



Demographic Study

for the

Denville Township School District

January 2022

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Executive Summary

Statistical Forecasting LLC (“Statistical Forecasting”) completed a demographic study for the Denville Township School District, projecting grade-by-grade enrollments from 2022-23 through 2026-27, a five-year period. In addition, the following tasks were completed:

- analyzed community population trends and age structure, demographic characteristics, birth counts, and fertility rates,
- examined historical enrollment trends districtwide, by grade configuration (PK-5 and 6-8), and by school,
- investigated historical enrollment trends with respect to race and poverty status in each school and districtwide,
- computed student yields by housing type (e.g., one- to four-family homes, townhouses/condominiums, and apartments),
- compared building capacities to current and projected enrollments,
- researched new housing starts and the impact on the school district, and
- projected enrollments, in a totally independent analysis, based on student yields and housing turnover rates (resales) in Denville Township.

Community Overview

In the 2020 Census, Denville Township (“Denville”) had 17,107 residents, which is a gain of 472 persons (+2.8%) from 2010. Forecasts prepared by the North Jersey Transportation Planning Authority project the population to be 17,743 in 2040, which would be a 3.7% increase from the 2020 Census and a gain of 636 persons.

While Whites are the largest race in Denville, their population is declining. In the 2020 Census, Denville was 78.8% White as compared to 85.3% in 2010, which is a loss of 6.5 percentage points. Asians were the second-largest race at 7.9% in 2020, while Hispanics were the third-largest race consisting of 7.5% of the population.

With respect to nativity, 10.2% of Denville residents are foreign-born, which is lower than that of New Jersey (23.4%). India and China are the largest sources, accounting for 20.9% and 15.7%, respectively, of the township’s foreign-born population.

Historical Enrollment Trends

Historical enrollments (PK-8) were analyzed from 2012-13 through 2021-22, a ten-year period. In general, enrollments declined through 2015-16 before stabilizing. In the last seven years, enrollments have ranged from 1,612-1,664. In 2021-22, enrollment is 1,629, which is a loss of 115 students (-6.6%) from the 2012-13 enrollment of 1,744.

For grades PK-5, enrollments declined through 2015-16 before reversing trend and stabilizing. In 2021-22, enrollment is 1,092, which is slightly higher than the 2012-13 enrollment of 1,082.

For grades 6-8 at Valleyview, enrollments have been generally declining over the last decade. In 2021-22, enrollment is 537, which is a loss of 125 students from the 2012-13 enrollment of 662.

Kindergarten Replacements

Kindergarten replacements were analyzed to determine whether there was any relationship between overall enrollment change and kindergarten replacement, which is the numerical difference between the number of graduating 8th graders and the number of entering kindergarten students. The district has experienced negative kindergarten replacement in each of the last nine years. Negative kindergarten replacement occurs when the number of kindergarten students entering the district is less than the number of graduating eighth grade students from the prior year. Negative kindergarten replacement has ranged from 6-83 students per year with the magnitude declining over time, which is due to the increasing sizes of the entering kindergarten classes and also the decreasing sizes of the graduating 8th grade classes.

In each of the last nine years when negative kindergarten replacement occurred, the district's losses due to negative kindergarten replacement were partially offset (or totally, resulting in a net enrollment gain) by a net inward migration of students in the other grades (K to 1, 1 to 2, 2 to 3, etc.). This was confirmed as all nine average survival ratios in the five-year trend were above 1.000.

Birth Counts

The number of births from 2007-2019 in Denville was used to project kindergarten enrollments five years later. After peaking at 194 births in 2008, the number of births declined to 139 in 2014 before reversing trend. In 2019, there were 179 births, which is the largest value since 2008.

Upon aggregating the number of births by elementary attendance area from 2007-2019, the Lakeview attendance area had the greater total number of births (1,330), which was twice the number that occurred in the Riverview attendance area.

Population Age Structure

Age-sex diagrams were created from the 2010 Census and the 2015-2019 American Community Survey ("ACS") for Denville to show the percentage of males and females in each age class. In 2010, the largest number of individuals was aged 45-49 for both males and females. In communities with little inward or outward migration and low mortality, the largest cohort in subsequent years is typically the next oldest cohort as people advance in age. However, in the 2015-2019 ACS, the largest cohort for males and females was the 60-64 age group. As the largest groups in the 2015-2019 ACS were not the next oldest cohorts, migration is likely occurring in the township. Over this time period, the greatest declines occurred in the 55-59 age group for males and the 10-14 age group for females, which corresponds approximately with children in grades 5-9. The greatest gains occurred in the 65-69 age group for males and the 60-64 age group for females.

Enrollments by Subgroup

a) Race

Enrollments by race were tabulated at the school level from 2016-17 to 2021-22. While Whites are the largest race in the district, the White percentage has been slowly declining over time. In 2021-22, 72.6% of the student population is White as compared to 76.1% in 2016-17, a loss of 3.5 percentage points. Conversely, the Hispanic population, which is the second-largest race in the district, has slowly increased from 10.1% to 12.0% over this time period, a gain of 1.9 percentage points.

At the elementary level, Whites are the largest race in each school. Whites range from 68.4% at Lakeview to 80.1% at Riverview. The White student percentage has declined slightly in each school since 2016-17. Hispanics are the second-largest race at Riverview but are the third-largest race at Lakeview. Hispanics range from 10.6% at Riverview to 11.7% at Lakeview, which is fairly similar.

At Valleyview, while Whites are the largest race in 2021-22 at 71.7%, there was an 8.1 percentage-point decline in the White population from 2016-17. Hispanics are the second-largest race in the school at 13.6%, which is a gain of 5.4 percentage points in the last five years.

b) Economically Disadvantaged

Enrollments of students who are economically disadvantaged were tabulated at the school level from 2016-17 to 2021-22. At the district level, the number and percentage of students that are economically disadvantaged have not had a clearly defined increasing or declining trend in the last six years. Whereas 68 students (4.1%) were economically disadvantaged in the school district in 2016-17, 71 students (4.4%) are economically disadvantaged in 2021-22, which is not significantly different. In the last six years, the percentage of students that are economically disadvantaged has ranged from 3.2%-5.2%.

At the elementary level, Lakeview has consistently had a greater percentage of economically disadvantaged students as compared to Riverview. In the last six years, the percentage of economically disadvantaged students has ranged from 4.7%-7.1% at Lakeview as compared to 1.1%-2.3% at Riverview.

At Valleyview, the percentage of economically disadvantaged students has not changed significantly in the last six years, ranging from 2.9%-5.2%.

Potential New Housing

Denville municipal representatives provided information regarding current and future residential development in the community. In total, there is the potential for 299 non age-restricted housing units in four separate developments, all of which are multi-family units such as duplexes, townhouses, or apartments.

In August 2020, Denville approved a settlement agreement with the Fair Share Housing Center regarding its affordable housing obligation. Of the 299 proposed units, 18% (55) will be set aside to meet affordable housing requirements. Based on the district's current elementary attendance boundaries, the impact would be greatest on Lakeview, as all of the developments are located within its boundaries.

An estimate was made of the number of public school children that could potentially come from the proposed housing developments. A total of 75 public school children (K-5 = 48 and 6-8 = 27) are projected to be generated. Additional children are expected for grades 9-12 but they are not considered here as they would not impact the school district. **It should be clearly stated that this is a rough estimate, as the bedroom distributions of some of the developments were unavailable, which are needed to compute the estimated number of public school children. In addition, two developments have not been approved and may not come to fruition or may change in scope before being approved.**

Student Yields

Student yields by length of ownership were determined for one- to four-family homes by joining the parcel-level property database of Denville with the 2021-22 student address data from the Denville Township School District. A total of 1,384 children living in 5,226 one- to four-family homes were identified. The remaining children in the school district either live in apartments, townhouses/condominiums, or mixed-use units (commercial and residential properties).

