

Housing and Enrollment Methodology Study

Between the spring of 2013 and the fall of 2015, Seattle Public Schools and [Integrated Economics](#) initiated an effort to extend the district's understanding of, and its ability to model, enrollment demand. The goal was to make greater use of housing market data - and ongoing modeling and tracking- to bolster SPS's understanding of enrollment demand, both in the short and long term.

The initiative was designed with three outcomes in mind—outcomes which have been achieved:

1. Develop a way to track, on an ongoing basis, the ways in which new development added to the city's existing housing stock affect enrollment demand;
2. Develop better understanding of—and ability to track—long-term enrollment cycles and medium-term trends in the city's neighborhoods; and
3. Use housing market data and alternative modeling techniques to augment estimation-models for near-term enrollment at the level of individual schools.

Neighborhood Enrollment Cycles

As Seattle Public Schools thinks about enrollment demands today and in the future, it is important to have a sense of what is happening in each of the city's neighborhoods.

Over multi-decadal cycles, neighborhoods tend to wax and wane in their generation of school-age children—a dynamic that is driven by natural aging of households and turnover of the housing stock.

Recognizing the impact that such cyclical shifts have on capacity considerations, the Housing and Enrollment Initiative tracks neighborhood trends and cycles. The goal is to develop a clear picture of how enrollment demand has changed, over the long term, in each of the city's neighborhoods. With that information in hand, both SPS and the community we serve are in a better position to understand how the things that are happening today fit within the big picture.

To track these cycles the district focuses on the notion of relative saturation:

1. How saturated is each neighborhood—today—with school age kids?; and
2. How has that saturation level changed over time?

Saturation levels in each neighborhood will rise and fall from year to year (due to long-term cycles and medium-term trends). And with each passing year, as we collect more data points, our understanding of each neighborhood (where it has been and where it looks to be going) will be enhanced.

Enrollment Saturation Data Results

Relative saturation is the measure SPS uses to track current enrollment trends for each of the city's neighborhoods.

Relative saturation is determined by asking two questions:

1. When the district accounts for a neighborhood’s unique mix of housing, how many school-age kids would the district expect to see from the neighborhood if the neighborhood was exactly typical of the patterns observed in the city as a whole?
2. How does the actual generation of kids in the neighborhood compare with the above number?

The measure of relative saturation is the ratio of the second number to the first.

For example, say a given neighborhood would have generated 100 enrolling kindergartners if its mix of housing stock generated enrollments that were precisely typical of the district as a whole. If the neighborhood actually generated 120 enrolling kindergartners in that year, its relative saturation rate for the year is 1.2 (120/100).

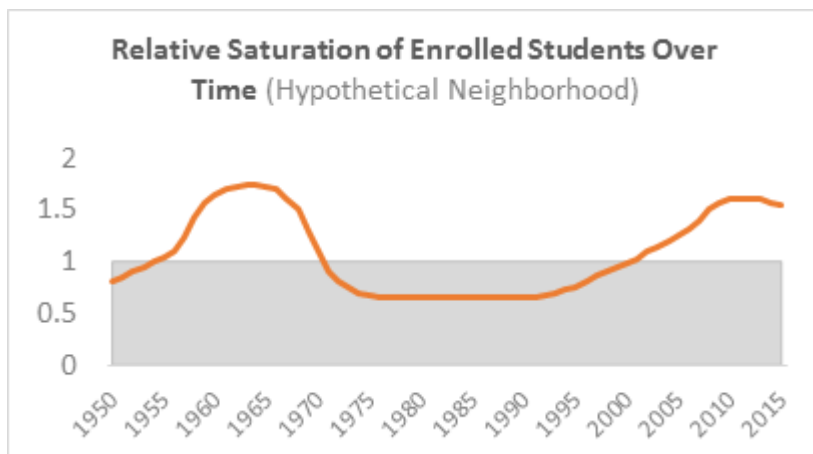
As they work through their long-term demographic cycles, some neighborhoods can be expected to move from relative saturation rates that exceed 1.0 (which is the citywide average) to rates below 1.0, and vice versa.

It should be noted, however, that there is no “normal” saturation level that applies to all neighborhoods. For example, a neighborhood that has a strong private school might consistently generate relative saturation rates that are below 1.0 over the long term.

On the other hand, there may be neighborhoods that possess a unique mix of attributes that translate into generating saturation rates that consistently remain above 1.0.

