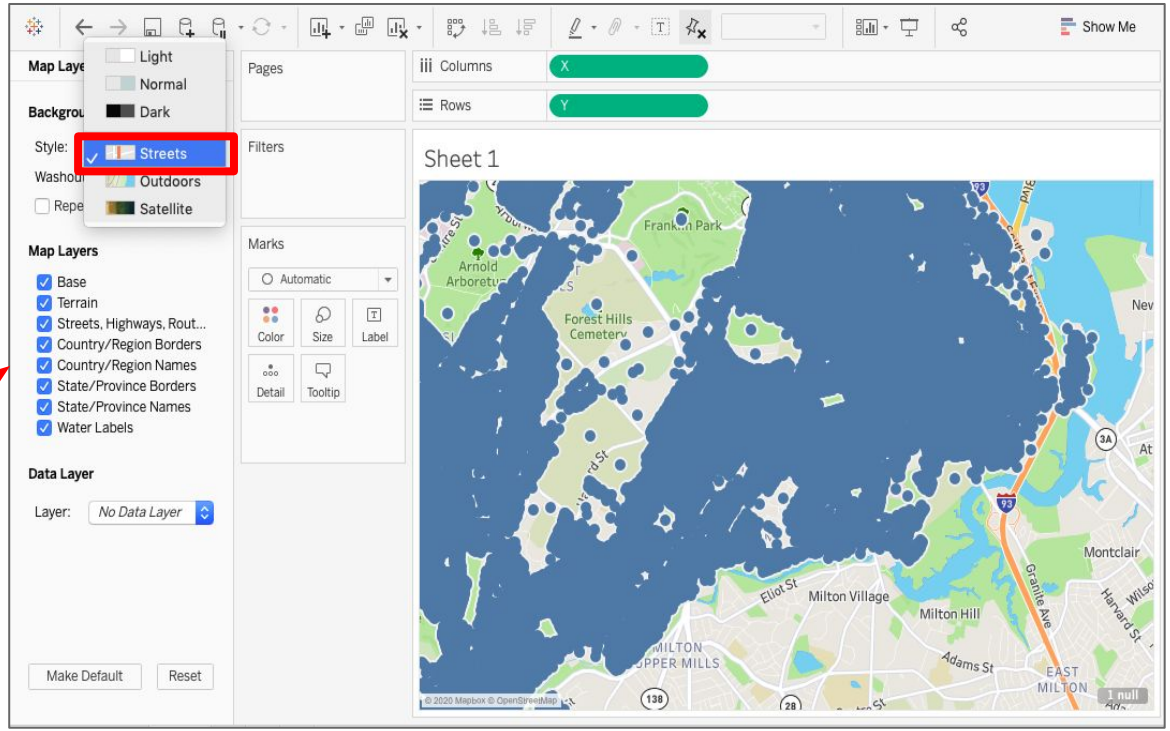
Step Five: Modifying the basemap

- Select **Map** on the toolbar and go to **Map Layers…** to modify the basemap.
- Select a new style, e.g. **Streets**.
- When you are happy, click the **X** at the top of the map layers sidebar.