Student yields increased with length of ownership, peaking at 0.72 children per housing unit with ten years of ownership. Student yields then begin to decline as length of ownership increases. It is expected that longer-held homes will have fewer children, as they would have graduated from the district. For homes with 19 or more years of ownership, the student yield was below 0.20. The average student yield for one- to four-family homes in Denville was computed to be 0.465.

Student yields were also computed for townhouses and condominiums in Denville. A total of 157 public school children (K-8) were identified living in 717 units in eight separate developments, which is an average student yield of 0.219. The largest student yields, in developments with at least 20 units, were in The Forges (0.530) and Berkshire Hills (0.133), which predominantly consist of a mix of two- and three-bedroom units.

Finally, student yields were computed for apartment complexes in Denville. A total of 23 public school children (K-8) were identified living in 254 units, which is an average student yield of 0.091. In general, student yields are quite low. The largest student yield, in developments with at least 20 units, was in Estling Village (0.150), which has a mix of one- and two-bedroom apartment units.

Home Sales

Home sales in Denville were analyzed from 1994-2021. The number of home sales peaked at 512 in 2002 before declining to 280 in 2011 due to the housing market crash and

banking crisis. During this period (2008-2012), the annual number of home sales was low, ranging from 280-319. Since then, home sales have rebounded. From 2013-2016, home sales steadily increased before stabilizing. In the last five years, the annual number of sales has ranged from 360-435, which is an average of 409 sales per year. Despite the increase in recent years, the annual number of sales is still lower than prior to the housing market crash and banking crisis.

Enrollment Projections

PK-8 enrollments were computed for a five-year period, 2022-23 through 2026-27, in two separate projections (baseline and adjusted for housing growth). In the baseline enrollment projections, which assume that the proposed housing developments do not come to fruition or are not occupied within the anticipated construction timeline, enrollment is projected to be 1,819 in 2026-27, which would be a gain of 190 students from the 2021-22 enrollment of 1,629. In the adjusted projections, enrollment is projected to be 1,877 in 2026-27, which would be a gain of 248 students from the 2021-22 enrollment.

For grades PK-5, enrollments are projected to increase throughout the projection period in both the baseline and adjusted projections. In the baseline projections, enrollment is projected to be 1,225 in 2026-27, which would be a gain of 133 students from the 2021-22 enrollment of 1,092. In the adjusted projections, enrollment is projected to be 1,256 in 2026-27, which would be a gain of 164 students from the 2021-22 enrollment.

For Valleyview (grades 6-8), enrollments are projected to decline for the next 1-2 years before reversing trend in the baseline and adjusted projections. In 2026-27, enrollment is projected to be 594 in the baseline projections, which would be a gain of 57 students from the 2021-22 enrollment. In the adjusted projections, enrollment is projected to be 621 in 2026-27, which would be a gain of 84 students from the 2021-22 enrollment.

Building Capacities

The capacities of the school buildings in the district were compared to the current enrollments in 2021-22 and the enrollment projections in the 2026-27 school year. Using the building capacities from the district's Long Range Facilities Plan, the differences between capacity and current/projected number of students were computed. Positive values indicate available extra seating while negative values indicate inadequate seating (also known as "unhoused students"). It should be noted that the capacity values are not fixed and can change from year-to-year based on classroom usage. For instance, additional special education classes in a building would reduce the building's capacity. On the other hand, districts with unhoused students can accommodate these children by increasing class sizes, which in turn increases the school's capacity. As such, the capacity of a school is not a fixed value and can be changed depending on how the building is used.

In 2021-22, there is a small shortage of seating in Lakeview (-24). In Riverview, there is a small surplus in seating (+10) if the Riverview Annex (the former St. Mary's Prep School) is included. If the Riverview Annex is not included in the capacity calculation, there are 112

unhoused students in the school. Regarding Valleyview, the school is nearing capacity (+7) in 2021-22.

Due to a projected increase in enrollment from the new housing developments, the number of unhoused students in Lakeview is projected to be much higher (-116) in 2026-27. As enrollments are also projected to increase in Riverview, a shortage of seating (-62) is projected when the Riverview Annex is included in the capacity calculation. If the Riverview Annex is not included in the capacity calculation, there would be 184 unhoused students at the school. Valleyview is projected to have a shortage of seating (-77) in 2026-27 due to a projected gain in enrollment.

Housing Turnover

Using historical housing turnover rates by length of ownership for one- to four-family homes in Denville, along with student yields by length of ownership, the number of students was projected from 2021-2025 in a completely independent analysis. To complete this analysis, three inputs were needed:

1. housing turnover rates by length of ownership,
2. current distribution of homes by length of ownership, and
3. student yields by length of ownership.

Using the housing turnover methodology, total enrollments were projected in two separate scenarios. In the first scenario, enrollment is projected to be 1,632 in 2025, which would be slightly higher than the 2020-21 enrollment (1,612), with the assumption that the turnover rates of long-held homes (27 or more years) would be much higher than experienced historically. In the second scenario, enrollment is projected to be 1,540 in 2025, which would be a loss of 72 students from the 2020-21 enrollment (1,612), with the assumption that the turnover rates of long-held homes (27 or more years) would be comparable to that experienced historically.

It should be clearly stated that the purpose of this analysis is not to use the projections for future planning since the CSR method is the most accurate method available. Rather, it is an independent process to see whether future enrollments may be affected by housing turnover. In the second scenario, which is more plausible, it appears enrollment is likely to decline due to housing turnover, controlling for all other factors, such as fertility rates, births, inward migration, or new residential construction.

Final Thoughts

After a period of fairly stable enrollments (PK-8) in the Denville Township School District, it appears a change in trend is on the horizon due to an increasing birth rate, approximately 300 new non age-restricted housing units in the township, and an inward migration of students. The inward migration is evident in the cohort survival ratios, as all nine grade progressions are showing an influx of children from one year to the next.

In closing, it is difficult to measure the impact of the coronavirus on the school district's enrollments moving forward. In the short-term, the coronavirus may have a negative impact on the local economy and rentals, which could lead to an outward migration of families with children. If there are a significant number of evictions from rental units, this could have a negative impact on the district's enrollment. In a New York Times article¹, families with financial means are leaving large metropolitan areas to reside in their second homes in rural areas or are purchasing an existing home in these new locations. These individuals can typically work remotely and are seeking to escape the pandemic. It is not clear whether these households will permanently reside in these locations or return to suburban/urban centers. While the duration of the pandemic is unknown and available data is limited, we are continuing to monitor data as it becomes available to assess its future impact on enrollments both short- and long-term.

¹ (<https://www.nytimes.com/2020/09/26/us/coronavirus-vermont-transplants.html>)

Introduction

Statistical Forecasting LLC (“Statistical Forecasting”) completed a demographic study for the Denville Township School District, projecting grade-by-grade enrollments from 2022-23 through 2026-27, a five-year period. In addition, the following tasks were completed:

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- projected enrollments, in a totally independent analysis, based on student yields and housing turnover rates (resales) in Denville Township.

Population Trends in Denville Township

Located in Morris County, Denville Township (“Denville”) contains a land area of 11.87 square miles, with an additional 0.77 square miles of water area. In the 2020 Census, Denville had 17,107 residents, which is 1,441.2 persons per square mile. Historical and projected populations for Denville from 1940-2040 are shown in Table 1 and Figure 1.

