Mapping with Tableau

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Current Issues in Cities and Suburbs
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NULab for Texts, Maps, and Networks

Introduction

This hands-on tutorial introduces using Tableau for basic point mapping. Students will:

- Learn about the Boston Area Research Initiative Data Portal
- Learn about Tableau
- Understand how to import and modify data in the Tableau environment
- Plot coordinate points onto a basemap
- Filter data in a variety of ways to produce custom visualizations

To follow along, visit
http://bit.ly/diti-fall2020-rabrenovic

Introduction

Reminder: this is just an introduction. These slides will be available for you to return to as you work on your assignment throughout the semester. Return to them often to remind yourself what to do. We also have office hours if you need help throughout the semester.

If you could map anything in your neighborhood of study, what would it be? Why would it be interesting to map? What would being able to map it add to your understanding of the neighborhood?

Boston Area Research Initiative - Data Portal

Boston Research Map

Boston Area Research Initiative Dataverse

What types of research questions could be asked using the building permits data set? What do you hypothesize we'll find in each neighborhood?

Tableau Basics

Tableau is a powerful visualizations tool. It can produce a variety of beautiful charts and graphs that look much nicer than basic Excel visualizations.

Tableau can also do basic mapping!

A Tableau license is available for free to students with a .edu email address. You can use the key on two different devices.

Link to Tableau for students:

https://www.tableau.com/academic/students

Key Terminology

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

Using Tableau
Step One: Connecting to Data

First, we need to connect to our data.

For the purposes of this exercise, we will be using building permit data for the City of Boston in csv format.

Select 'Microsoft Excel' and navigate to the data file that was sent via email.
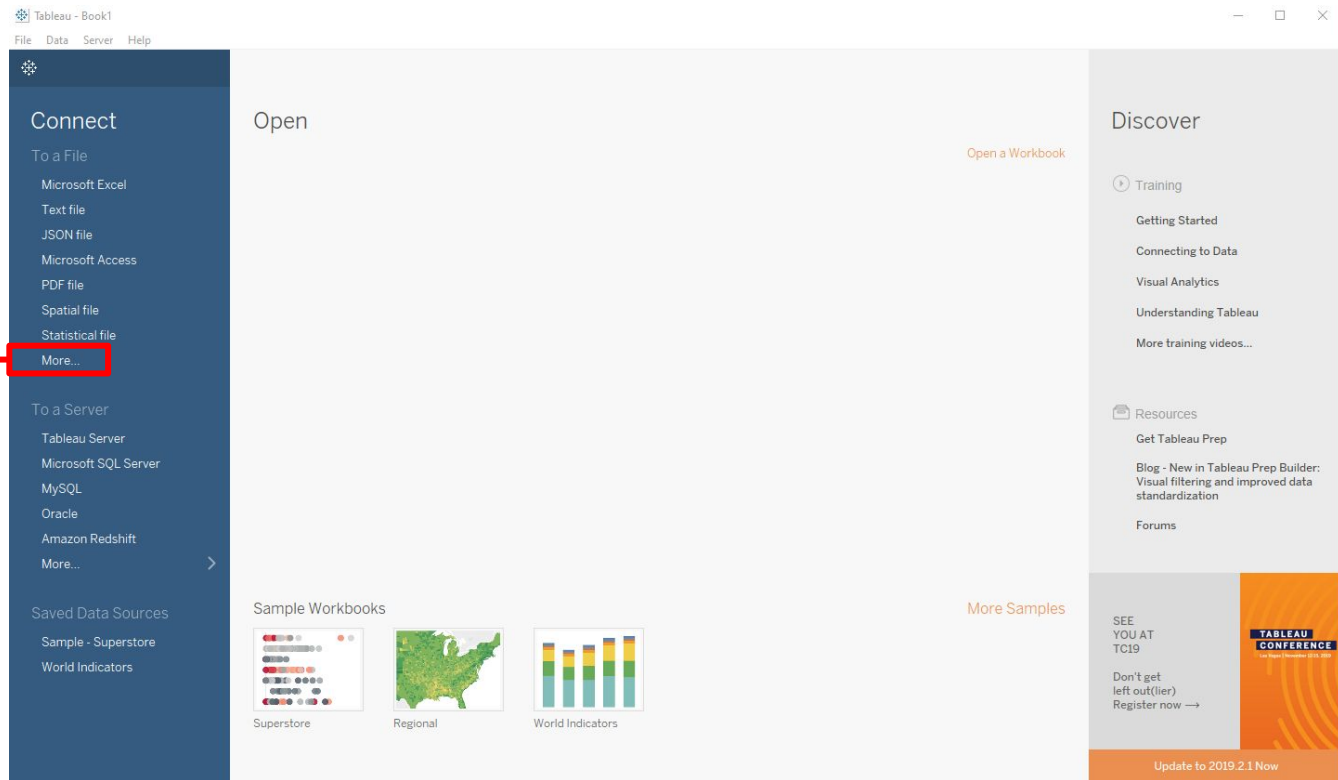
Using Tableau, Step Two: Convert Coordinate Column to Geo Data

We can change the data type of our columns by clicking on the # or abc at the top of the column display.

In order to map our data, we have to first convert the X/Y data into a coordinate class.

We can do this by clicking on the abc, and changing the data type from String to Number (decimal), then clicking on the # and hovering over 'Geographic Role,' and clicking on Latitude or Longitude. Convert:

X -> Longitude
Y -> Latitude

Using Tableau
Step Three: Plot our Points

To map our data points, we drag our Y data into the 'columns' area, and our X data in the 'rows' area.

Tableau will automatically plot our points based upon the X/Y coordinates.
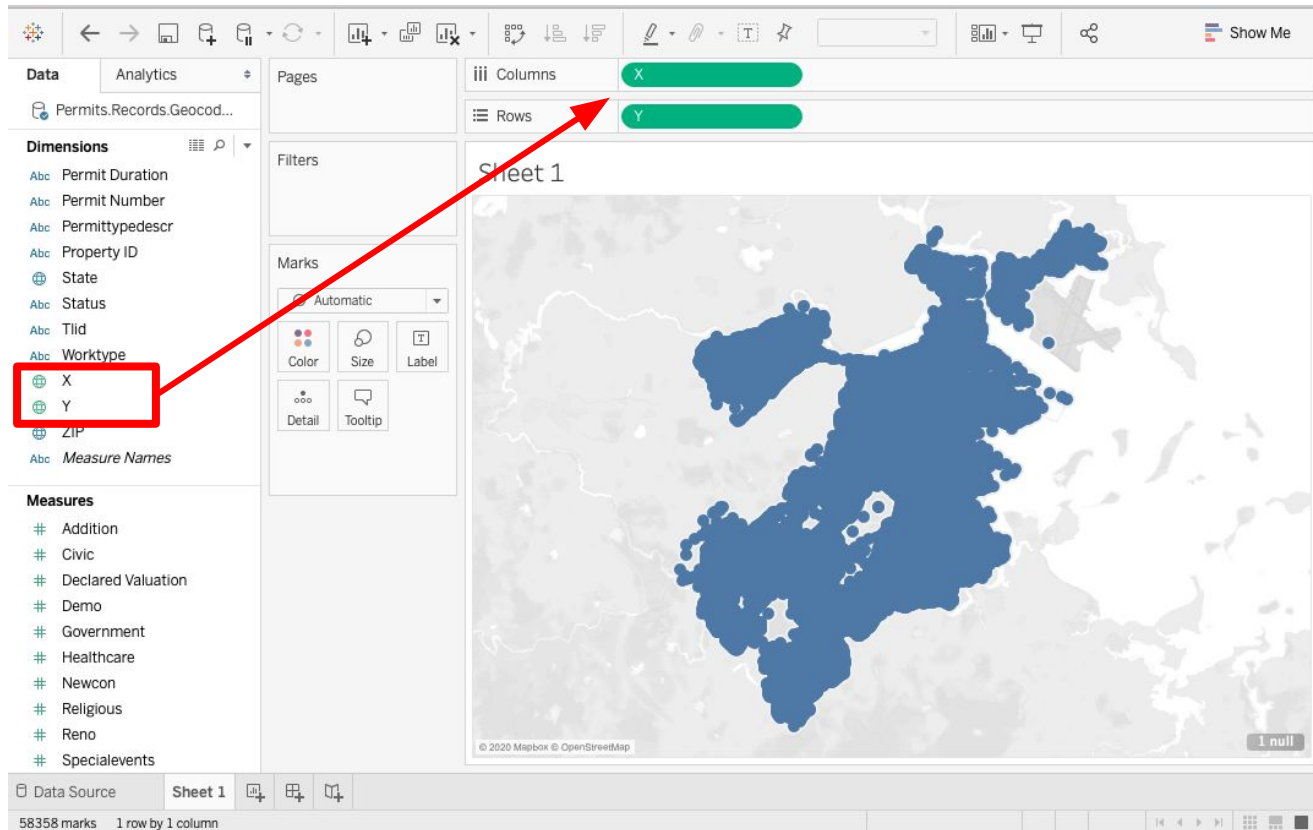
Using Tableau
Step Four: Zoom Controls

