

## Graphic Detail

Geographic Information Systems (GIS) organize and clarify the patterns of human activities on the Earth's surface and their interaction with each other. GIS data, in the form of maps, can quickly and powerfully convey relationships to policymakers and the public. This department of Cityscape includes maps that convey important housing or community development policy issues or solutions. If you have made such a map and are willing to share it in a future issue of Cityscape, please contact [john.c.huggins@hud.gov](mailto:john.c.huggins@hud.gov).

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# Visualizing and Comparing Residential Permit Data Using Lollipop Plots

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Residential permits are a common indicator of housing market activity. Residential permits indicate the demand for new homes, and by categorizing homes into different construction types, it is possible to understand what types of homes are in-demand in the market and the types of homes that the market is producing. In this article, I use a cross between a scatter plot and a bar chart called a lollipop plot to visualize residential permits by year for single-family dwellings (SFDs) and townhomes in Montgomery County, Maryland. These data were obtained from dataMontgomery (2019), the open data portal for the county. These data are for construction permits that were finalized between 2000 and 2018 for SFDs and townhomes, as far back as data were available. Between 2000 and 2018, there were 14,831 and 6,322 permits for SFDs and townhomes, respectively.

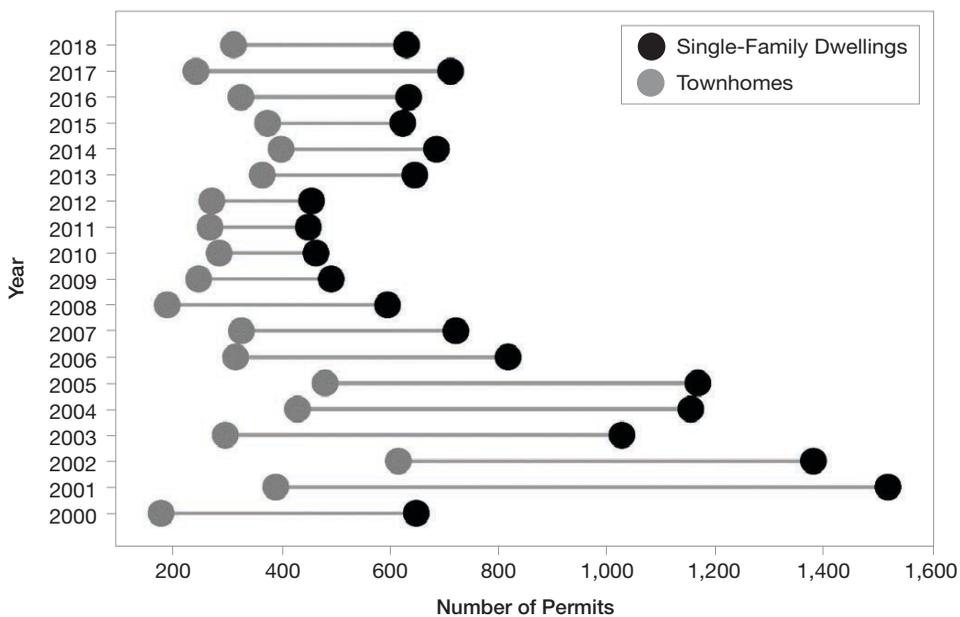
The lollipop plot compares and offers a visualization of a pair of variables in a given record. In this demonstration, each year is a record, and the variables are the number of permits finalized for SFDs and townhomes. A pair of points is plotted on the graph and a line is established between each pair, demonstrating the difference between the two values. For example, as seen in exhibit 1, there were 649 SFD permits and 179 townhome permits in 2000; the lollipop plots a value at each data point

and then connects the point via a line. Values for SFDs and townhomes are color-coded. In addition to being able to understand how many permits of each type were issued each year, the reader can also discern the difference between the numbers of permits of each type issued in a given year.