Table 1
Historical and Projected Populations for Denville Township
1940-2040

Year	Population	Percent Change
Historical¹		
1940	3,117	N/A
1950	6,055	+94.3%
1960	10,632	+75.6%
1970	14,045	+32.1%
1980	14,380	+2.4%
1990	13,812	-3.9%
2000	15,824	+14.6%
2010	16,635	+5.1%
2020	17,107	+2.8%
Projected²		
2030	17,496	+2.3%
2040	17,743	+1.4%

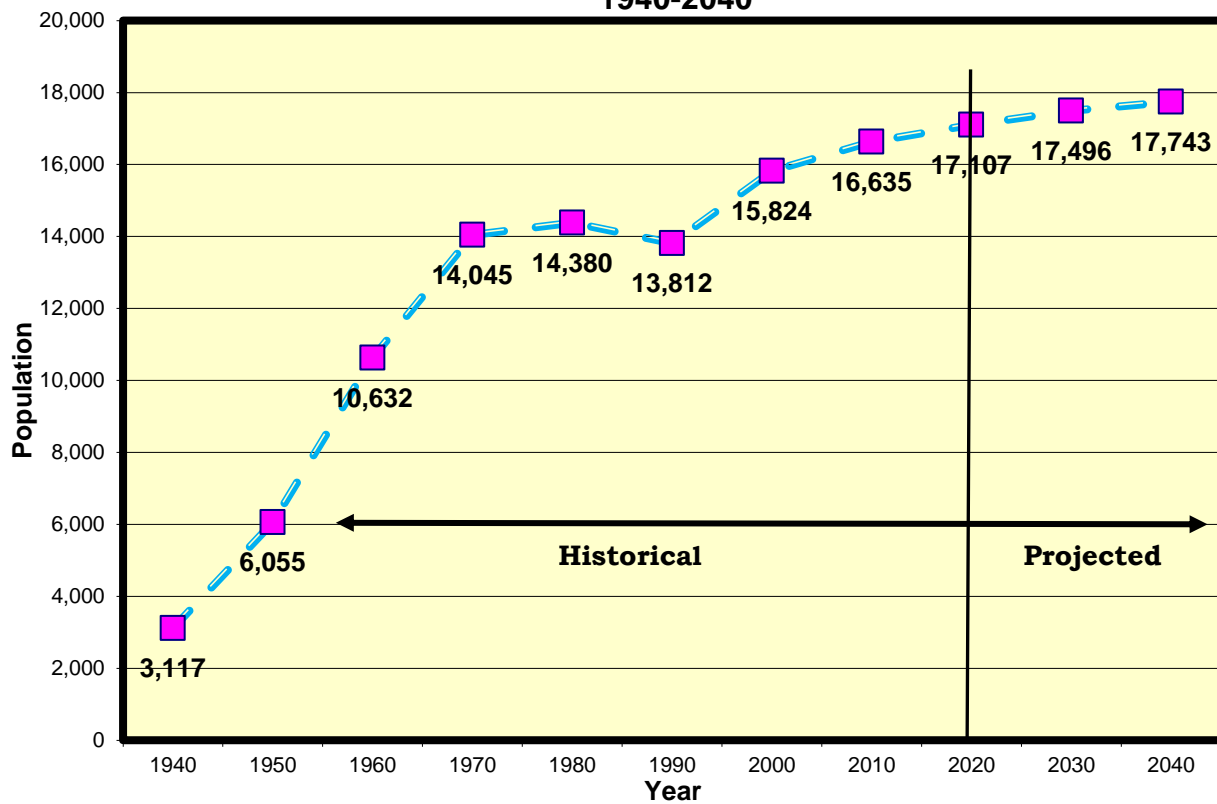
Sources: ¹United States Census Bureau

²North Jersey Transportation Planning Authority, Inc. (2017)

From 1940-1980, the population in Denville more than quadrupled, with its greatest gain occurring in the 1940s (+94.3%) when the population nearly doubled. After experiencing a small population decline in the 1980s, the population has increased in each of the last three decades, gaining nearly 3,300 persons over this time period.

Population projections for 2030 and 2040, which were prepared by the North Jersey Transportation Planning Authority (“NJTPA”), indicate that the population will slowly increase. The forecast projects the population to be 17,743 in 2040, which would be a 3.7% increase from the 2020 Census and a gain of 636 persons.

Figure 1
Denville Township Historical and Projected Populations
1940-2040



Denville Township Demographic Profile

In Table 2, selected demographic characteristics of Denville are compared from the 2010 and 2020 Censuses and the 2006-2010 and 2015-2019 American Community Surveys (“ACS”). At the time of this writing, a limited amount of demographic data was available from the 2020 Census, which was limited to total population counts and racial distributions from the Redistricting Data. While some Census variables account for everyone in the population (e.g., age and race), other variables are collected from a sample (e.g., median household income, educational attainment, poverty status, etc.). The ACS replaced the long form of the Census, last administered in 2000 to approximately 16% of the population in the United States. For communities with fewer than 65,000 persons such as Denville, ACS data represent a sample collected over a five-year time period, where the estimates represent the average characteristics between January 2015 and December 2019, for example. This information does not represent a single point in time like the long form of earlier Censuses. The five-year ACS contains 1% annual samples from all households and persons from 2015 to 2019, resulting in a 5% sample of the population. Due to the small sample size, the sampling error is quite large, which increases the degree of uncertainty of the estimated values. Therefore, the forthcoming ACS data should be interpreted with caution.

While Whites are the largest race in Denville, their population is declining. In the 2020 Census, Denville was 78.8% White as compared to 85.3% in 2010, which is a loss of 6.5 percentage points. Asians were the second-largest race at 7.9% in 2020, which is a gain of 1.4 percentage points from the 2010 percentage of 6.5%. Hispanics were the third-largest race consisting of 7.5% of the population in 2020, which is a gain of 2.2 percentage points from the 2010 percentage of 5.3%. Figures 2, 3, and 4 show the White, Asian, and Hispanic percentages by Census block group, which are the three largest races in Denville. The White percentage is greatest in the northern and central sections of the township, which is located primarily within the Riverview elementary attendance area. The Asian percentage is greatest predominantly in the southern and eastern sections of the township, while the Hispanic percentage is greatest predominantly in the northern and southern sections of the township.

Regarding nativity, 10.2% of Denville residents were foreign-born in the 2015-2019 ACS, which is nearly unchanged from the 2006-2010 ACS percentage (10.8%). As a point of comparison, New Jersey’s foreign-born resident percentage was 23.4% in the 2019 ACS, which is much higher than Denville’s percentage. While not shown in the table, place of birth, which serves as a proxy for country of origin, indicates that China and the Philippines were the largest sources of immigrants in the 2006-2010 ACS, accounting for 11.7% and 10.9%, respectively, of the foreign-born population. In the 2015-2019 ACS, India is now the largest source (20.9%) of the foreign-born population while China is now the second-largest source (15.7%). Figures 5 and 6 show the percentage of foreign-born persons and the percentage of persons speaking English less than “Very Well” in Denville by Census block group, which may potentially correlate with English as a New Language (“ENL”) students in need of English language development instruction. The foreign-born percentage is greatest in the central and southern sections of the township, which is located primarily within the Lakeview elementary attendance area. The percentage of persons speaking English less than “Very Well” is greatest in the southern section of the township in the Lakeview elementary attendance area.

Table 2
Selected Demographic Characteristics of Denville Township

Race Origin¹	2006-2010 ACS 2010 Census	2015-2019 ACS 2020 Census
White	14,186 (85.3%)	13,485 (78.8%)
Black or African American	220 (1.3%)	317 (1.9%)
Hispanic or Latino	883 (5.3%)	1,280 (7.5%)
American Indian and Alaska Native	16 (0.1%)	27 (0.2%)
Asian	1,081 (6.5%)	1,351 (7.9%)
Native Hawaiian and Other Pacific Islander	0 (0.0%)	0 (0.0%)
Other Race	15 (0.1%)	41 (0.2%)
Two or more Races	234 (1.4%)	606 (3.5%)
Place of Birth		
Foreign-Born	10.8%	10.2%
Age		
Under 18	23.7%	21.4%
18-64	60.5%	59.5%
65 and over	15.8%	19.1%
Median age	43.4 years	45.1 years
Educational Attainment		
Bachelor's degree or higher	50.0%	57.8%
Graduate or professional degree	16.7%	25.7%
Income		
Median household income	\$103,435	\$125,655
Percentage of Persons in Poverty ages 5-17	1.5%	4.6%
Housing Units		
Total number	6,734	6,779
Occupied units	6,432 (95.5%)	6,368 (93.9%)
Owner-occupied units	5,519 (85.8%)	5,314 (83.4%)
Renter-occupied units	913 (14.2%)	1,054 (16.6%)
Median value of an owner-occupied unit	\$439,300	\$419,500
Average household size	2.57	2.59
Housing Type¹		
Total number	6,767	6,779
1-unit, attached or detached	5,803 (85.8%)	5,628 (83.0%)
Two units	83 (1.2%)	202 (3.0%)
Three or four units	103 (1.5%)	0 (0.0%)
Five to nine units	68 (1.0%)	123 (1.8%)
10 to 19 units	152 (2.2%)	118 (1.7%)
20 or more units	558 (8.2%)	708 (10.4%)
Mobile home, boat, RV, van, etc.	0 (0.0%)	0 (0.0%)

Sources: American Community Survey (2006-2010 and 2015-2019), United States Census (2010 and 2020)

Notes: ¹Data may not sum to 100.0% due to rounding.