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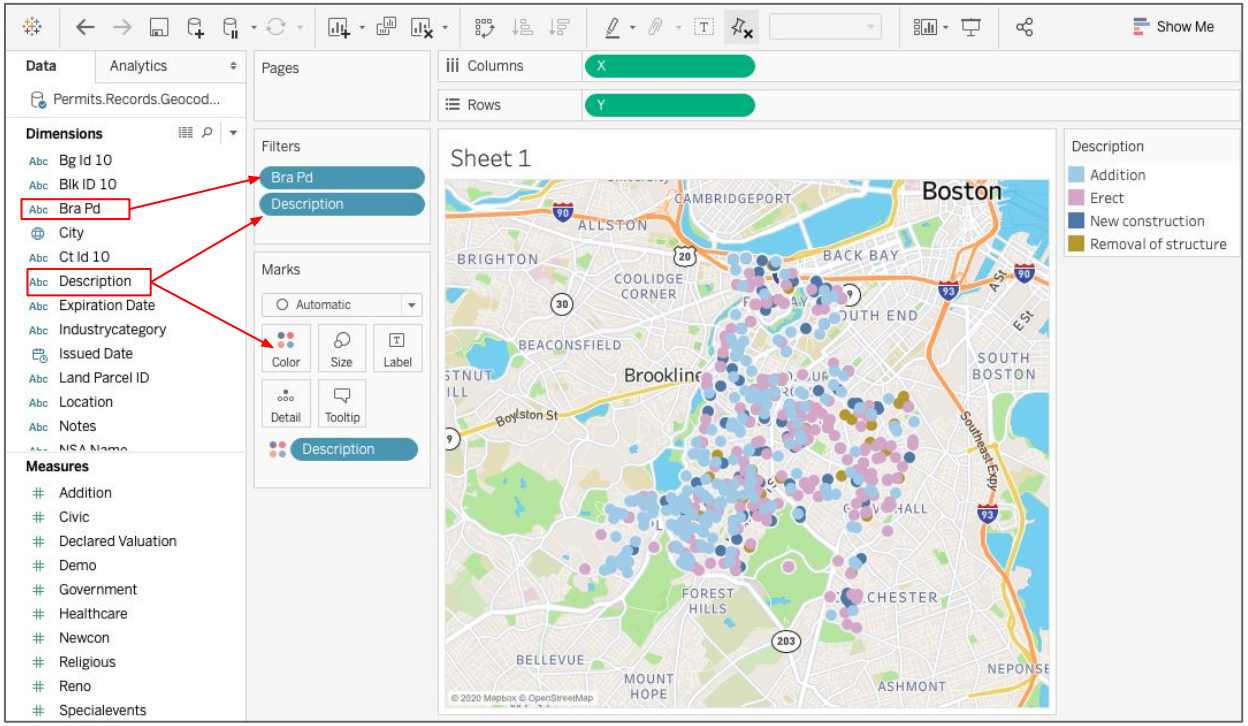
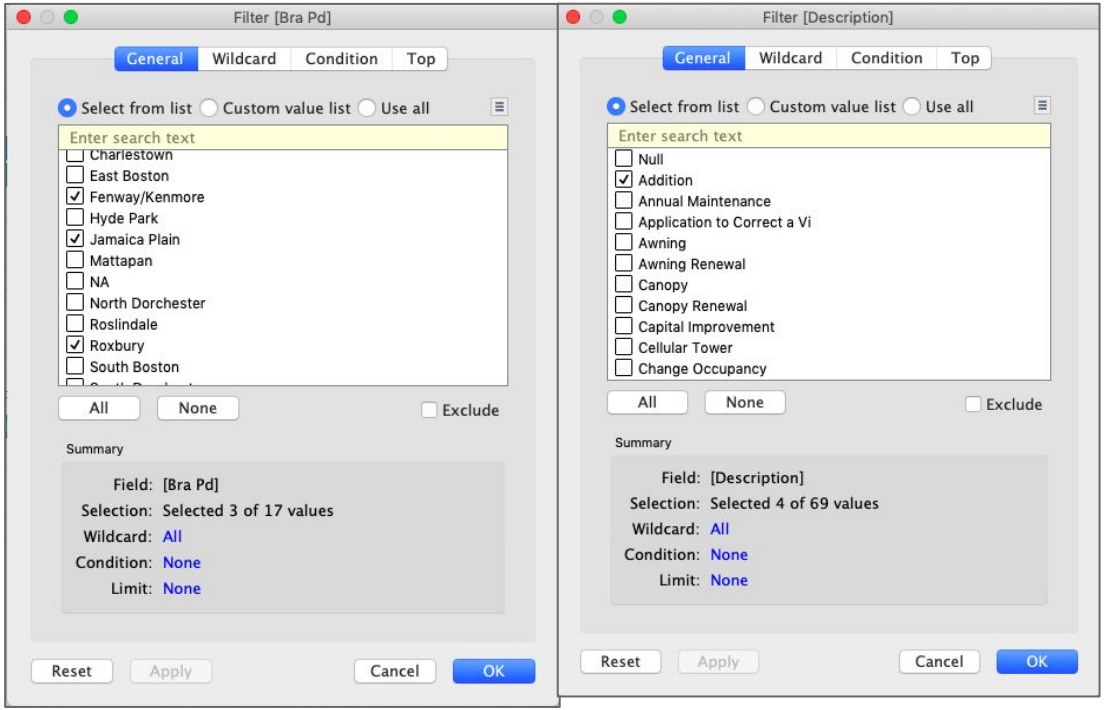
Step Six: Creating filters

- To create different filters and visualization parameters, drag a dimension or measure into the **Marks** box. Change marks to **Map**.
- To specify a type of visualization, drag the parameter of choice onto **Color**, **Size**, etc.
- We have mapped **Description of Permit Type** as a color, and filtered by neighborhood and description of permit type (which will appear as a tooltip).



Step Seven: Creating filters continued

- We want to filter our neighborhood data parameter to only display Fenway/Kenmore, Jamaica Plain and Roxbury.
- Click on **Filter…** to bring up the filter box.
- Deselect all and then check the boxes for Fenway/Kenmore, Jamaica Plain and Roxbury.
- Do the same thing for permit description type, selecting the boxes for **Addition**, **Erect**, **New Construction**, and **Removal of Structure**.



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Step Seven: Creating filters results