The navigation and zoom controls are in the top left of the plot area. We can use the zooming and panning tools to navigate to our area of interest.

We have zoomed into the Downtown Boston, Fenway/Kenmore, Jamaica Plain, Roxbury areas.
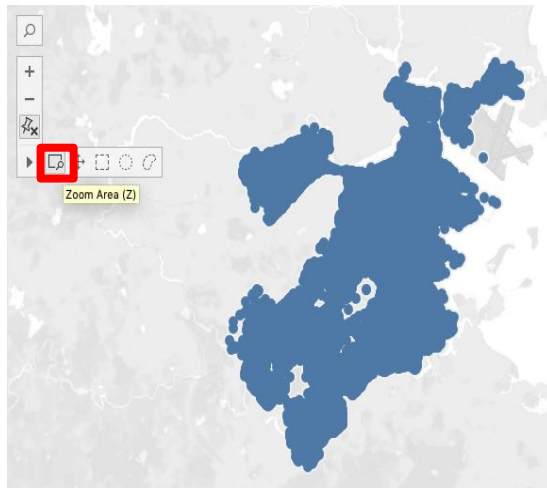
Using Tableau
Step Five: Modify Basemap

We can use the 'Map' > 'Map Layers…' option from the toolbar to modify our basemap.

We have changed our Style to 'street.' You may also want to toggle other Map Layers like 'Streets, Highways, Routes.'
When you are done, click the X at the top of the map layers sidebar.
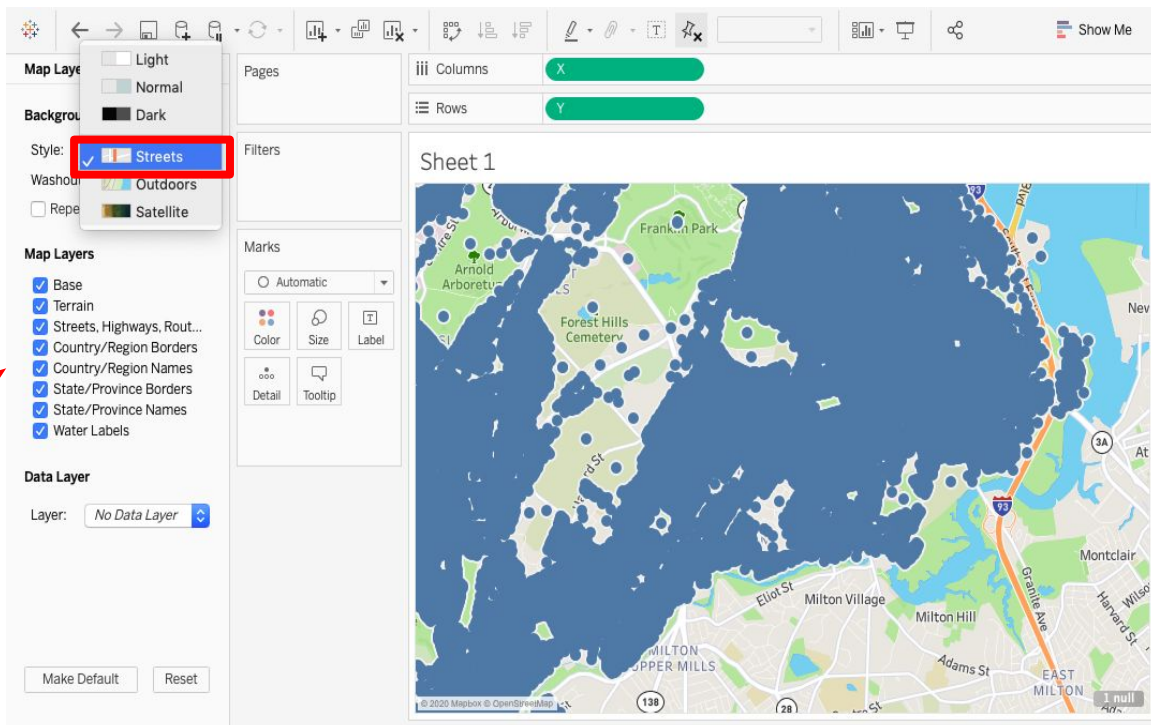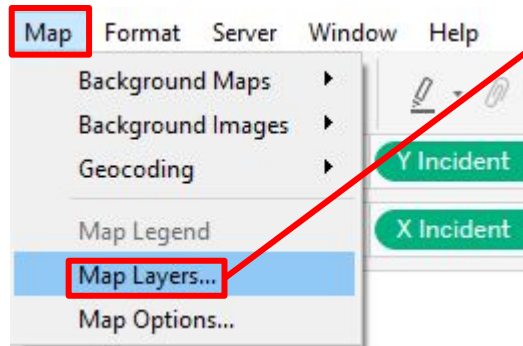
Hypothesis: Gentrification will look different in each neighborhood of study.

Operationalization: Gentrification can be tracked by filtering out Addition, Erection, New Construction, and Removal of Structure building permits

Using Tableau
Step Six: Create Filters

To create different filters and visualization parameters, drag a dimension or measure into the 'marks' box. Change marks to "Map" in dropdown option.

To specify a type of visualization, drag the parameter of choice onto 'color,' 'size,' etc.

For this exercise, 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).
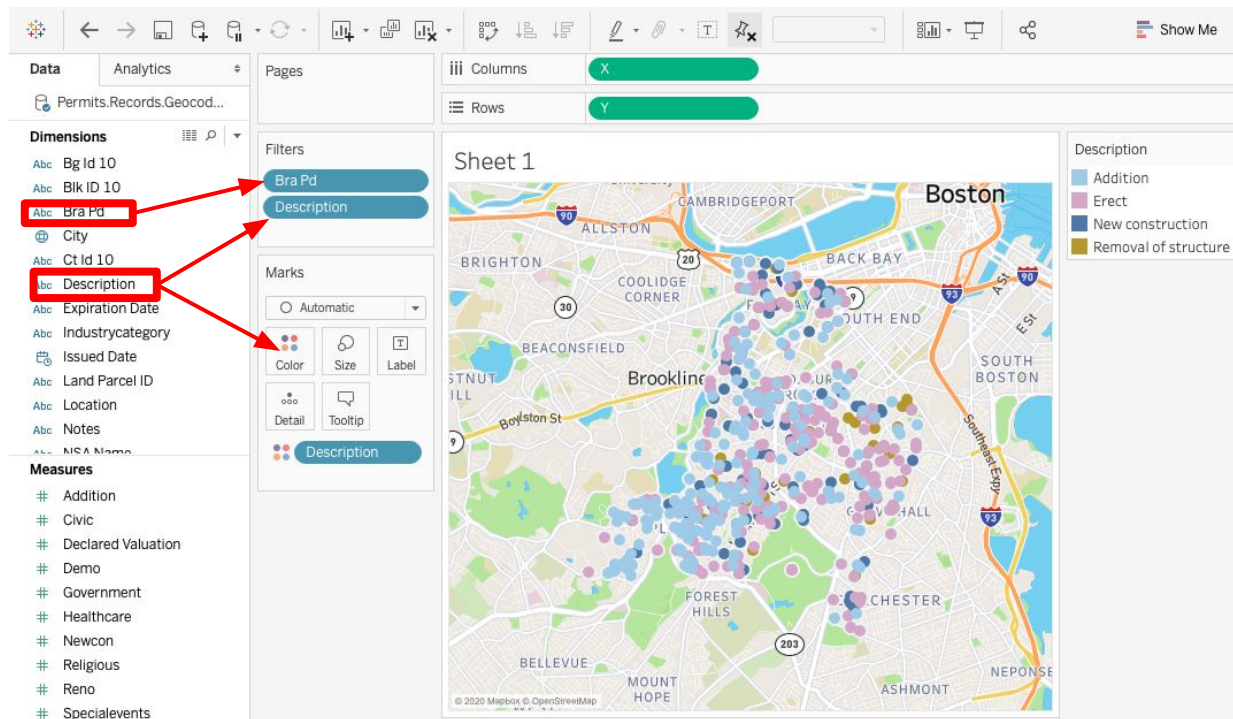
Using Tableau
Step Seven: Create Filters Continued