Cells shaded orange are from the decennial Census while cells shaded blue are from the American Community Survey.

The median age in Denville increased from 43.4 years in 2010 to 45.1 years in the 2015-2019 ACS, which is higher than the median age in New Jersey (40.2 years). The percentage of people under the age of 18 years, which corresponds predominantly to school-age children, declined from 23.7% to 21.4%. Figure 7 shows the percentage of school-age children (5-17) in Denville by Census block group. The greatest percentages of school-age children are in the northern and southern sections of the township.

Regarding educational attainment for adults aged 25 and over, 57.8% of the population had a bachelor's degree or higher in the 2015-2019 ACS as compared to 50.0% in the 2006-2010 ACS, a gain of 7.8 percentage points. As a point of comparison, the percentage of persons having a bachelor's degree or higher in Denville is greater than that of New Jersey (41.2%). Persons with graduate or professional degrees increased from 16.7% to 25.7% during this time period, a gain of 9.0 percentage points.

Median household income increased from \$103,435 in the 2006-2010 ACS to \$125,655 in the 2015-2019 ACS, a gain of 21.5%. By comparison, median household income in New Jersey is \$85,751, which is nearly \$40,000 lower than that of Denville. During this time period, the percentage of school-age children (5-17) that are in poverty increased from 1.5% to 4.6%, a gain of 3.1 percentage points. Figure 8 shows the percentage of persons living in poverty in Denville by Census block group. While the percentages are very small, the percentage of persons living in poverty is greatest in the northern section of the township in the Riverview elementary attendance area.

Regarding housing, there were 6,779 housing units in Denville in the 2015-2019 ACS, which is a gain of 45 units (+0.7%) from 2010. Over this time period, the overall occupancy rate declined slightly from 95.5% to 93.9% while the average household size was nearly unchanged (2.59 persons in the 2015-2019 ACS). Renter-occupied units accounted for 16.6% of the occupied units in the 2015-2019 ACS, which is a gain of 2.4 percentage points from the 2010 percentage (14.2%). As a point of comparison, the percentage of renter-occupied units in Denville is significantly lower than that of New Jersey (36.7%). Finally, the median home price of an owner-occupied unit in the 2015-2019 ACS was \$419,500, which is a 4.5% decline from the value reported in the 2006-2010 ACS (\$439,300).

With respect to housing type, 83.0% of the homes in the 2015-2019 ACS were one-unit, either attached or detached, which is a loss of 2.8 percentage points from the 2006-2010 ACS percentage (85.8%). Housing with 20 or more units, which contain renters, was the second-largest type of housing in the 2015-2019 ACS and consisted of 10.4% of the housing stock. In general, there has been little change in the housing distribution since the 2006-2010 ACS.

Figure 6
Denville Township Percentage of Persons Speaking English Less than "Very Well"

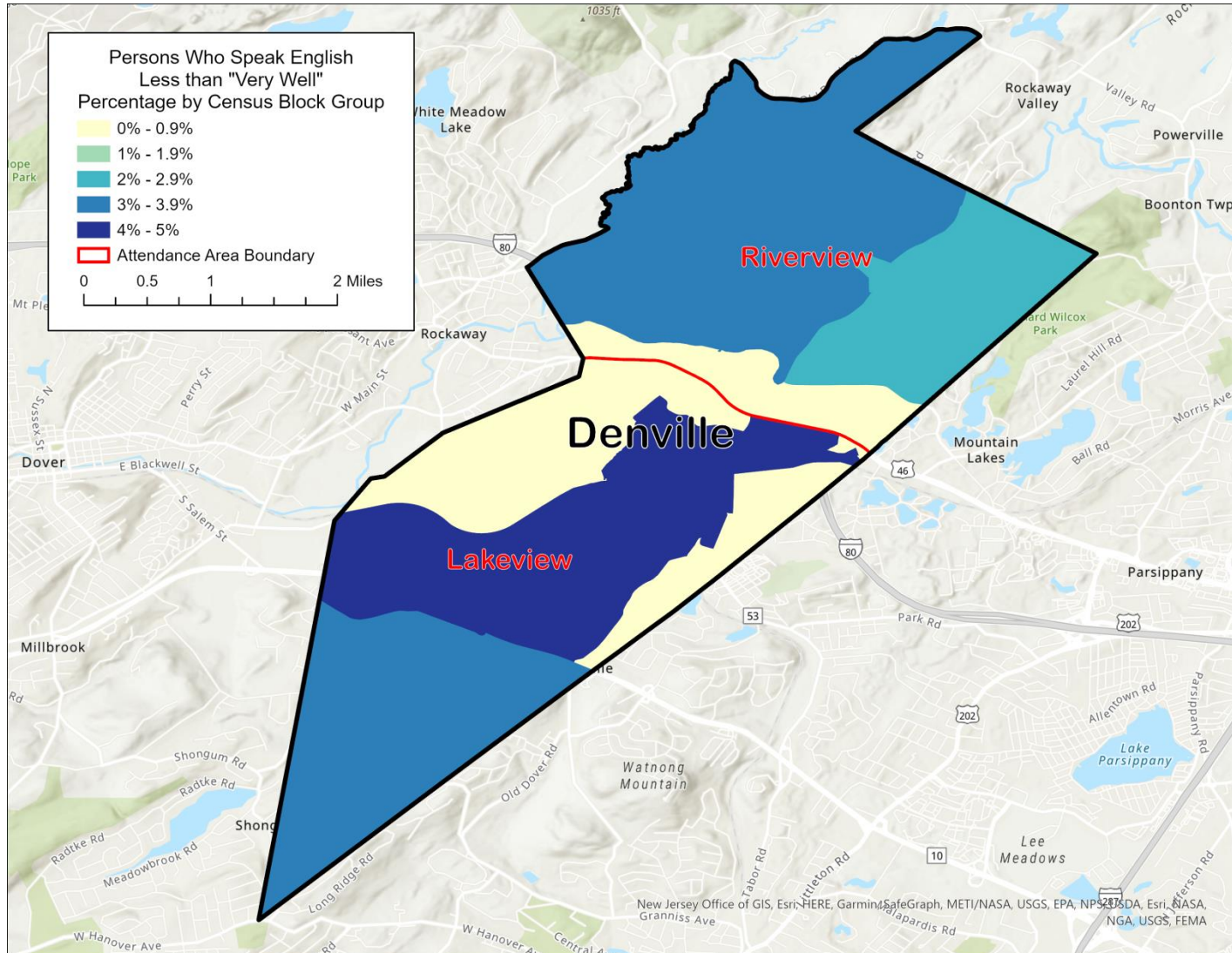
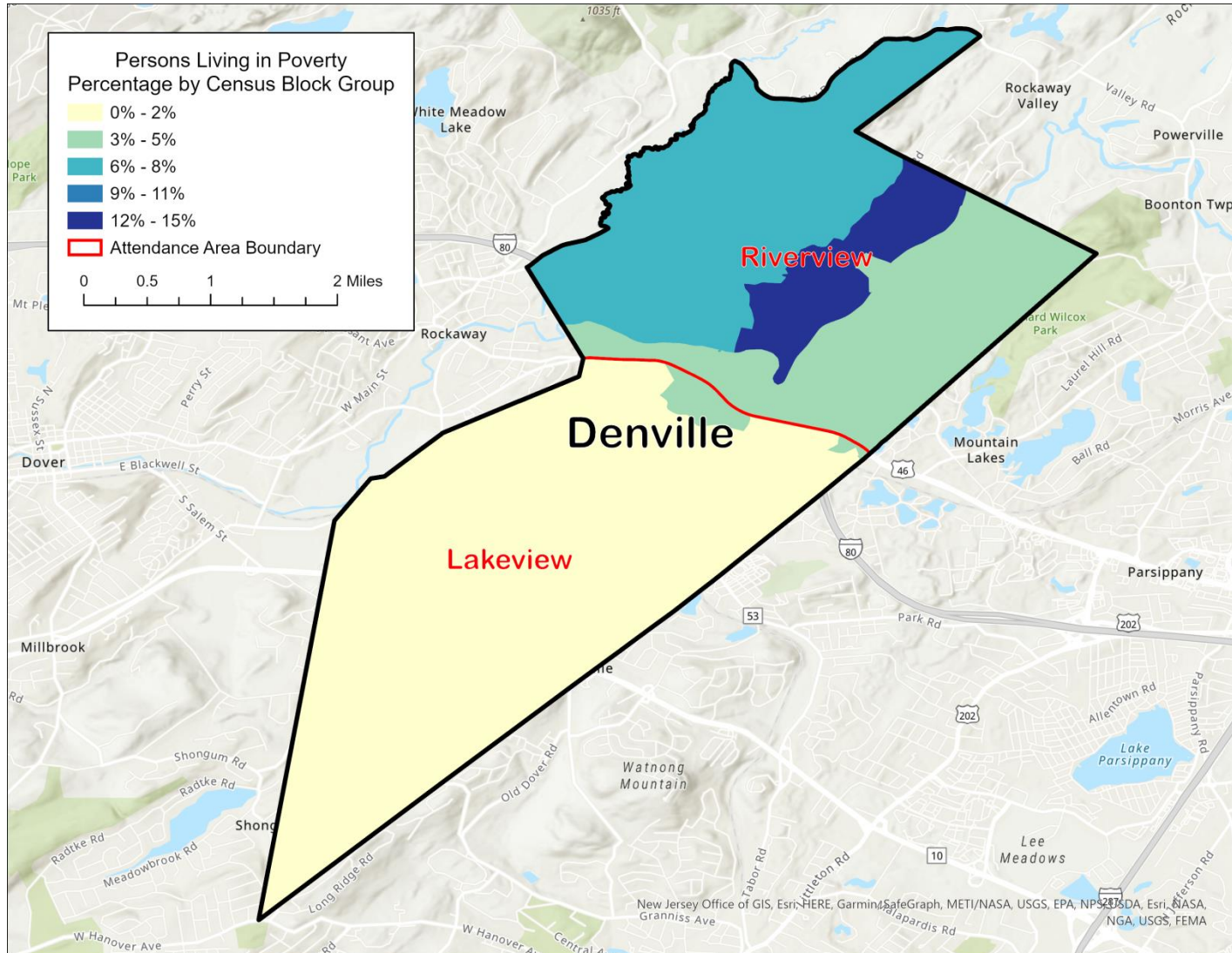