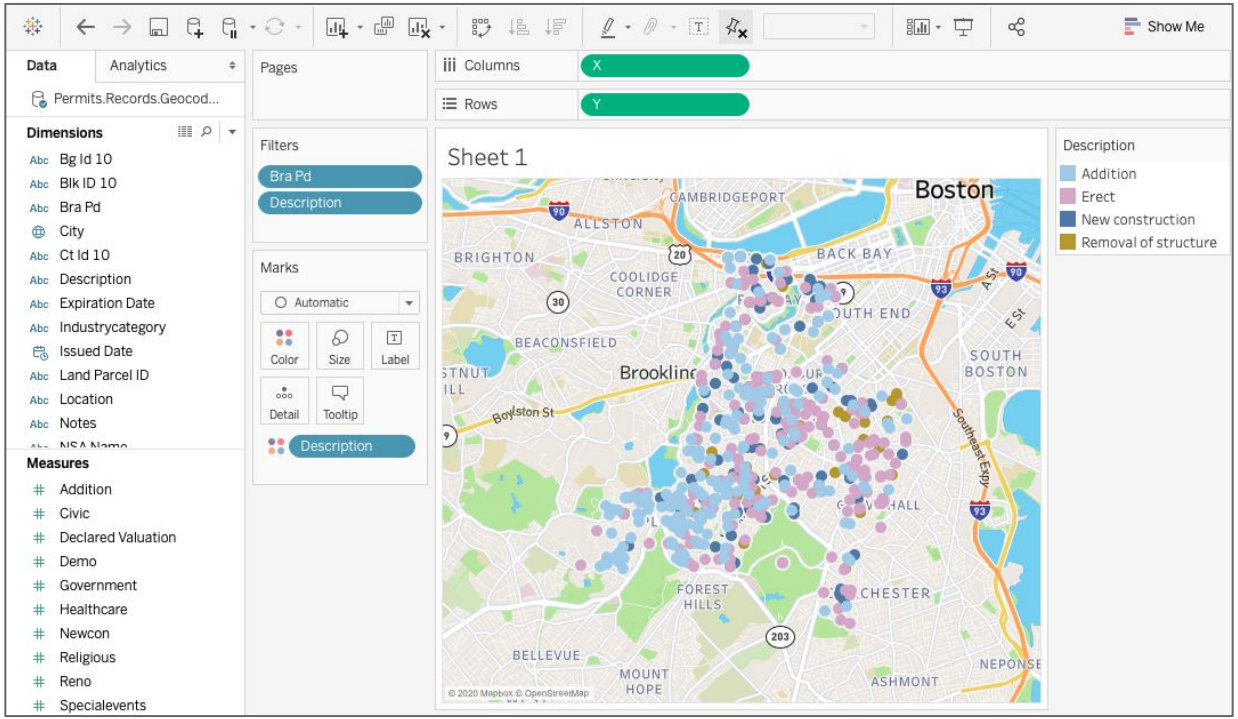

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Tableau and Accessibility

- Tableau lets you *modify* and *customize* how your maps and graphs look.
- Keep accessibility concerns in mind when choosing fonts and colors.
  - Colors with higher contrast from the background are easier to distinguish.