For this exercise, we want to filter our neighborhood data parameter to only display Fenway/Kenmore, Jamaica Plain and Roxbury.

We click on 'Filter…' This will bring up the filter box.

Now we will deselect all and then check the boxes for Fenway/Kenmore, Jamaica Plain and Roxbury.

We do the same thing for permit description type, selecting the boxes for Addition, Erect, New Construction, and Removal of Structure.
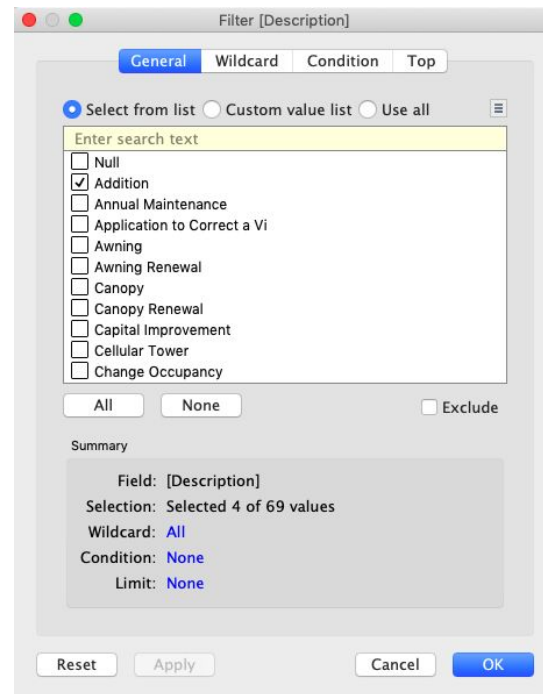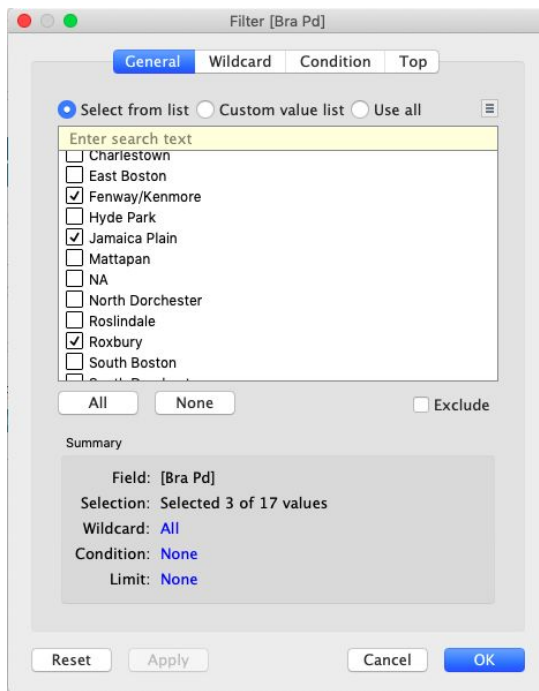
Using Tableau
Step Seven: Create Filters Results
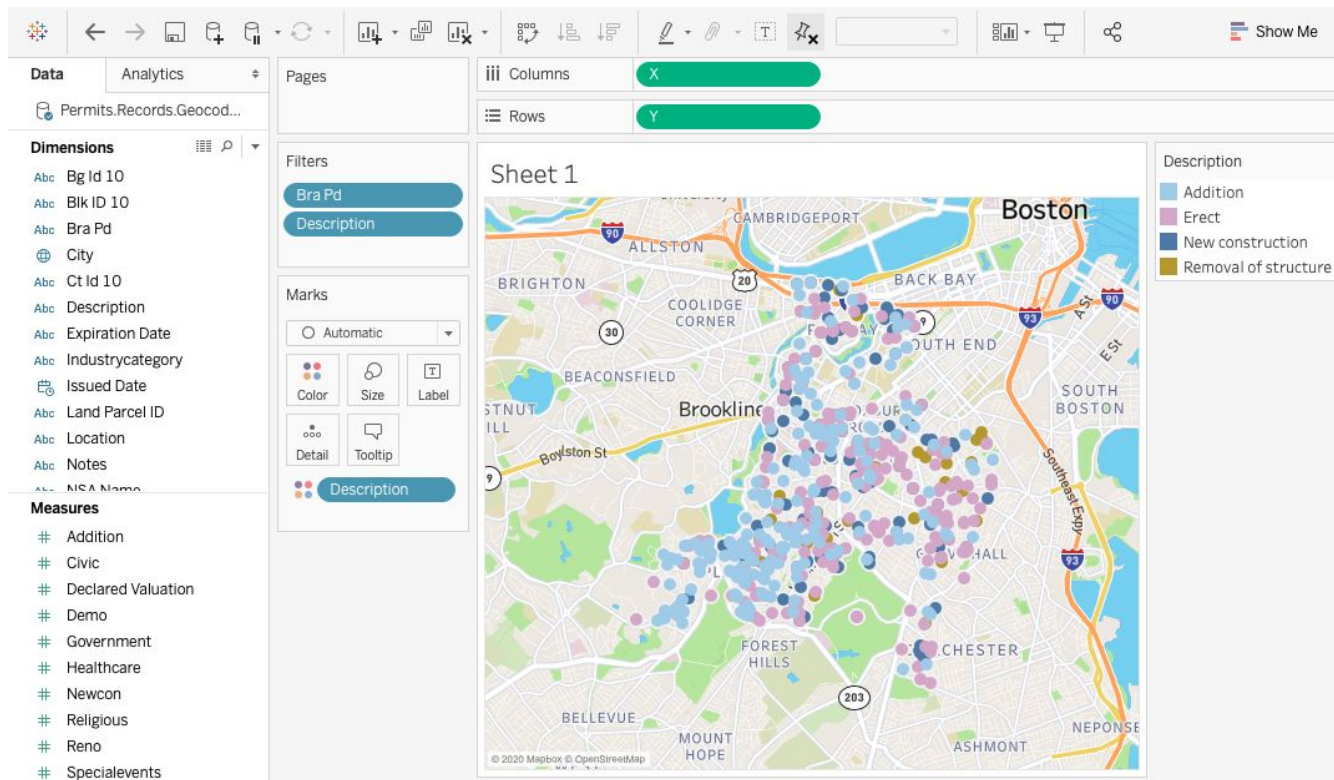
Using Tableau
Step Eight: Modify Colors

The light pink and blue for Addition and Erection do not contrast very well, so we will now change the colors.