Figure 8
Denville Township Percentage of Persons Living in Poverty



District Overview

The Denville Township School District has three (3) schools that serve grades pre-kindergarten through eighth. In Figure 9, the location of each of the district's schools is shown with respect to the municipal boundaries. Children attend either Lakeview Elementary School ("Lakeview") or Riverview Elementary School ("Riverview") for grades K-5 before attending Valleyview Middle School ("Valleyview") for grades 6-8. A pre-kindergarten program exists in Lakeview. Figure 10 shows the elementary schools and their respective attendance areas while Figure 11 shows the elementary schools and their respective attendance areas with a "flexible attendance zone," which allows the school district's administration to assign elementary students to either school in an effort to balance out enrollment.

According to the district's Long Range Facilities Plan ("LRFP"), total educational capacity² in the district is 1,622 using District Practices methodology and 1,556 using Facilities Efficiency Standards ("FES") methodology. The District Practices methodology considers how the building is utilized by the school district and its targeted student-teacher ratios, while the FES methodology utilizes FES-recommended class sizes. Capacity using FES methodology is often lower, particularly for middle and high schools, than when using District Practices methodology. Since buildings cannot be 100% utilized, due in part to scheduling conflicts, most districts employ either an 85% or 90% utilization factor to determine school capacity. A comparison of each school's capacity to current and projected enrollments is provided later in the report.

In this study, historical enrollments from the New Jersey Department of Education ("NJDOE") New Jersey Standards Measurement and Resource for Teaching ("NJ SMART") database were used to project enrollments using the Cohort-Survival Ratio method.

² This includes the capacity for the Riverview Annex, the former St. Mary's Prep School.