  - Larger, bolder fonts stand out and designate importance.
  - Overcrowding text makes the information harder to read.

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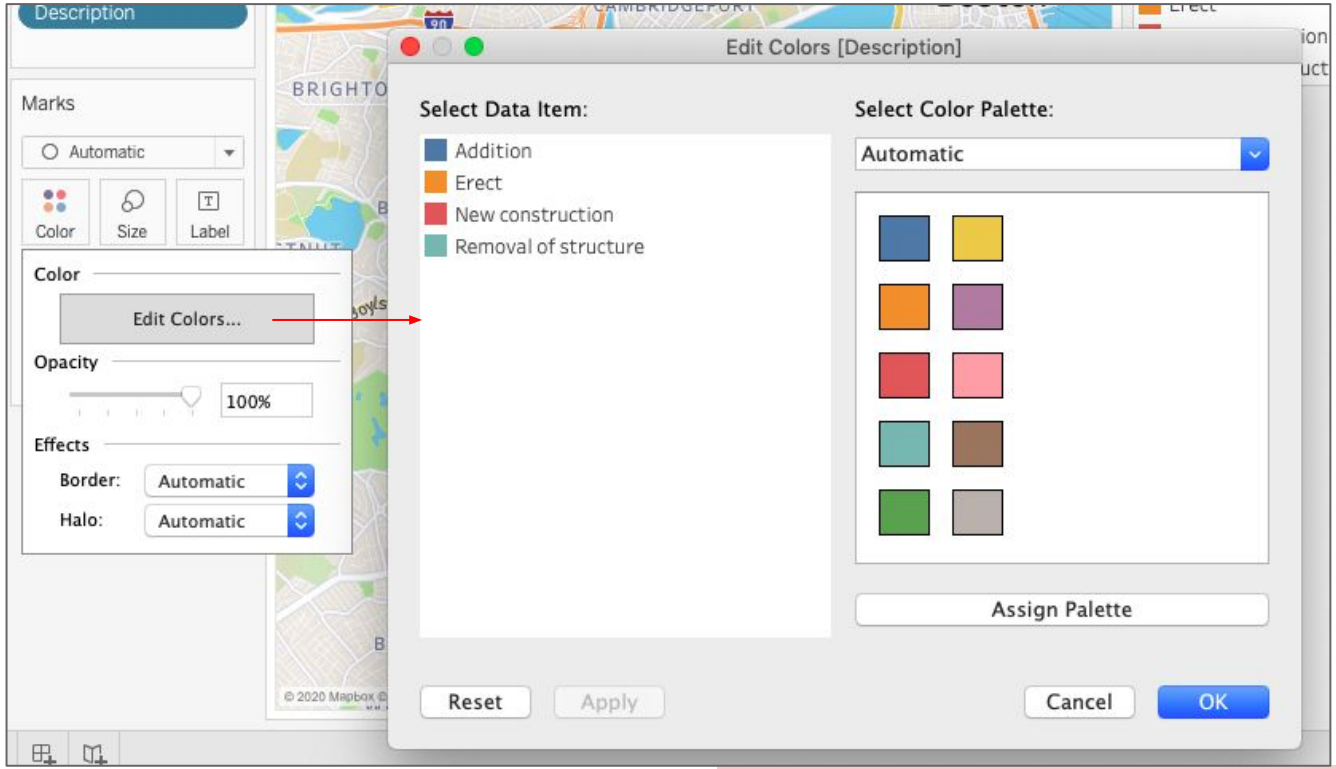
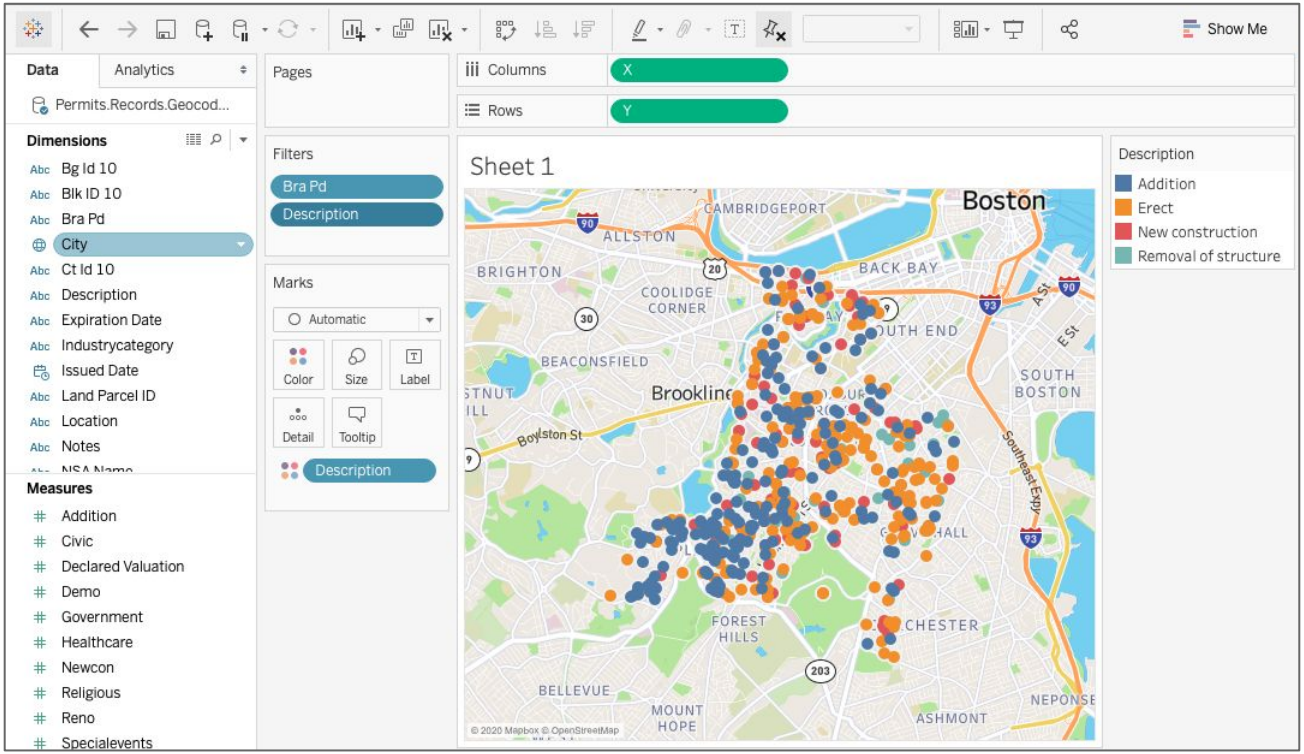
Step Eight: Modifying colors