On the Bra Pd (neighborhoods) sidebar, click the drop down arrow, then click on 'edit colors…'

On the edit colors box we can now change our colors to contrast more for better visualization.
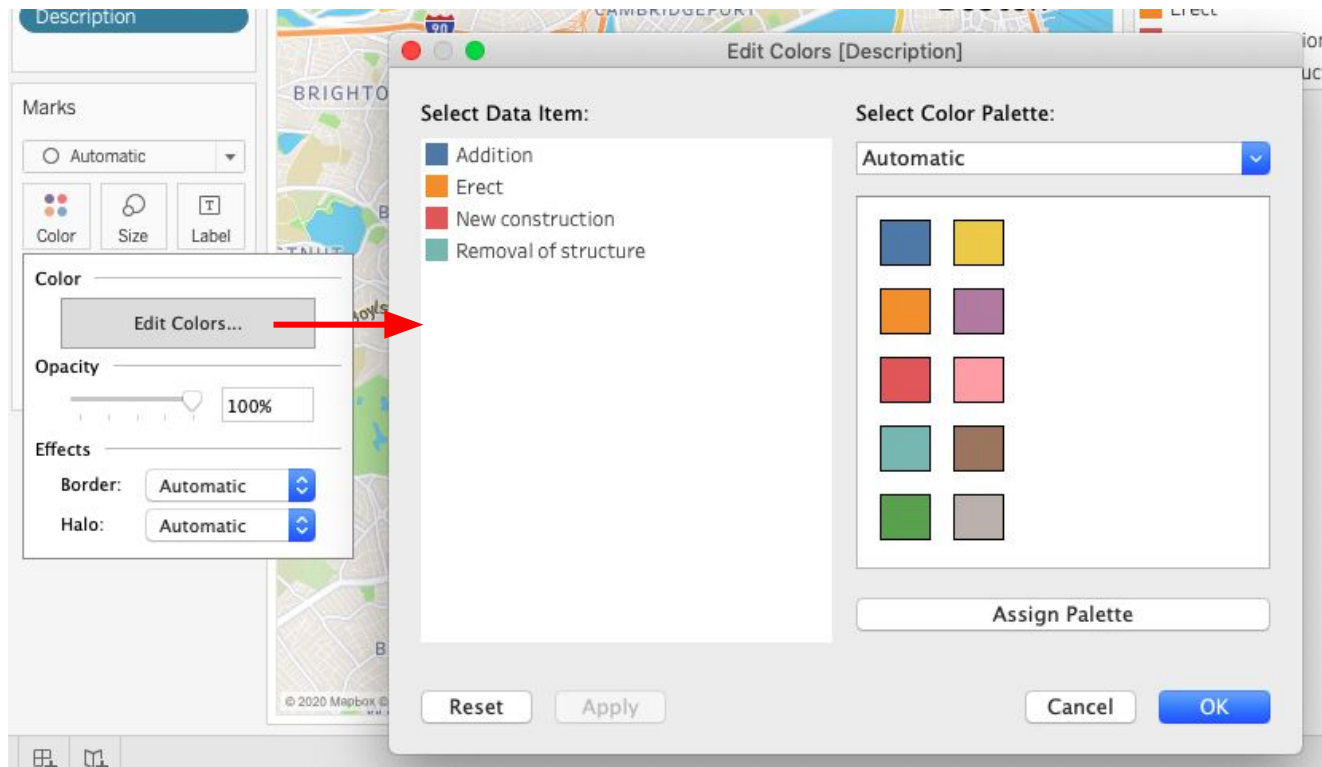
Using Tableau
Step Eight: Modify Colors Results
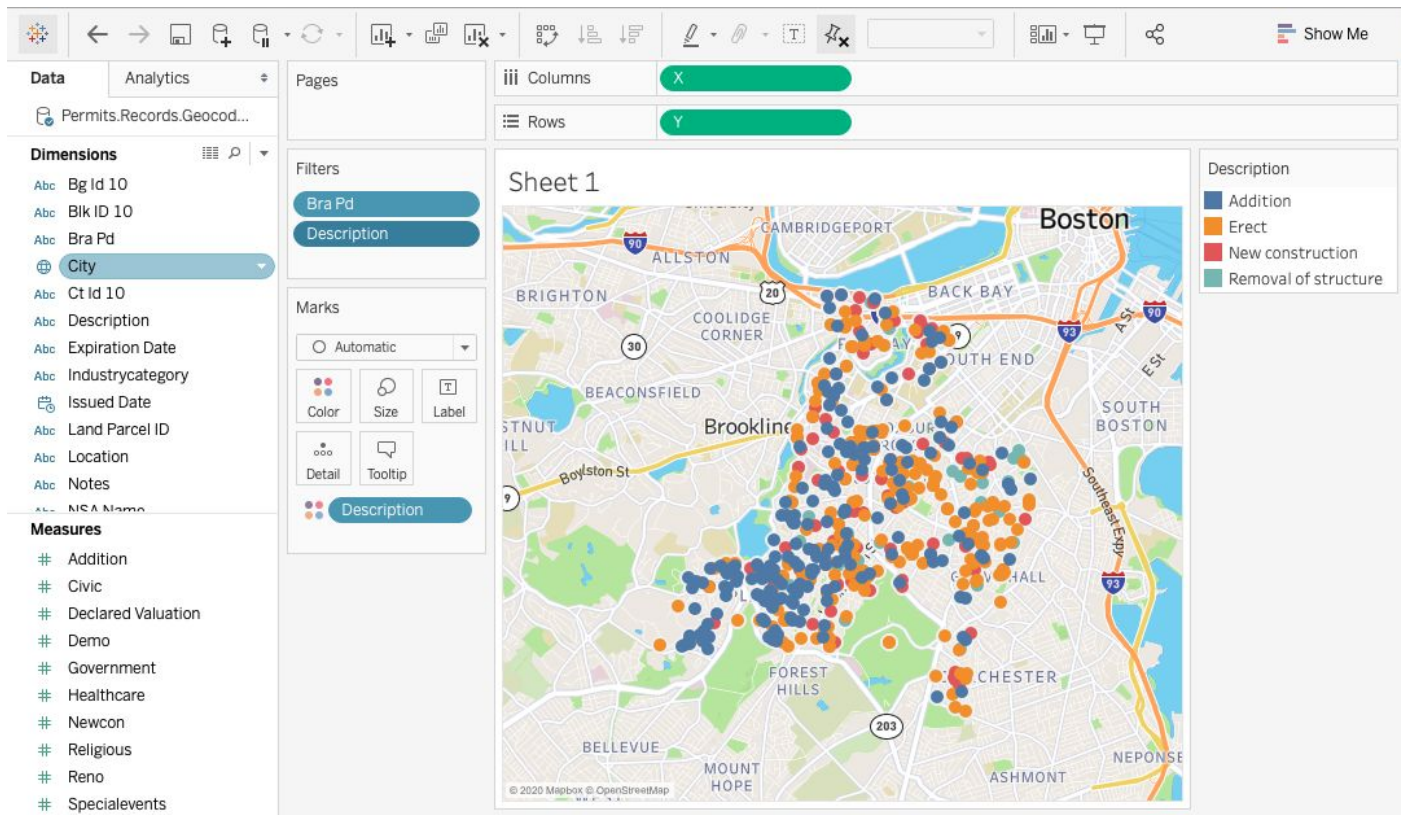
Using Tableau
Step Nine: Exporting Images

Once we are happy with our map after filtering for different data points, we can export our image.

From the 'Worksheet' drop-drop down menu, hover over 'Export,' then click on 'Image…' You can select the type of export then click 'save.'