Figure 9
School Locations – Denville Township School District

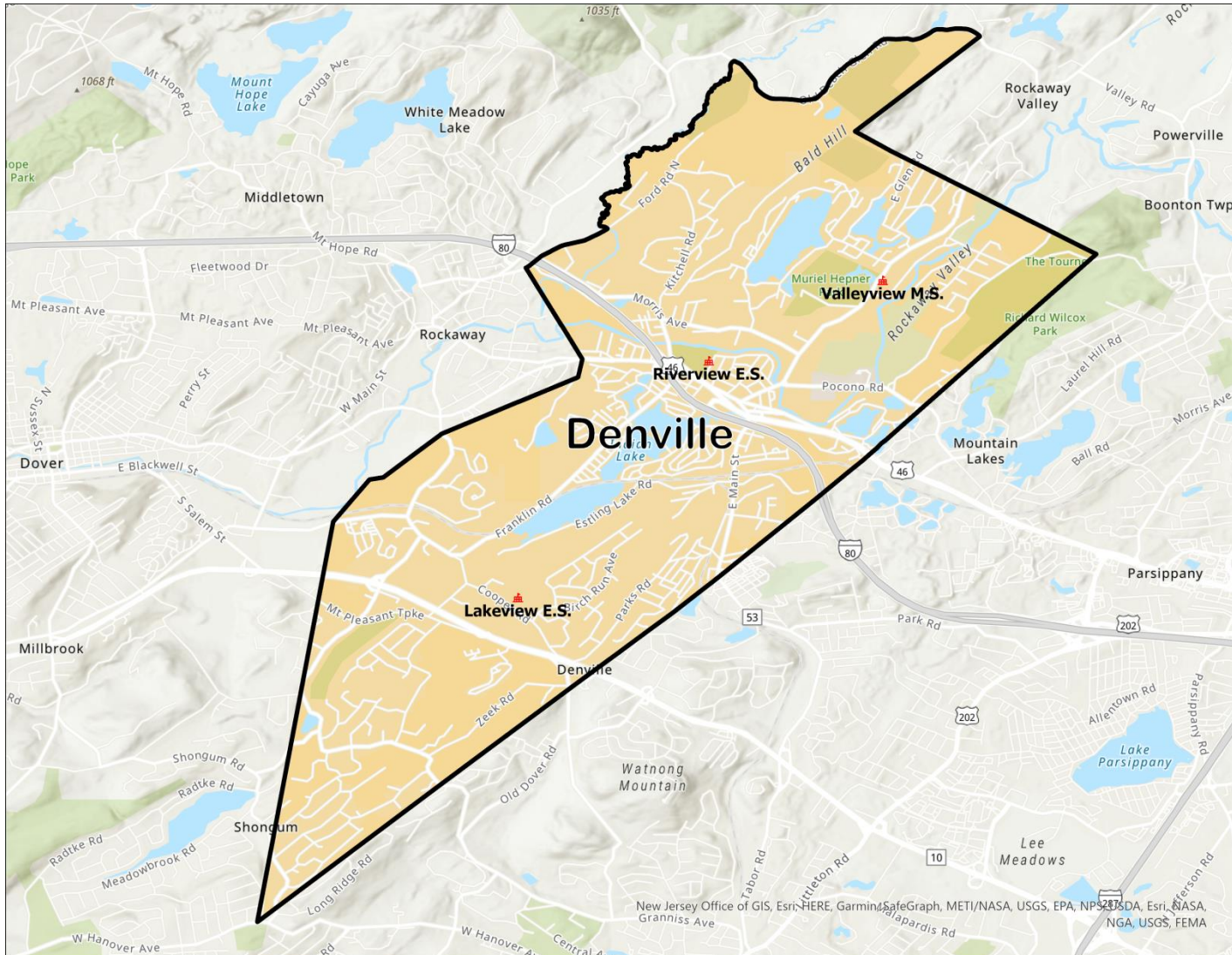


Figure 10
Elementary School Attendance Areas – Denville Township School District

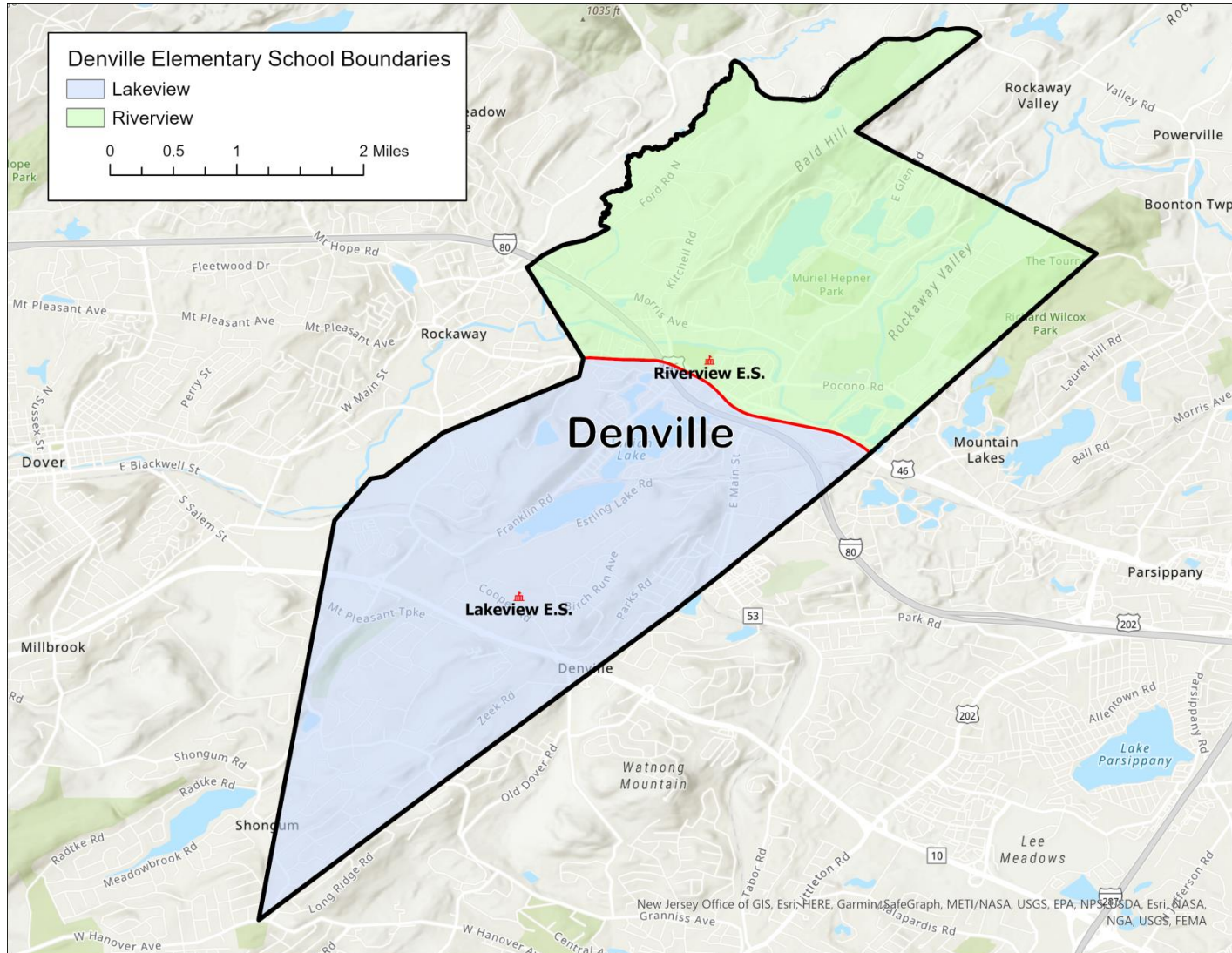
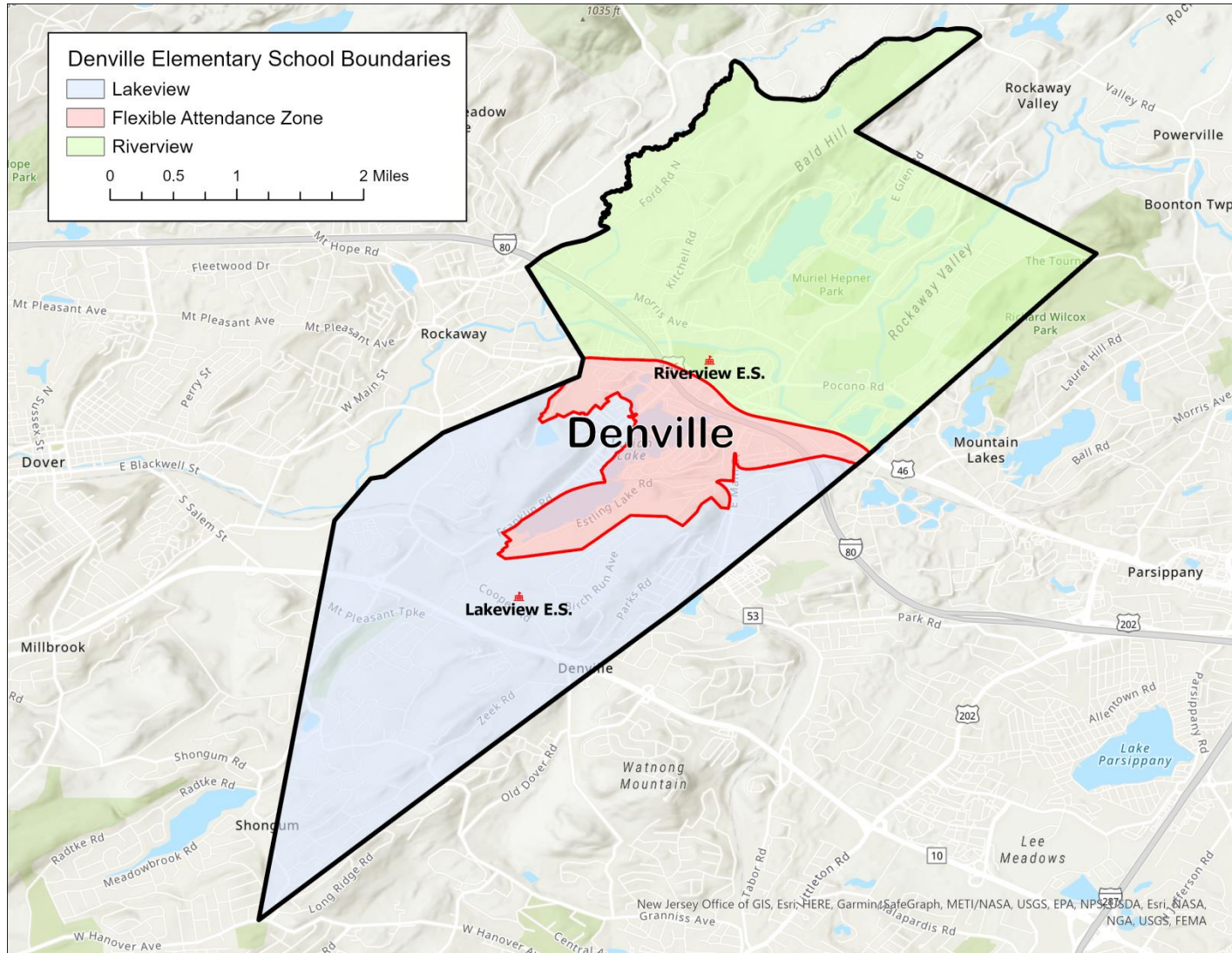