- The standard map colors don't contrast very well.
- On the **Bra Pd (neighborhoods)** sidebar, click the dropdown arrow, then click on **Edit Colors….**
- We can now change our colors and improve the contrast.



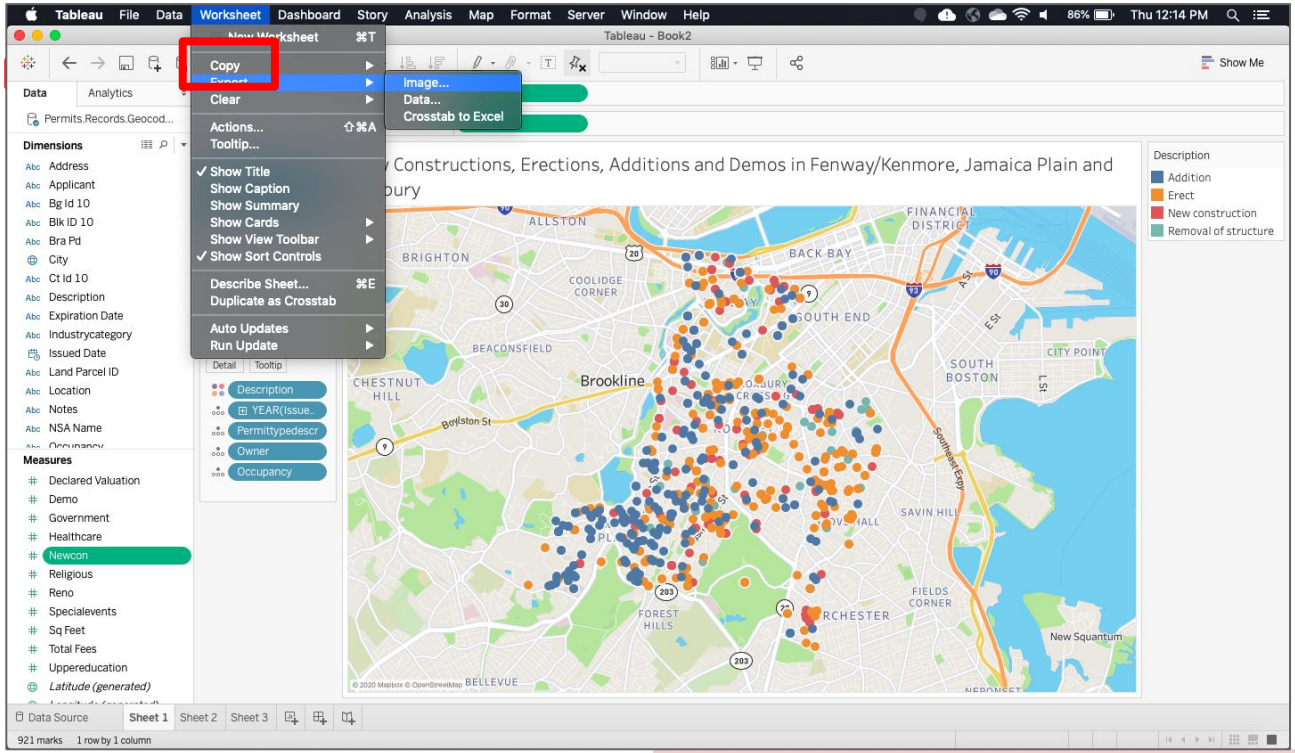
Step Eight: Modifying colors results



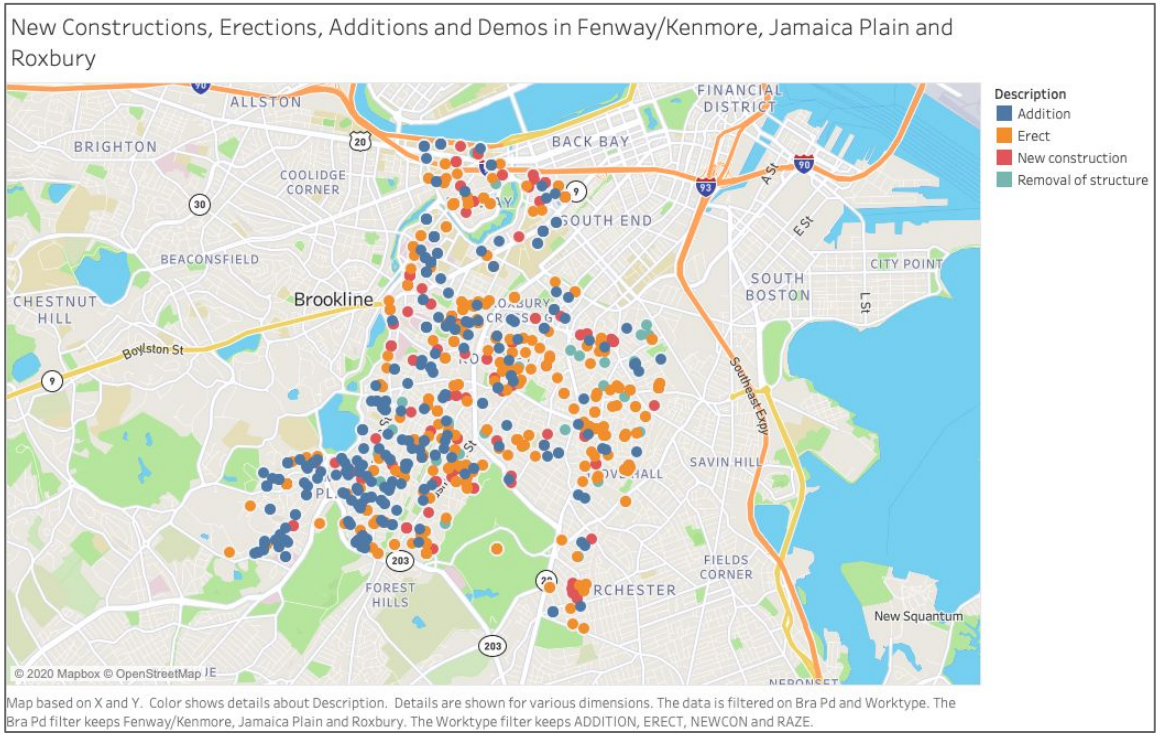
Step Nine: Exporting images

From the **Worksheet** drop-drop down menu, select **Export**, then click on **Image**….

You can select the type of export then click **Save**.



Exported image



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Graphing in Tableau

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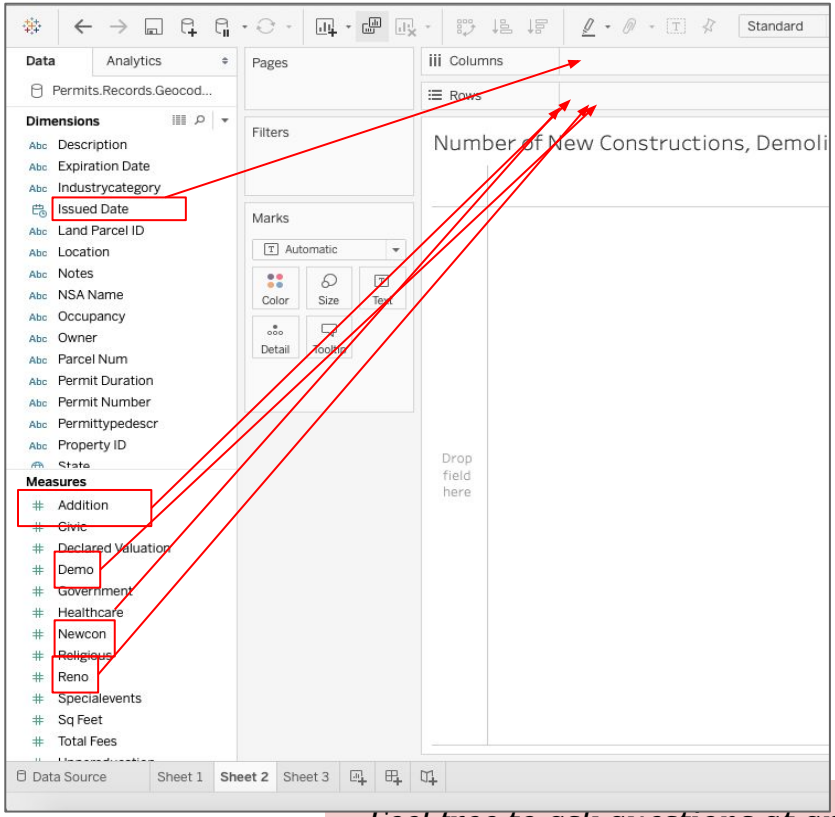
Graphs with Tableau: Drag & drop

- As with mapping, creating a graph can be accomplished by dragging and dropping our dimensions and measures.
- To map the number of records over time according to permit type, first create a new sheet (click the **+** sign next to **Sheet 1** at the bottom).
- Next, drag and drop the **Issued Date** dimension to the columns, and the **Addition**, **Demo**, **Newcon** and **Reno** measures to the rows.