Navigate to where you would like to save the image, name it, and change the file type if you would like - then click 'save.'
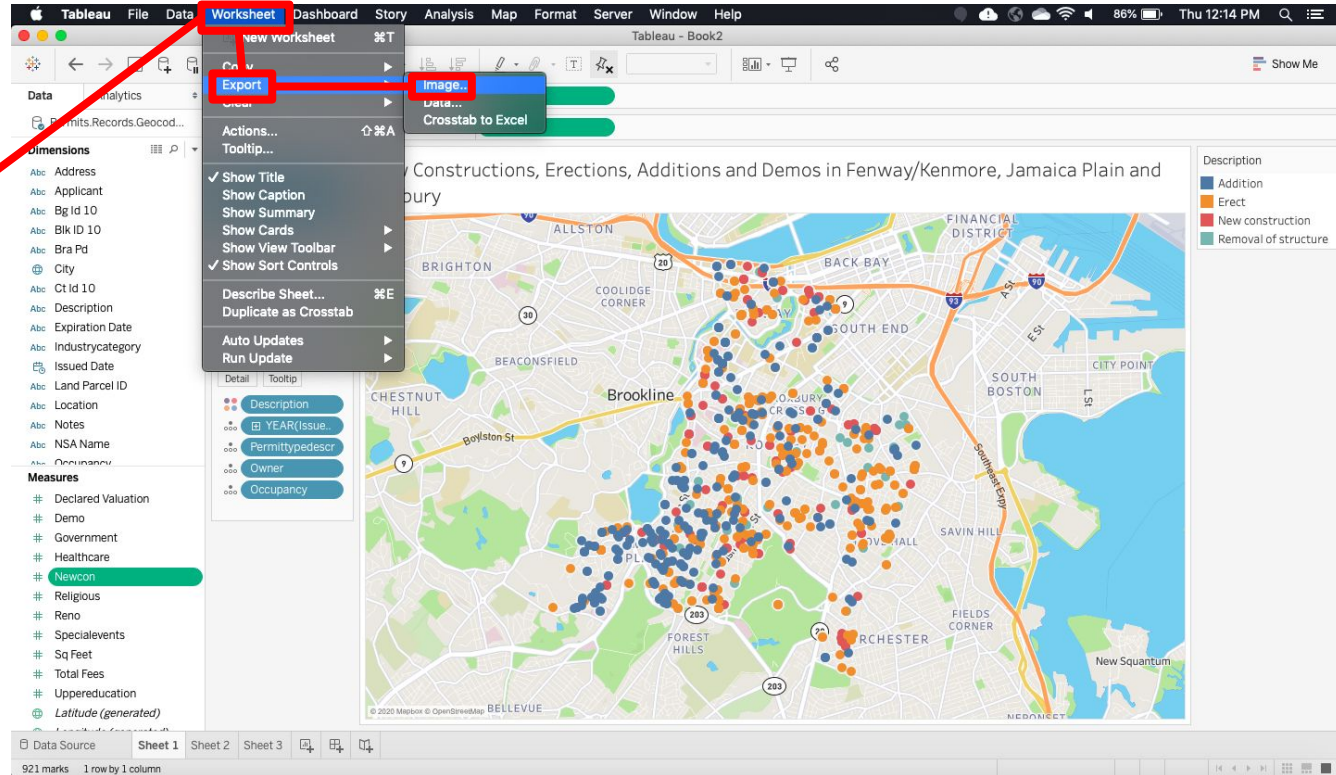
New Constructions, Erections, Additions and Demos in Fenway/Kenmore, Jamaica Plain and Roxbury

Description
- Addition
- Erect
- New construction
- Removal of structure

© 2020 Mapbox © OpenStreetMap
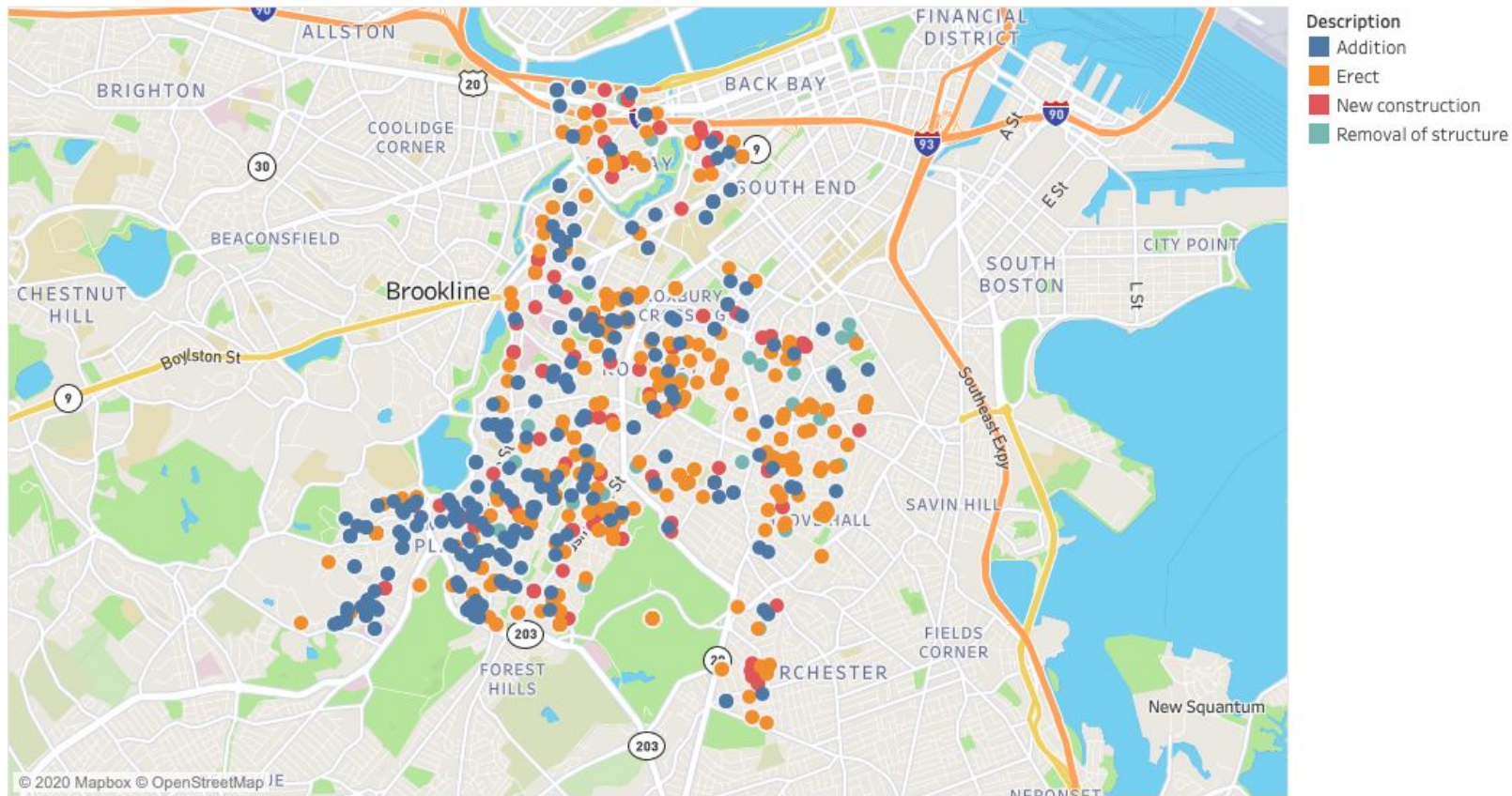
Map based on X and Y. Color shows details about Description. Details are shown for various dimensions. The data is filtered on Bra Pd and Worktype. The Bra Pd filter keeps Fenway/Kenmore, Jamaica Plain and Roxbury. The Worktype filter keeps ADDITION, ERECT, NEWCON and RAZE.

Graphs with Tableau: Drag & Drop

Similar to mapping, creating a graph is as simple as dragging and dropping our dimensions and measures.