Figure 11
Elementary School Attendance Areas with Flexible Attendance Zone – Denville Township School District



Explanation of the Cohort-Survival Ratio Method

In 1930, Dublin and Lodka provided an explicit age breakdown, which enabled analysts to follow each cohort through its life stages and apply appropriate birth and death rates for each generation. A descendant of this process is the Cohort-Survival Ratio (“CSR”) method, which is the NJDOE-approved methodology to project public school enrollments. In this method, a survival ratio is computed for each grade progression, which essentially compares the number of students in a particular grade to the number of students in the previous grade during the previous year. The survival ratio indicates whether the enrollment is stable, increasing, or decreasing. A survival ratio of 1.00 indicates stable enrollment, less than 1.00 indicates declining enrollment, while greater than 1.00 indicates increasing enrollment. If, for example, a school district had 100 fourth graders and the next year had 95 fifth graders, the survival ratio would be 0.95.

The CSR method assumes that what happened in the past will also happen in the future. In essence, this method provides a linear projection of the population. The CSR method is most applicable for districts that have relatively stable trends without any major unpredictable fluctuations from year to year. In school districts encountering rapid growth or decline not experienced historically (a change in the historical trend), the CSR method must be modified and supplemented with additional information. In this study, survival ratios were calculated using historical data for birth to kindergarten, kindergarten to first grade, first grade to second grade, etc. Due to the fluctuation in survival ratios from year to year, it is appropriate to calculate an average survival ratio, which is then used to calculate grade-level enrollments five years into the future.

The accuracy of the projections is contingent on the most recent historical trends continuing into the future. If there is a departure from these trends caused by, for example, migration or withdrawal of students due to the coronavirus pandemic, numerous new housing starts (or planned housing starts that do not occur), changes in school district policy, changes to immigration laws, an economic downturn, a change in the housing resale market, etc., the enrollment projections presented are less likely to be accurate in future years, as this analysis does not forecast future trends. Therefore, the projections need to be revised annually to detect potential reversals in enrollment trends. Changes in enrollment are dependent on several factors such as birth counts, migration of students into or out of the school district, the presence of charter schools, private schools, or parochial schools, and school district policy changes.

Historical Enrollment Trends

Historical enrollments for the Denville Township School District from 2012-13 through 2021-22, a ten-year period, are shown in Figure 12 and Table 3. In general, enrollments declined through 2015-16 before stabilizing. In the last seven years, enrollments have ranged from 1,612-1,664. In 2021-22, enrollment is 1,629, which is a loss of 115 students (-6.6%) from the 2012-13 enrollment of 1,744.

Figure 12
Denville Township School District Historical Enrollments
2012-13 to 2021-22

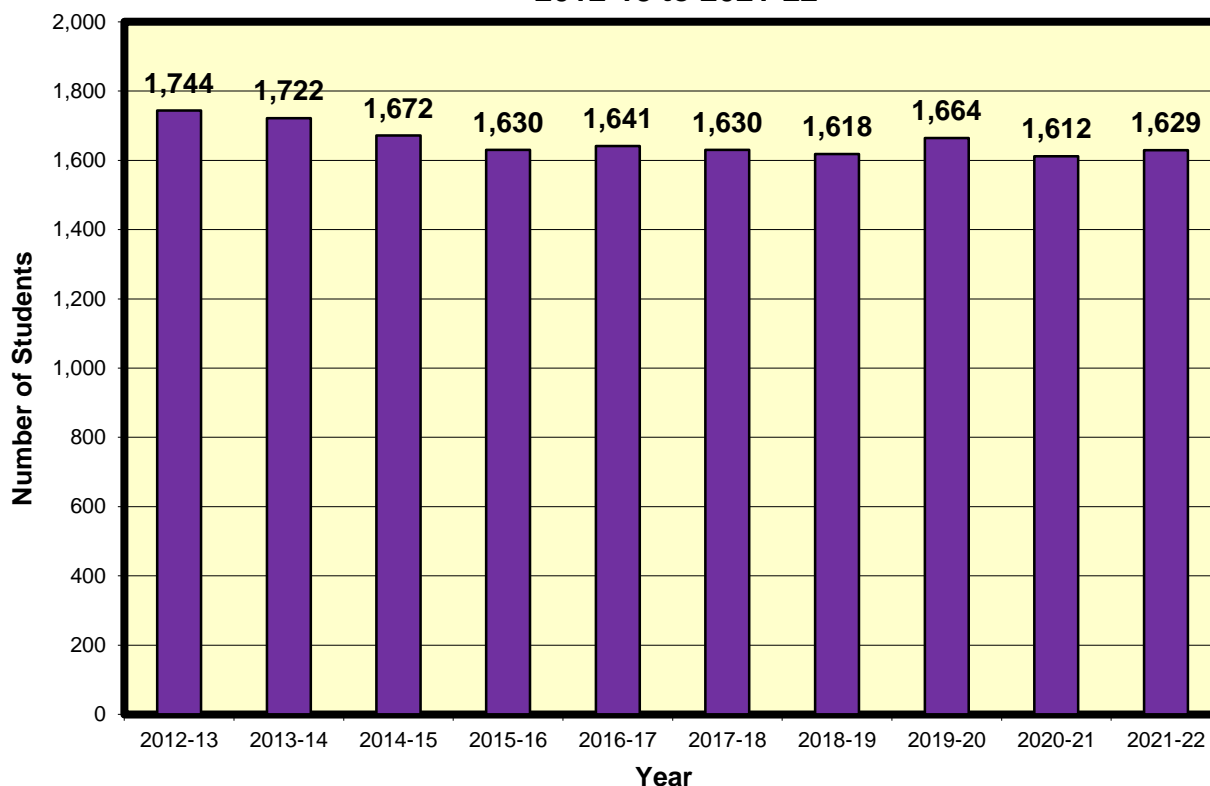


Table 4 shows computed grade-by-grade survival ratios from 2012-13 to 2021-22. In addition, the average, minimum, and maximum survival ratios are shown for the past ten years along with the five-year averages, which were used to project enrollments. The average survival ratios also indicate the net migration by grade, where values over 1.000 reflect net inward migration and values below 1.000 reflect net outward migration. All nine average survival ratios (five-year average) were above 1.000, indicating a net inward migration of students. In comparing the five-year averages with the ten-year averages, the most notable difference was for birth to kindergarten, which has experienced an increase in its ratio in the near term. The increase in the birth-to-kindergarten ratio is likely due to the district's change from a half-day to a full-day kindergarten program in 2013-14, as more parents enrolled their children in kindergarten in the school district rather than the first grade. The remaining differences were very small, demonstrating the long-term stability of the survival ratios over the last decade.

Table 3
Denville Township School District Historical Enrollments
2012-13 to 2021-22

Year ¹	PK ²	K	1	2	3	4	5	SE ³	PK-5 Total	6	7	8	SE ⁴	6-8 Total	PK-8 Total
2012-13	22	118	175	165	188	193	219	2	1,082	208	224	230	0	662	1,744
2013-14	29	147	151	188	172	188	195	1	1,071	221	210	220	0	651	1,722
2014-15	24	156	154	158	196	173	188	1	1,050	197	223	202	0	622	1,672
2015-16	23	137	165	169	163	199	173	1	1,030	185	198	217	0	600	1,630
2016-17	34	156	144	172	177	173	209	1	1,066	182	191	202	0	575	1,641
2017-18	33	159	160	146	186	177	176	1	1,038	221	182	189	0	592	1,630
2018-19	33	165	168	153	149	187	176	0	1,031	178	222	186	1	587	1,618
2019-20	41	179	170	181	159	154	185	0	1,069	190	177	227	1	595	1,664
2020-21	30	168	180	180	177	164	160	0	1,059	187	189	176	1	553	1,612
2021-22	34	170	173	186	184	181	164	0	1,092	165	189	183	0	537	1,629

Notes: ¹Data were provided by the New Jersey Department of Education (<http://www.nj.gov/education/data/enr/>) and the Denville Township School District.