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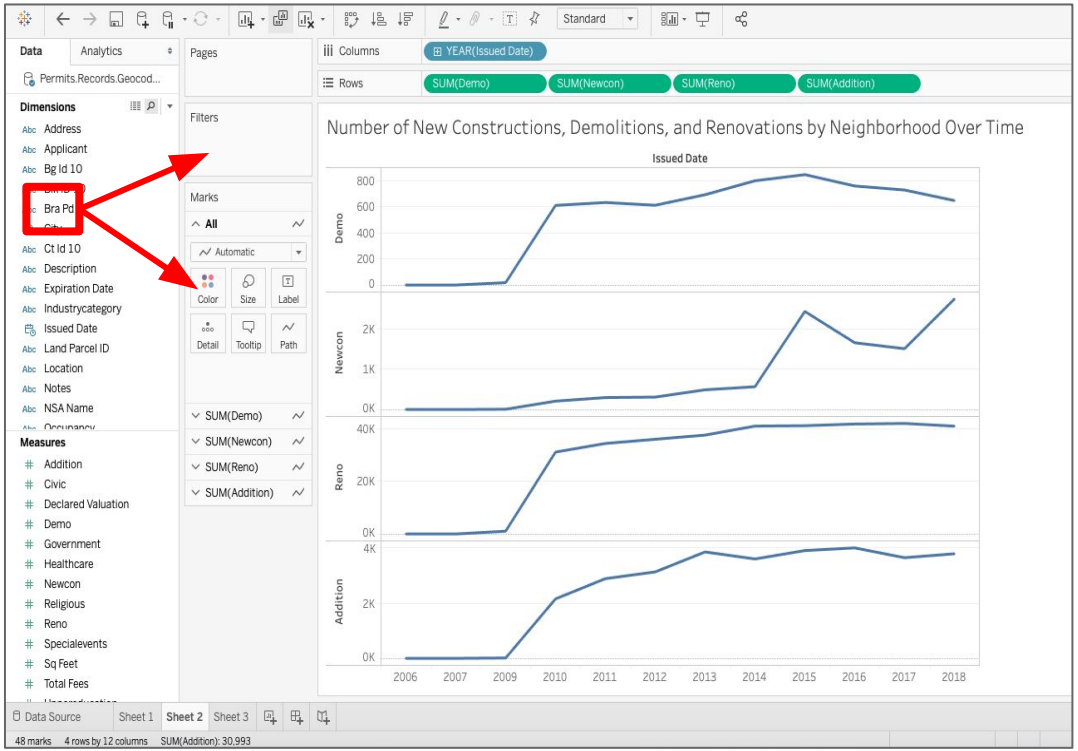
Graphs with Tableau: Drag & drop

We now have a graph of different building permit records over time. To see specific neighborhoods:

- Drag and drop the **Bra Pd** measure onto both the filter box and the colors in the marks box to the left of our new graph. Filter your neighborhoods to include only Fenway/Kenmore, Jamaica Plain and Roxbury.
- Tableau will automatically set each neighborhood to a different color and redraw our graph.



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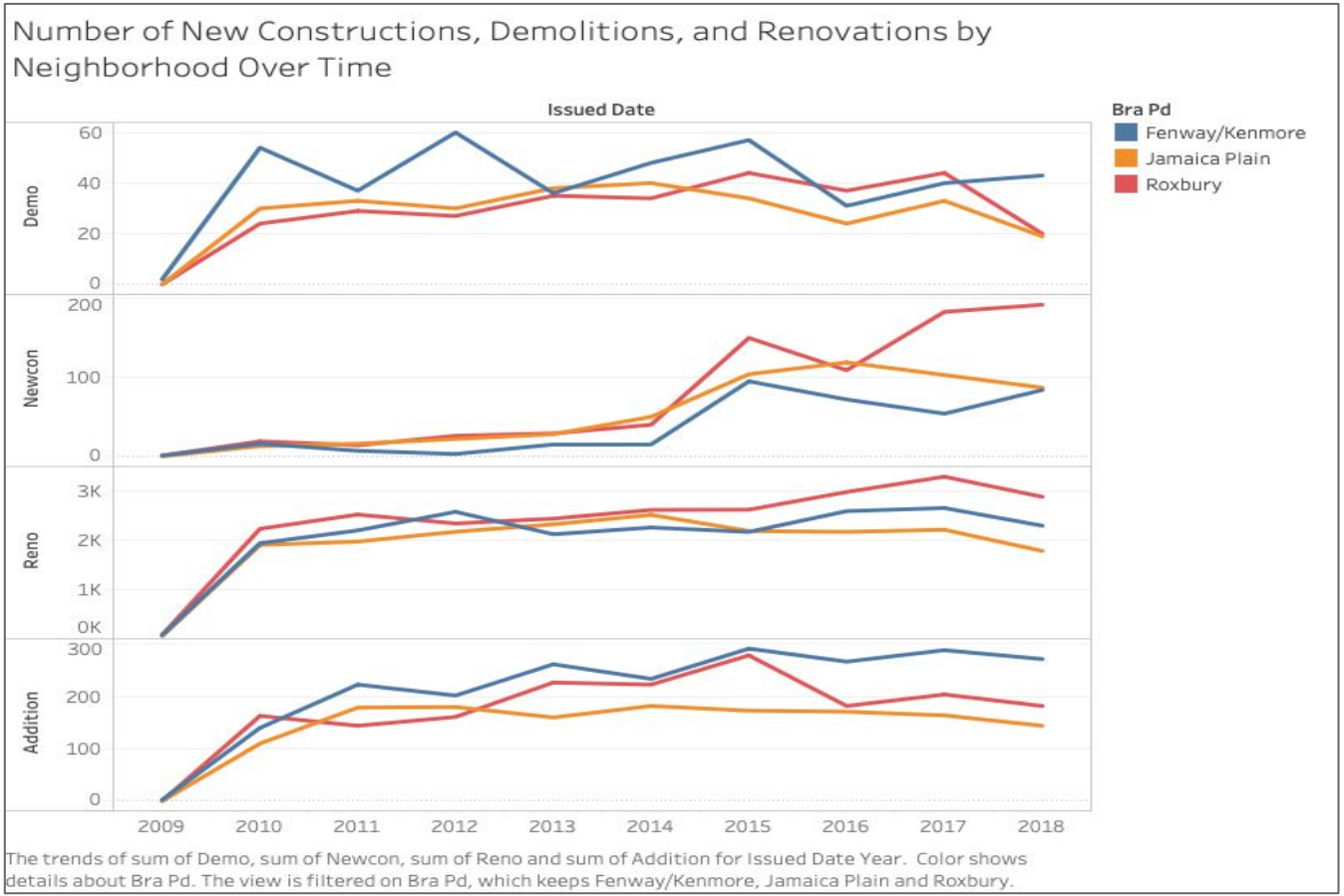

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Example research questions

- How much value are new constructions and renovations adding to their neighborhood over time?
- How much value does each type of construction add to each neighborhood's overall valuation?
- What different types of industry are building in these neighborhoods?