In this demonstration, we will 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, we will drag and drop our 'Issued Date' dimension to the columns, and the 'Addition, Demo, Newcon and Reno' measures to the rows.
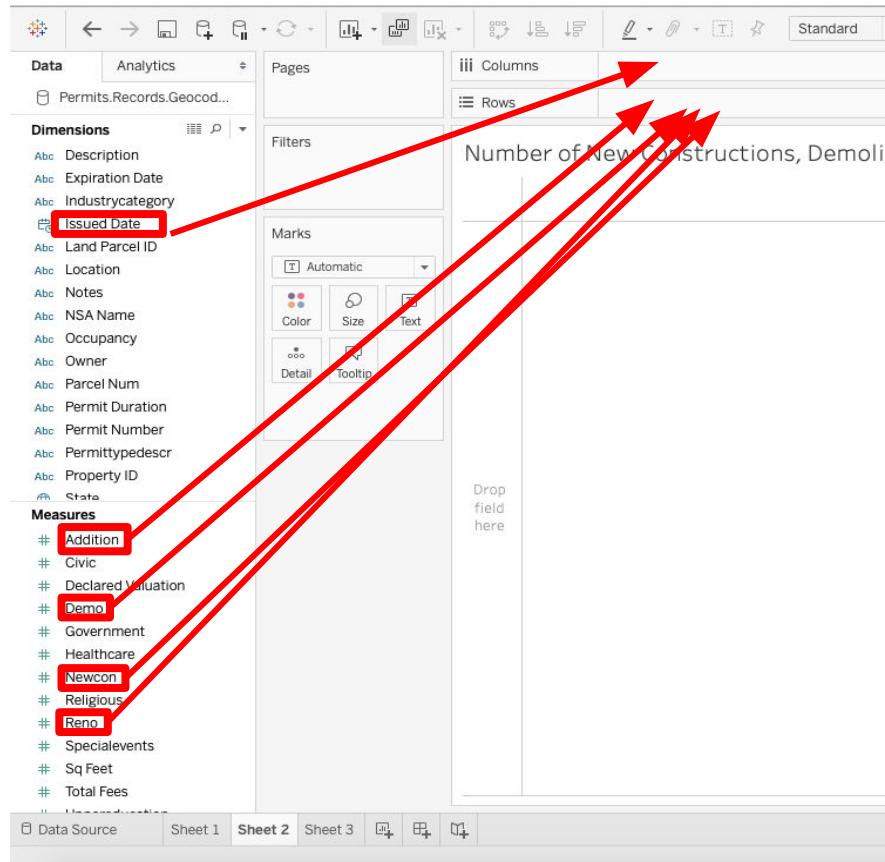
Graphs with Tableau: Drag & Drop

We now have a graph of different building permit records over time, but we still need to show their prevalence in specific neighborhoods.

Next, we drag and drop our "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.

We will then export the graph in the same way we exported our map.
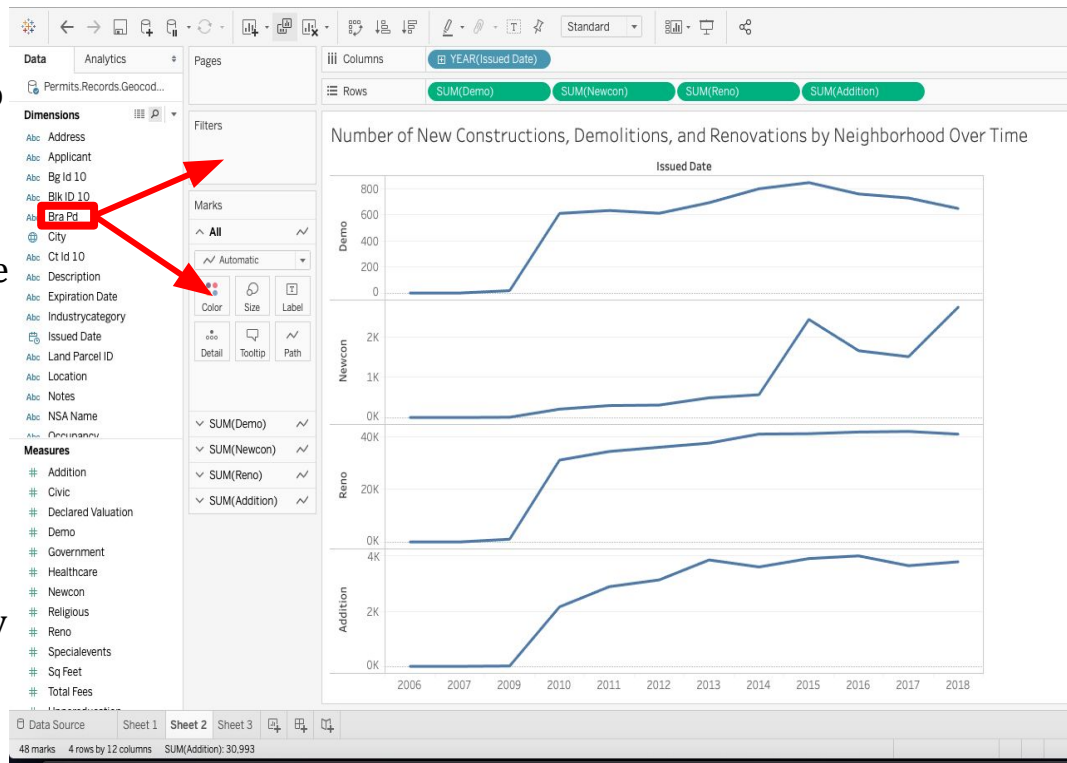
Number of New Constructions, Demolitions, and Renovations by Neighborhood Over Time

Issued Date

Bra Pd
- Fenway/Kenmore
- Jamaica Plain
- Roxbury
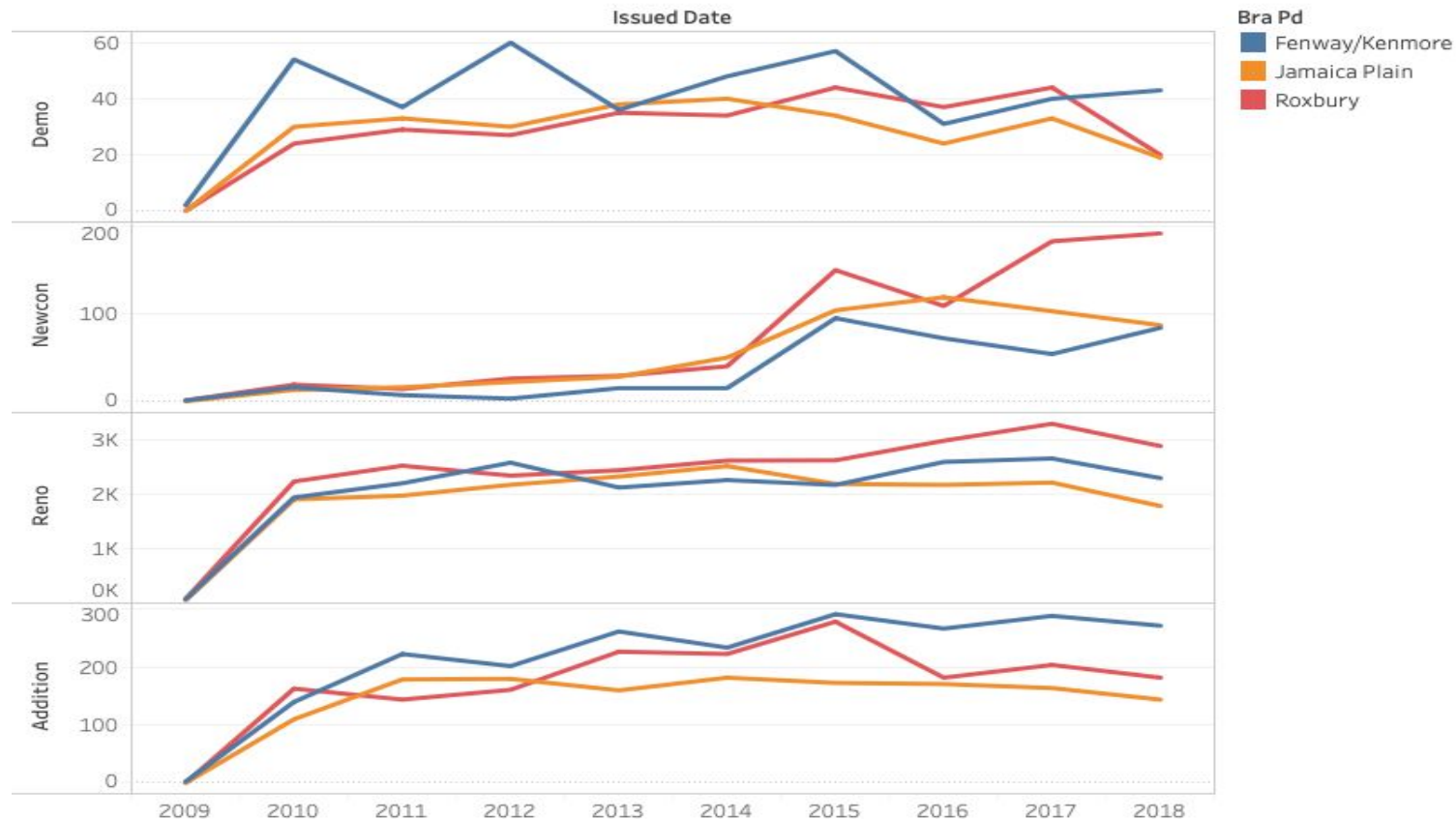
The trends of sum of Demo, sum of Newcon, sum of Reno and sum of Addition for Issued Date Year. Color shows details about Bra Pd. The view is filtered on Bra Pd, which keeps Fenway/Kenmore, Jamaica Plain and Roxbury.