Saturation levels in each neighborhood will rise and fall from year to year (due to long-term cycles, natural fluctuations, and medium-term trends). And with each passing year, as we collect more data points, our understanding of each neighborhood (where it has been and where it looks to be going) will be enhanced.

The figure below illustrates what relative saturation trends might look like for a neighborhood that is dominated by single family housing—in this case, housing that was primarily developed in the 1950s. This illustrative example is almost certainly smoother than what we would expect to see in the real world, but it illustrates how saturation rates might change over time given aging households.



In this hypothetical neighborhood, newly formed families moved into the newly-developed housing in the 1950s which translated to a boom in school-age children (this model focuses specifically on enrolling kindergartners). But as those families aged, levels of saturation diminished.

Then, as households aged out of their single family houses and a turnover of housing began in the 1990s, another boom in saturation rates occurred.

Possessing this kind of information for each neighborhood in the city allows SPS and the community to fit current trends in enrollment into the big picture.

Relative Saturation Rate by Neighborhood

A relative saturation rate that exceeds 1.0 is indicative of a neighborhood that is generating more enrolling kindergartners than the District would expect to see if the mix of housing in the neighborhood generated enrollments precisely at the citywide average rate. [The Seattle neighborhoods in this map](#) align closely to the geographies used to measure relative saturation rates in the charts below.

	2011	2012	2013	2014	2015
Alki/Admiral	1.39	1.37	1.35	1.14	1.57
Arbor Heights	1.30	1.39	1.26	1.53	1.21
Ballard	1.40	1.21	1.28	1.15	1.56
Beacon Hill	0.83	0.92	0.80	0.84	0.84
Belltown*	<i>*sample size too small</i>				
Broadview/Bitter Lake	1.60	1.04	1.48	1.41	1.33
Capitol Hill	1.93	2.05	1.43	2.11	1.48
Cascade/Eastlake	1.32	0.73	0.83	1.09	0.89
Cedar Park/Meadowbrook	0.98	0.98	0.93	0.93	0.94
Central Area/Squire Park	1.16	1.36	1.15	1.26	1.21
Columbia City	1.08	0.90	0.86	0.88	0.86
Downtown Commercial Core*	<i>*sample size too small</i>				
Duwamish/SODO	1.03	0.91	1.02	0.87	0.93
Fauntleroy/Seaview	1.27	1.41	1.28	1.35	1.45
First Hill	1.56	1.04	1.20	0.79	2.58
Fremont	1.13	1.76	1.57	1.30	1.63
Georgetown*	<i>*sample size too small</i>				
Green Lake	1.50	1.38	1.27	1.34	1.16

Greenwood/Phinney Ridge	1.00	1.07	1.06	1.06	1.06
Haller Lake	1.40	1.41	1.45	1.18	1.24
High Point	0.52	0.79	0.51	0.70	0.52
Highland Park	1.19	1.03	1.08	1.24	1.09
Interbay	1.16	0.98	1.14	0.99	0.90
Judkins Park	0.60	1.90	1.18	1.47	0.72
Laurelhurst/Sand Point	0.65	0.61	0.54	0.61	0.61
Licton Springs	1.30	1.33	1.67	1.37	1.07
Madison Park	1.13	0.77	0.79	0.93	0.57
Madrona/Leschi	1.14	1.44	1.23	1.11	1.28
Magnolia	0.97	0.84	0.95	0.84	0.87
Miller Park	1.29	0.89	0.85	1.16	1.04
Montlake/Portage Bay	0.91	0.80	1.05	1.03	1.07
Mt. Baker/North Rainier	1.29	1.15	1.72	1.21	1.14
North Beach/Blue Ridge	1.04	0.93	1.16	1.07	1.04
North Beacon Hill/Jefferson Park	0.75	0.85	1.00	0.87	0.82
North Capitol Hill*	<i>*sample size too small</i>				
North Delridge	1.26	1.20	1.23	1.56	1.20
Northgate/Maple Leaf	0.90	1.11	0.99	0.81	1.01
Olympic Hills/Victory Heights	1.20	1.21	1.21	1.27	1.41
Pioneer Square/International District	0.68	0.27	0.42	0.26	0.46
Queen Anne	0.95	0.89	0.87	0.86	0.71
Rainier Beach	0.80	0.90	1.02	1.02	0.96
Ravenna/Bryant	0.97	0.84	0.84	0.90	0.88
Riverview	1.02	1.02	0.91	0.96	1.25
Roxhill/Westwood	1.12	1.03	1.36	1.13	1.22
Seward Park	0.85	0.88	0.99	1.01	0.97
South Beacon Hill/New Holly	0.64	0.65	0.61	0.72	0.67
South Park	0.71	0.66	0.75	0.64	0.75
Sunset Hill/Loyal Heights	0.96	0.97	1.02	1.03	1.06