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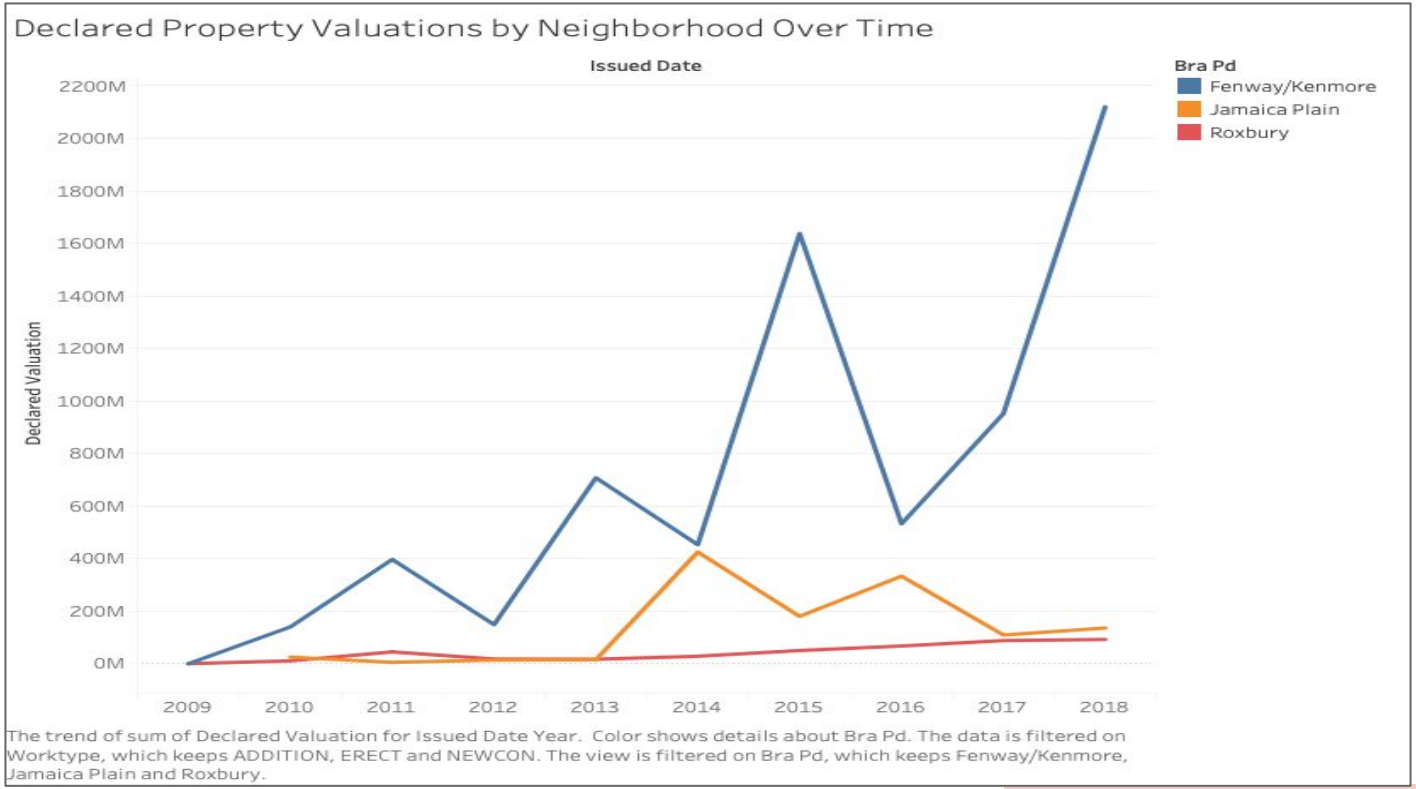
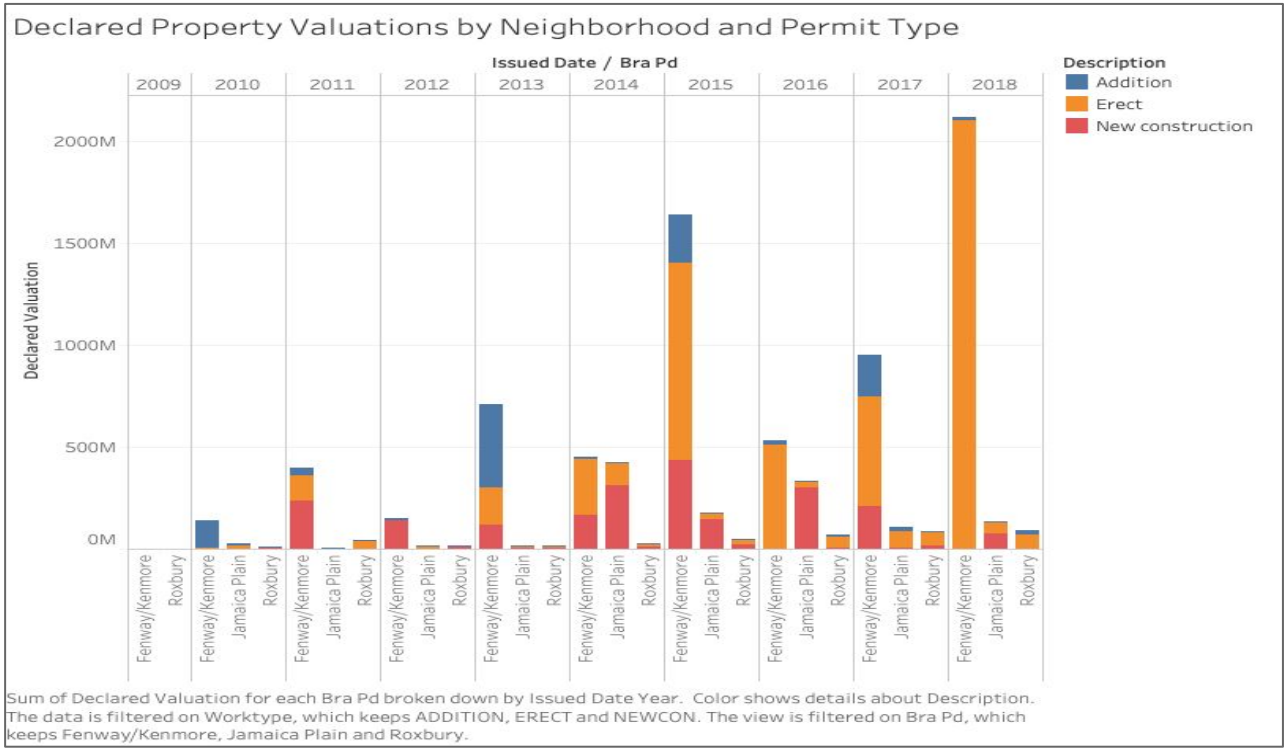
How much value are new constructions and renovations adding to their neighborhoods over time?