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?
- Who owns the buildings that are being renovated and constructed?
- What different building types are being constructed and renovated?

How Much Value are New Constructions and Renovations adding to their Neighborhoods over Time?

Declared Property Valuations by Neighborhood Over Time
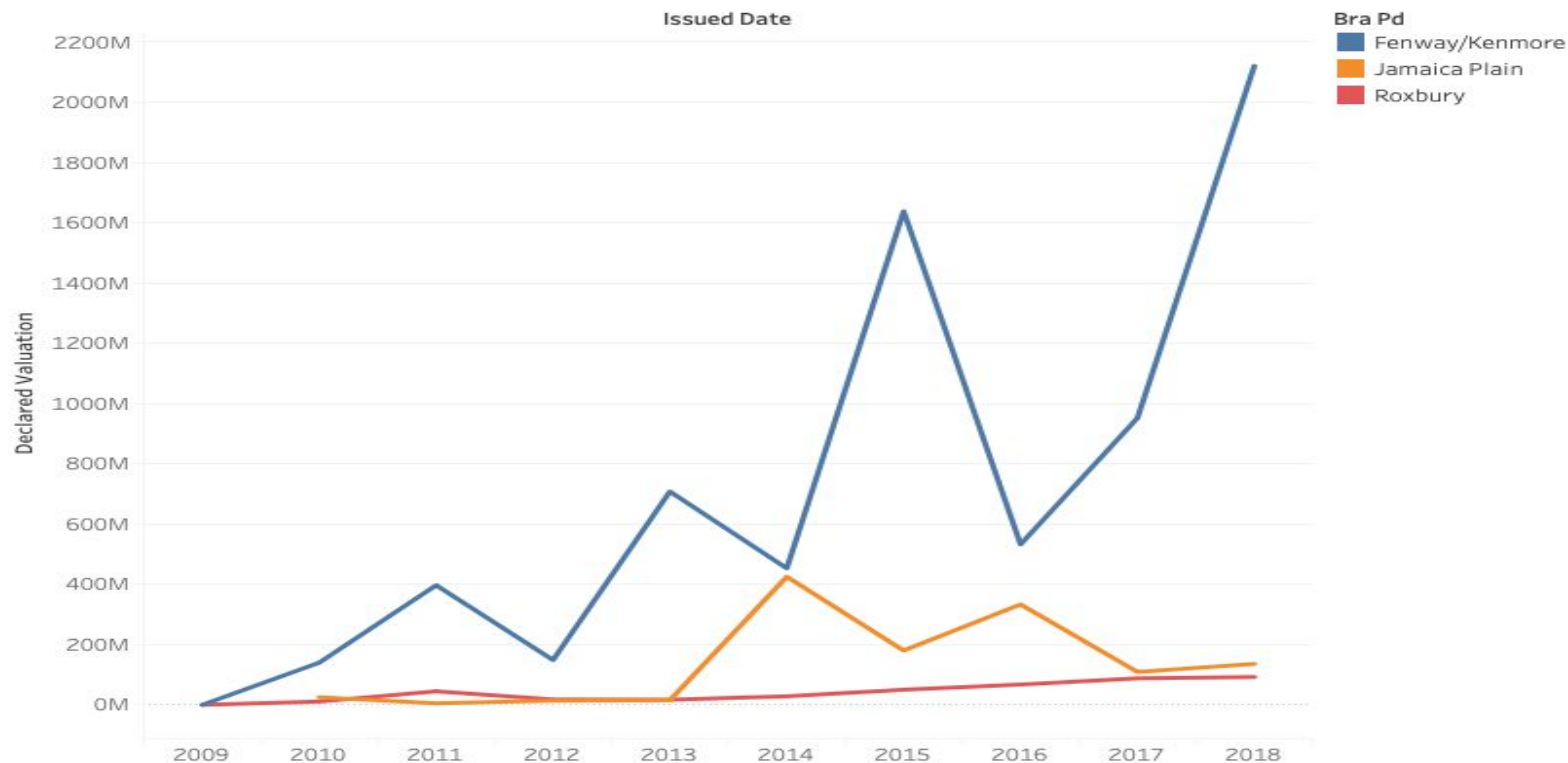
The trend of sum of Declared Valuation for Issued Date Year. Color shows details about Bra Pd. The data is filtered on Worktype, which keeps ADDITION, ERECT and NEWCON. The view is filtered on Bra Pd, which keeps Fenway/Kenmore, Jamaica Plain and Roxbury.

How much value does each type of construction add to each Neighborhood's Overall Valuation?

Declared Property Valuations by Neighborhood and Permit Type
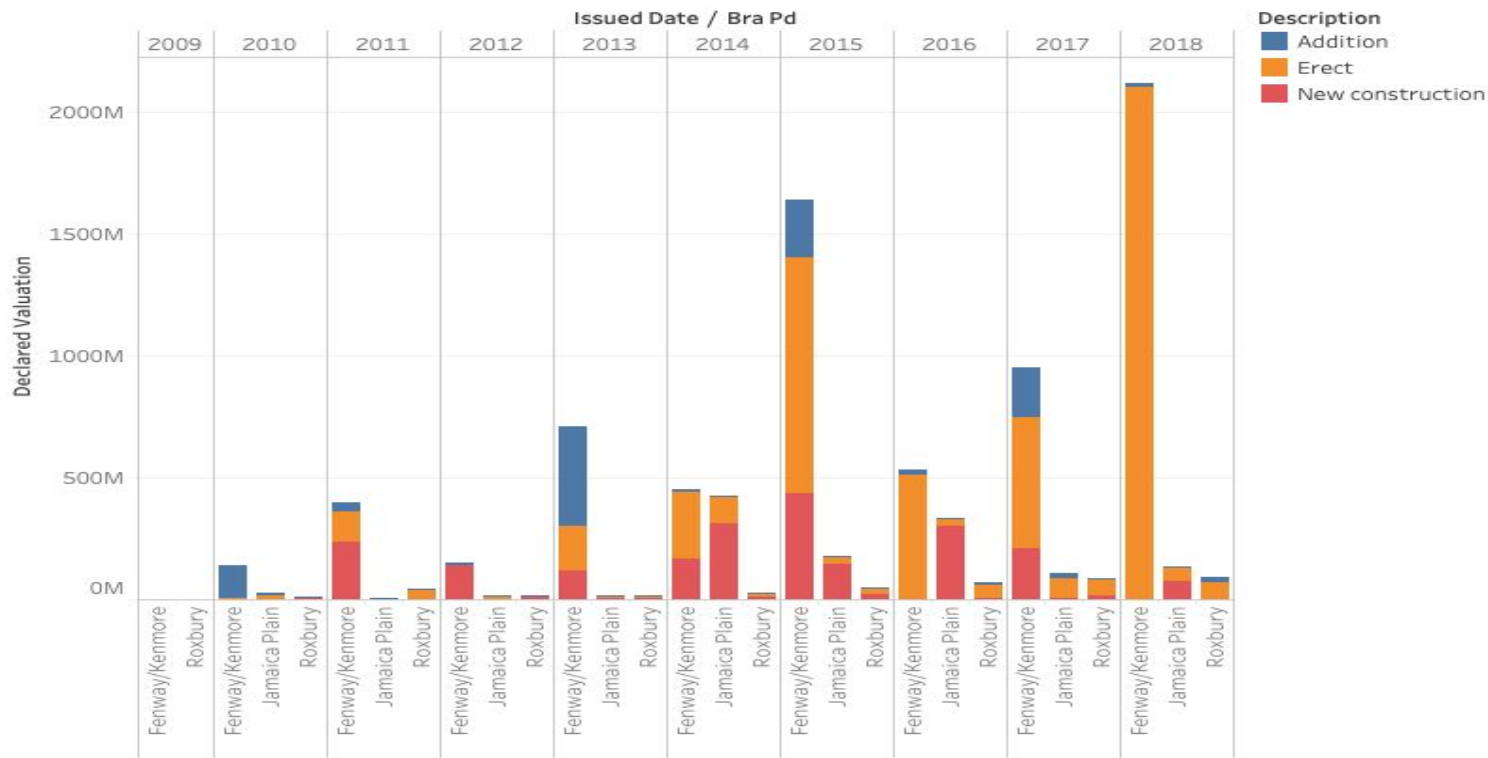
Sum of Declared Valuation for each Bra Pd broken down by Issued Date Year. Color shows details about Description. The data is filtered on Worktype, which keeps ADDITION, ERECT and NEWCON. The view is filtered on Bra Pd, which keeps Fenway/Kenmore, Jamaica Plain and Roxbury.