University District	1.87	1.90	1.11	1.75	1.09
Wallingford	0.82	0.89	1.04	0.94	1.40
Wedgwood/View Ridge	0.81	0.81	0.71	0.83	0.85
West Seattle Junction/Genesee Hill	0.90	0.89	0.81	0.87	0.86
Whittier Heights	0.92	0.83	0.97	0.90	0.93

Saturation levels in each neighborhood will rise and fall from year to year (due to long-term cycles, natural fluctuations, and emerging trends).

Over relatively long periods of time, some neighborhoods will exhibit saturation rates that move from less than 1.0 to greater than 1.0 (and vice versa). It is probable, however, that other neighborhoods will consistently exhibit saturation rates that exceed 1.0—even over the long term. It is also probable that others will consistently exhibit rates that fall below 1.0.

With each passing year, as we collect more data points, our understanding of each neighborhood (where its saturation levels have been and where they look to be going) will be enhanced.

The Relationship Between Housing and Enrollment

Seattle Public Schools has initiated a broad program to use housing market data to enhance its understanding of enrollment demand, both long and short term.

As a compliment to this effort, SPS is also initiated a program to track the evolving relationships between housing and enrollment.

In particular, SPS is interested in answering two questions:

1. When one distinguishes between all of the different types of housing, how does each type of housing drive enrollment in today's world?
2. How will these relative contributions by housing type change over time?

Observations on Current Enrollment

In today's world, statistical analysis suggests that certain types of housing contribute strongly to enrollment demand. In particular, (1) single family housing with assessed values of less than \$600,000, and (2) larger apartments that have relatively low assessed values per square foot are the dominant factors in driving enrollment.

The same statistical analyses suggest that (again, in today's world) some other types of housing exhibit a very small impact. For example, condominium units and higher-value apartments appear to generate extremely small impacts on enrollment (in the range of one or two enrolling kindergartners for each 1,000 such units).

The expectation is that these conditions will shift in coming years (more on that below) but for now the bulk of enrollment generation is concentrated in single family houses and lower-value apartments.

Tracking Future Shifts

While the observations about the importance of single family and low-value apartments are important, SPS knows that these conditions will probably change in coming years.

The Central Puget Sound Region is experiencing a long-term shift in its overall mix of housing. Particularly in the areas that are closest to the urban core, most of the new housing units that are being built are multifamily units. Over time, this will continue to skew the overall mix of housing in the direction of multifamily.

As this transition unfolds, SPS recognizes that it is important to monitor how the shifts will influence patterns of enrollment.

With more and more households in the region, and with single family housing becoming increasingly scarce (in relation to total population), things must change.

Ultimately, one or both of the following will have to happen:

1. The single family housing stock that does exist in the region will become increasingly prized (and increasingly occupied) by families with children. Today, we see evidence that when a young family living in a condo or a high-value apartment has a child, that family is likely to move to a single family home. If this cultural norm continues to hold sway, this means that as the area's population grows, Seattle's relatively fixed pool of single family neighborhoods should see a long-term uptrend in the rates at which they generate school-age children. In other words, you will be less and less likely to see households with no children occupying single family houses.
2. The region will see more enrolling kids coming from multifamily housing. This is the alternative to Phenomenon 1.

Many people assume that both things will occur. The key questions are: Will one or the other phenomena dominate? And at what pace will the transition it happen?

These are the questions the Housing and Enrollment Initiative is designed to track.

This [bar chart of K forecast models for 2015 attendance areas](#) shows a comparison between the Seattle Public Schools (SPS) actual headcount and SPS projected headcount along with Integrated Economics (IE) projection for the same year. The IE model results differed from the SPS model because it incorporates housing variables such as "type of housing" and "price of housing" to better predict enrollment by capturing how many children are expected to come from a certain type of housing and in what particular neighborhood. The SPS model predicted better for some attendance areas than IE's model and not so well for others. This chart supports evidence the current SPS projection model gets close to accurately counting enrollment; however, including additional variables associated with the growth in the city, and eventually growth in the schools, is always welcomed and perhaps implemented.