How much value does each type of construction add to each neighborhood's overall valuation?



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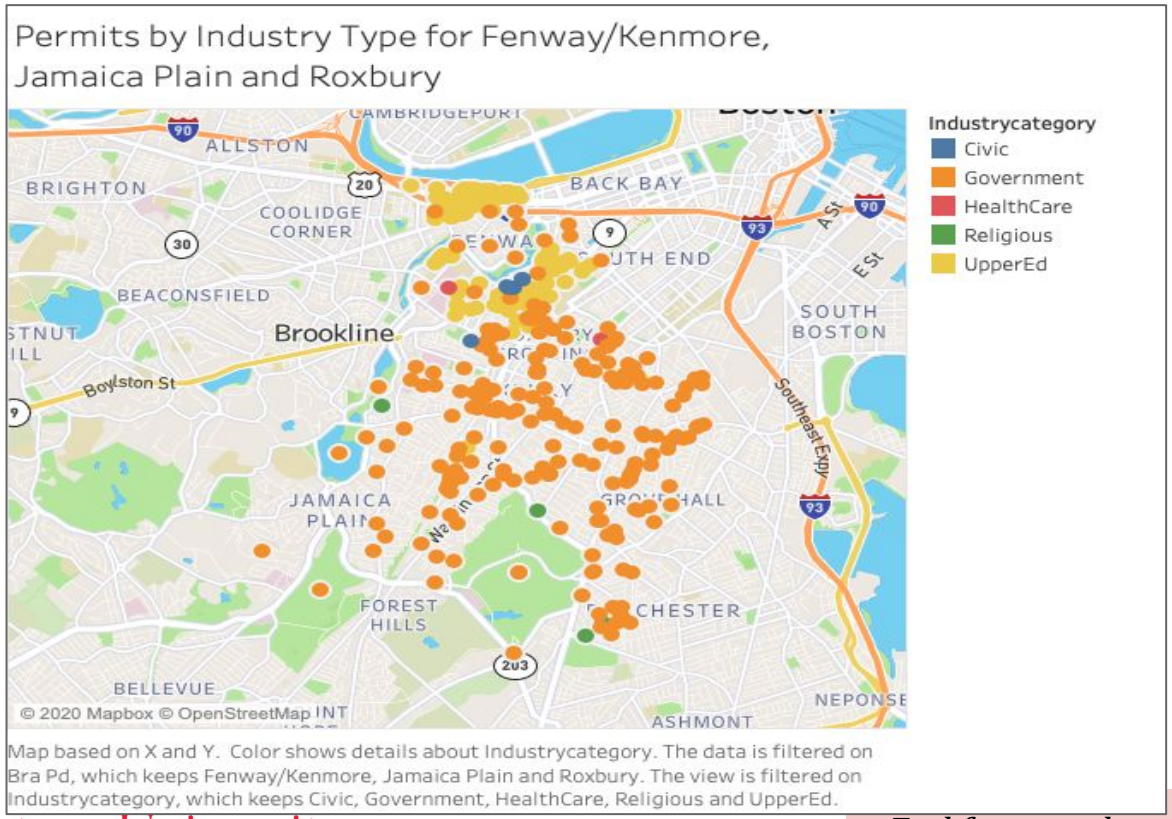
What different types of industry are building in these neighborhoods?



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Conclusion

Tableau is a powerful tool for quickly mapping coordinate points onto a simple map. Experiment with the many different options available for filtering and displaying data in different ways.

Tableau is also very powerful at creating a variety of charts and graphs, this can easily be done by dragging non-coordinates to the ‘column’ and ‘row’ areas.

Research questions can include a number of different dimensions and measures—do not be afraid of experimenting with different visualizations

For more powerful mapping software, see ArcGIS, QGIS, or CartoDB.

Feel free to ask questions at any point during the presentation!

Thank you!

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- Slides developed by Jeff Sternberg, Ana Abraham and Juniper Johnson
- If you have any questions, contact us at **nulab.info@gmail.com**
- Schedule an appointment with us! **https://calendly.com/diti-nu**
- Link to Online Materials:
  https://bit.ly/sp23-drakulich-tableau
- We'd love your feedback! Please fill out a short survey here:
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