What different types of industry are building in these neighborhoods?

Permits by Industry Type for Fenway/Kenmore, Jamaica Plain and Roxbury
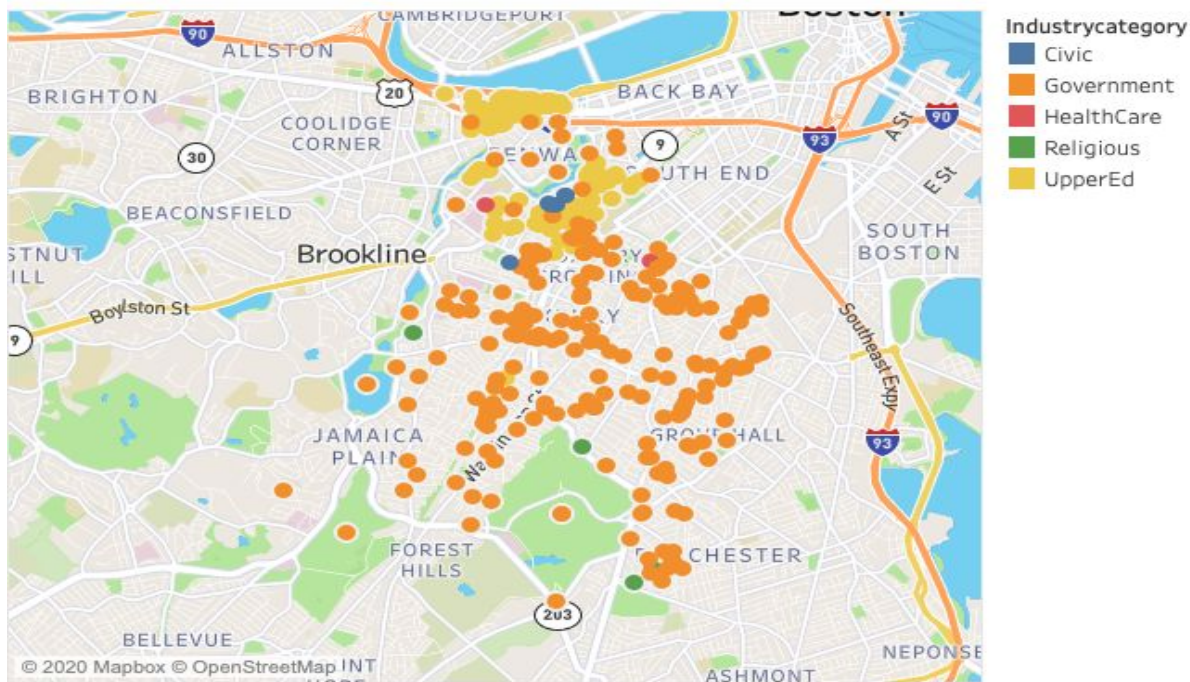
Map based on X and Y. Color shows details about Industrycategory. The data is filtered on Bra Pd, which keeps Fenway/Kenmore, Jamaica Plain and Roxbury. The view is filtered on Industrycategory, which keeps Civic, Government, HealthCare, Religious and UpperEd.

Other Relevant BARI Data (data here)

↕ Sort ▾

Yelp Reviews in Boston, MA

Aug 27, 2020

Qiliang Chen; Riley Tucker; Dan O'Brien, 2020, "Yelp Reviews in Boston, MA", https://doi.org/10.7910/DVN/DMWCBT, Harvard Dataverse, V1, UNF:6:LK7qhw898NQb7KAGmXRD/A== [fileUNF]

These datasets include information about Yelp restaurant reviews for the city of Boston processed from data scraped by BARI. We have generated a list of Boston restaurants by searching all of Boston's zipcodes on Yelp and then verifying that each identified restaurant has an addr...

Airbnb in Greater Boston, MA

Aug 26, 2020

Mehrnaz Amiri; Riley Tucker; Dan O'Brien, 2020, "Airbnb in Greater Boston, MA", https://doi.org/10.7910/DVN/GXLZXF, Harvard Dataverse, V1, UNF:6:VwnVhoV6wbR9iqk8zI2kJA== [fileUNF]

These datasets include information about Airbnb listings in the Boston area processed from data released by insideairbnb.com. Inside Airbnb produces monthly data releases about Airbnb activity for select regions internationally. This data includes listings from Inside Airbnb's "B...

Building Permits

Aug 26, 2020

Saina Sheini; Barrett Montgomery; de Benedictis-Kessner, Justin; O'Brien, Daniel T., 2018, "Building Permits", https://doi.org/10.7910/DVN/B7DHBK, Harvard Dataverse, V4, UNF:6:8hb+ab7Ejt8i4bZVDgMlVQ== [fileUNF]

This dataset contains various files detailing the City of Boston's building permits applications from September 26, 2006 to the recent present. The raw data were originally gathered and released by the Inspectional Service Department (ISD) of the City of Boston. It details variou...

Craigslist Postings in Massachusetts

Aug 26, 2020

Edgar Castro; Mehrnaz Amiri; Riley Tucker; Daniel T. O'Brien, 2020, "Craigslist Postings in Massachusetts", https://doi.org/10.7910/DVN/52WSPT, Harvard Dataverse, V1, UNF:6:Nlsyp+lOo4qS8BQlOOu8jA== [fileUNF]

These datasets include information about housing listings on Craigslist for the state of Massachusetts processed from data scraped by BARI. This release includes listings for all five Massachusetts regions designated by Craigslist (Boston, Cape Cod, South Coast, Western Mass, and...

Look through the full list of data on BARI's website. What data are you most excited about exploring and why? What questions might you explore with these data?

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.

Sometimes you need to tell a story

Quantitative data can give a big-picture view of a neighborhood. Sometimes, however, you want to tell a more in-depth story that can't be conveyed through data alone. For that, we turn to StoryMap.

But first...

Thank you!

If you have any questions, contact DITI at nulab.info@gmail.com

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Slides, handouts, and data available at **http://bit.ly/diti-fall2020-rabrenovic**

Schedule an appointment with us! **https://calendly.com/diti-nu**