The first exhibit shows a standard lollipop plot. For each year, there are a pair of plotted points for the SFD and townhome values that are color-coded by category. The line between each pair indicates the difference between the numbers of permits issued by each type. In the years prior to the 2007–2008 financial crisis, SFD permits dwarfed townhome permits issuances. During the recession years, from 2009 to 2013, SFD permits continued to be about twice the number of townhome permits. In all years, permit issuances for SFDs were greater than those for townhomes. Since 2013, permits for townhomes generally increased slightly, while permits for SFDs increased considerably. In addition to showing the number of permits issued each year, the lollipop plot adds value by providing a visualization of the difference between the types of permits issued, allowing patterns to emerge and be more easily recognized.

**Exhibit 1**

Lollipop Plot for Single-Family Dwellings and Townhomes by Year

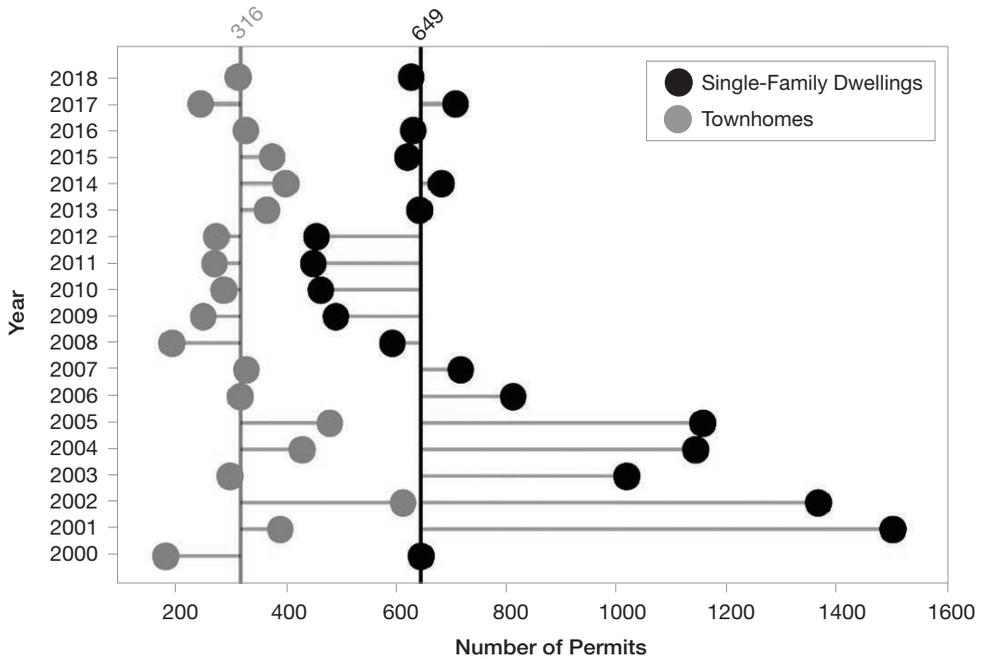


The second exhibit is a modification of the lollipop plot that, instead of comparing the difference between the types of construction, compares the median value for that type of construction over the time period. Between 2000 and 2018, the median values for final SFD and townhome permit issuances per year were 649 and 316, respectively. From 2001 to 2007, SFD permits were generally far and above the median value and then steadily decreased, reaching a low point in 2011 and 2012. Since 2012, permits for SFDs have generally been similar to the median value for the timeframe as a whole. Prior to the market crisis, permits for townhomes were more variable but in

most years were above the median value. Similar to SFD permits, counts for townhome permits fell during the recession years but rose again entering the middle decade and have remained above the median value in most years since 2013. Using the median value as the mark for comparison allows for values between years to be more directly comparable.

**Exhibit 2**

Lollipop Plot for Single-Family Dwellings and Townhomes by Year Compared to Median Value for Each Permit Type



**Acknowledgments**

Alexander Din was a housing research and GIS analyst for the Maryland Department of Housing and Community Development at the time this article was written.

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**Reference**

dataMontgomery. 2019. Residential Permits. <https://data.montgomerycountymd.gov/Licenses-Permits/Residential-Permit/m88u-pqki/data>.

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