My name is Lori Butler. This is my capstone project for Cohort 1 of the Daytime Data Analytics program at Nashville Software School. The title is “What’s happening in my neighborhood? An exploration into Nashville’s growth.

My motivation for doing this is two-fold. First, growth is happening right next to me here in Nashville. I live in the Bordeaux area – a bit north of North Nashville. The lot next door is 2.3 acres and it sold in 2014 for $60k, and 5 years later it sold for more than triple that amount for $219k.

Also, I live near the segment of Clarksville Pike that is being widened to four lanes, so even more growth is expected as this project moves forward.

To look at this upcoming growth I used **Building Permit Applications**; and **Building Permits Issued** data from the Nashville Open Data Portal. I also used the **Nashville**/Davidson County **Zip Code** GeoJSON file.

I chose to look at building permit information because it gives a “major hint”, as this Investopedia article states, into the state of the economy in the recent past, and a glimpse into the near future. I initially considered using **Neighborhood Association** boundaries but quickly realized that zip codes provided better coverage.

It’s helpful to understand a couple things about the permitting process when interpreting this data. After submitting an application it’s reviewed by many agencies. It may be several weeks, or even several months, before a permit is issued and in some cases the application may be rejected or withdrawn.

The challenges I had with this data were in three main areas. First, there were issues getting the latitude and longitude of each address. I used a regular expression to pull the latitude and longitude into separate columns.

Second, the permit **applications** data included records dating all the way back to 2004. I focused my analysis on the most recent six months, as I found that to be the most reliable.

Third, in the permits **Issued** data I discovered that there were sometimes two permits issued for a single project, with separate permit numbers. For example, in this project a new permit number was issued when the contractor was changed six months after the first permit had been issued. I chose to leave these duplicates in place to avoid corrupting valid data.

The key questions I explored were first, where has growth been happening – based on the number of permits issued. I was also interested in seeing the average construction cost in these areas. Then I was curious to see where growth might happen in the near future by using permit applications data.

These charts show the number of permits issued, broken out be each zip code. This first view shows <u>all three years combined</u>. On the map, the circles represent individual permits, and the shaded areas represent each zip code, with the **darker shading** indicating the most permits issued.

Sylvan Park and North Nashville are the top two areas based on total permits issued over the past three years. I wondered whether this was something consistent, over the full three years, or whether the two top areas had just pulled ahead in recent months or years. It turns out that Sylvan Park is in the top three

32 out of the last 36 months. North Nashville is close behind, having been in the top three **28** out of the last 36 months.

These two areas are in the top three for the past seven consecutive months – from May 2020 back to November 2019. *[Walk through chart by month.]* The area in the top three tends to be different each month, including areas like **Wedgewood/The Gulch**, **Brentwood**, **Antioch**, **Hermitage,** and **Germantown**.

From this we can tell that there are lots of permits being issued in these two areas, very consistently over that past three recent years. It is worthwhile to note that a permit issued indicates a serious *intention* to build a house, but this data doesn't contain information about a *start or completion date* for construction. Also, this data also *only* refers to new home construction, it doesn't contain any information about the sale of existing homes.

In addition to looking at the *count* of permits being issued, I also wondered about the average estimated construction cost for these areas.

These charts show the *average construction cost* **across all three years.** The bars are still sorted high to low by the **number of permits issued**, and the **darker shading** indicates the highest average construction cost. The treemap chart, is sorted by average construction cost. We see that Sylvan Park and North Nashville are in the middle.

I wondered whether the **relative average construction cost** increased in recent months for these two areas, since they have been popular for such a long time. When we look at May 2020, month by month going back in time, we can see that they stay consistently in the middle (not the darkest green and not the lightest green). This remains true for each month for the past three years.

The information we've been looking at shows us the past permits issued. I wondered if the same areas would be popular with the recent building permit **applications** as well.

In this slide we're looking at the total permit **applications** over the past six months, from Dec 2019 to May 2020. I chose to show this as total of all permit application, rather then month to month, since there's no way to know if or when the permits will actually be issued. We see here that it looks like there is still a steady amount of interest in North Nashville and Sylvan Park.

In conclusion, we can tell from this information that Single Family Home construction has been strongest in Sylvan Park and North Nashville, it looks like interest is still strong as of May 2020.

As a caveat, it's important to remember that while most permits issued do result in a new home being built, some are never built and some make take a long time.

For this project I used Python in Jupyter Notebook, Tableau Desktop, and Excel.

I want to end by saying thank you to Nashville Software School, particularly to our instructors Mary and Mahesh for making this very fun career transition possible for me.

Feel free to share this video with others, and to contact me if you have any questions. Thank you for listening to this demo of my capstone project!