²Pre-kindergarten regular education enrollment

³Self-contained special education enrollment/ungraded students at the elementary school level

⁴Self-contained special education enrollment/ungraded students at the middle school level

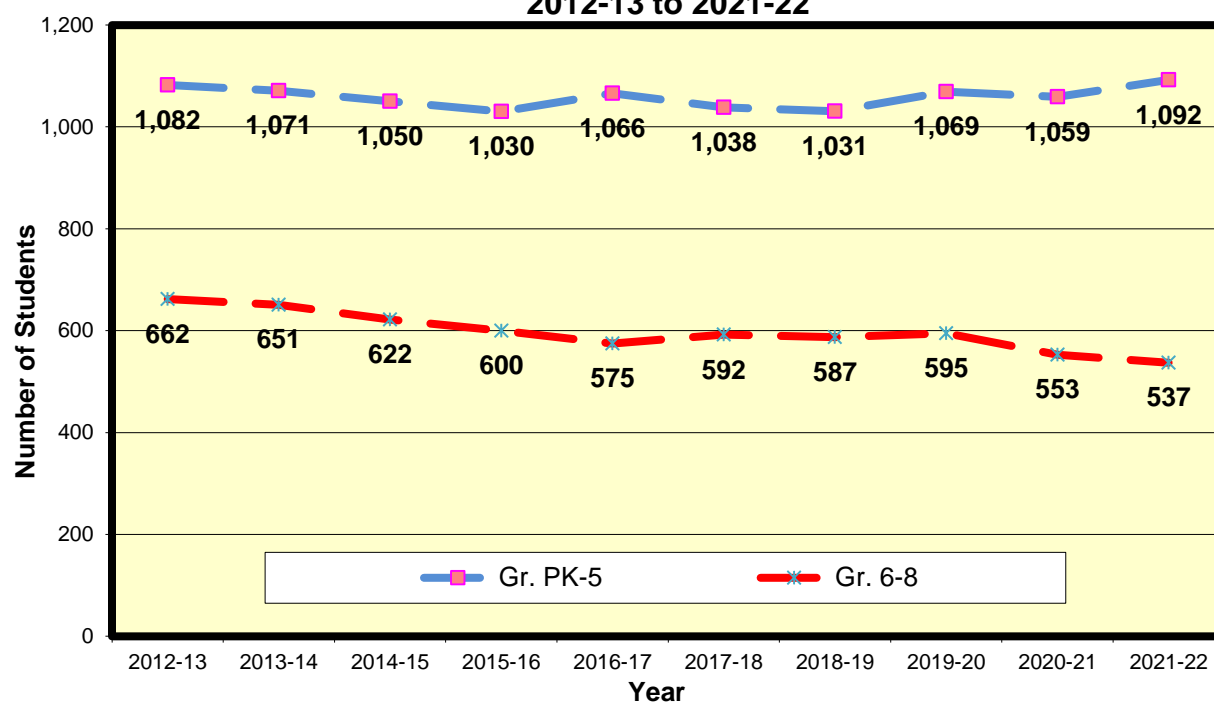
Table 4
Denville Township School District Historical Survival Ratios
2012-13 to 2021-22

Progression Years	B-K	K-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8
2012-13 to 2013-14	0.7577	1.2797	1.0743	1.0424	1.0000	1.0104	1.0091	1.0096	0.9821
2013-14 to 2014-15	0.9571	1.0476	1.0464	1.0426	1.0058	1.0000	1.0103	1.0090	0.9619
2014-15 to 2015-16	0.8405	1.0577	1.0974	1.0316	1.0153	1.0000	0.9840	1.0051	0.9731
2015-16 to 2016-17	1.0196	1.0511	1.0424	1.0473	1.0613	1.0503	1.0520	1.0324	1.0202
2016-17 to 2017-18	1.0325	1.0256	1.0139	1.0814	1.0000	1.0173	1.0574	1.0000	0.9895
2017-18 to 2018-19	1.0510	1.0566	0.9563	1.0205	1.0054	0.9944	1.0114	1.0045	1.0220
2018-19 to 2019-20	1.2878	1.0303	1.0774	1.0392	1.0336	0.9893	1.0795	0.9944	1.0225
2019-20 to 2020-21	1.0769	1.0056	1.0588	0.9779	1.0314	1.0390	1.0108	0.9947	0.9944
2020-21 to 2021-22	1.1724	1.0298	1.0333	1.0222	1.0226	1.0000	1.0313	1.0107	0.9683
Maximum Ratio	1.2878	1.2797	1.0974	1.0814	1.0613	1.0503	1.0795	1.0324	1.0225
Minimum Ratio	0.7577	1.0056	0.9563	0.9779	1.0000	0.9893	0.9840	0.9944	0.9619
Avg. 5-Year Ratios	1.1241	1.0306	1.0314	1.0150	1.0232	1.0057	1.0332	1.0011	1.0018
Avg. 10-Year Ratios	1.0217	1.0649	1.0445	1.0339	1.0195	1.0112	1.0273	1.0067	0.9927
Diff. Between 5-Year and 10-Year Ratios	+0.1024	-0.0343	-0.0130	-0.0189	+0.0038	-0.0055	+0.0059	-0.0056	+0.0091

Factors related to inward migration include families with school-age children purchasing an existing home or new housing unit, or renting an apartment. The reasons for families moving into a community vary. For instance, a family could move into Denville to be close to work, the presence of affordable housing, or to be near family members. Another plausible reason for inward migration is the reputation of the school district, as the appeal of a school district draws families into a community, resulting in the transfer of students into the district. On the flip side, outward migration is caused by families with children moving out of the community, perhaps due to difficulty in finding employment or affordable housing. Outward migration in the school district can also be caused by parents choosing to withdraw their children from public school to attend private, parochial, or charter schools, to be homeschooled, or to attend a different public school district. In the case of the Denville Township School District, the reasons for migration are not explicitly known (such as for economic reasons or the appeal of the school district), as exit and entrance interviews would need to be conducted for all children leaving or entering the district.

Historical enrollments are also shown in Table 3 and Figure 13 by the school district's grade configuration (PK-5 and 6-8). Self-contained special education/ungraded students were incorporated into the totals for each grade configuration. For grades PK-5, enrollments declined through 2015-16 before reversing trend and stabilizing. In 2021-22, enrollment is 1,092, which is slightly higher than the 2012-13 enrollment of 1,082. For grades 6-8 at Valleyview, enrollments have been generally declining over the last decade. In 2021-22, enrollment is 537, which is a loss of 125 students from the 2012-13 enrollment of 662.

Figure 13
Denville Township School District
Historical Enrollments by Grade Configuration
2012-13 to 2021-22



Kindergarten Replacement

Kindergarten replacements were analyzed to determine whether there was any relationship between overall enrollment change and kindergarten replacement, which is the numerical difference between the number of graduating 8th graders and the number of entering kindergarten students. The district has experienced negative kindergarten replacement in each of the last nine years. Negative kindergarten replacement occurs when the number of kindergarten students entering the district is less than the number of graduating eighth grade students from the prior year. Conversely, positive kindergarten replacement occurs when the number of kindergarten students entering the district is greater than the number of graduating eighth grade students from the prior year. As shown in Figure 14, negative kindergarten replacement has ranged from 6-83 students per year with the magnitude declining over time, which is due to the increasing sizes of the entering kindergarten classes and also the decreasing sizes of the graduating 8th grade classes. In 2021-22, there was a loss of six (6) students due to kindergarten replacement, as 176 eighth graders graduated in 2020-21 and were replaced by 170 kindergarten students in 2021-22.

Figure 14
Denville Township School District
Historical Kindergarten Replacement

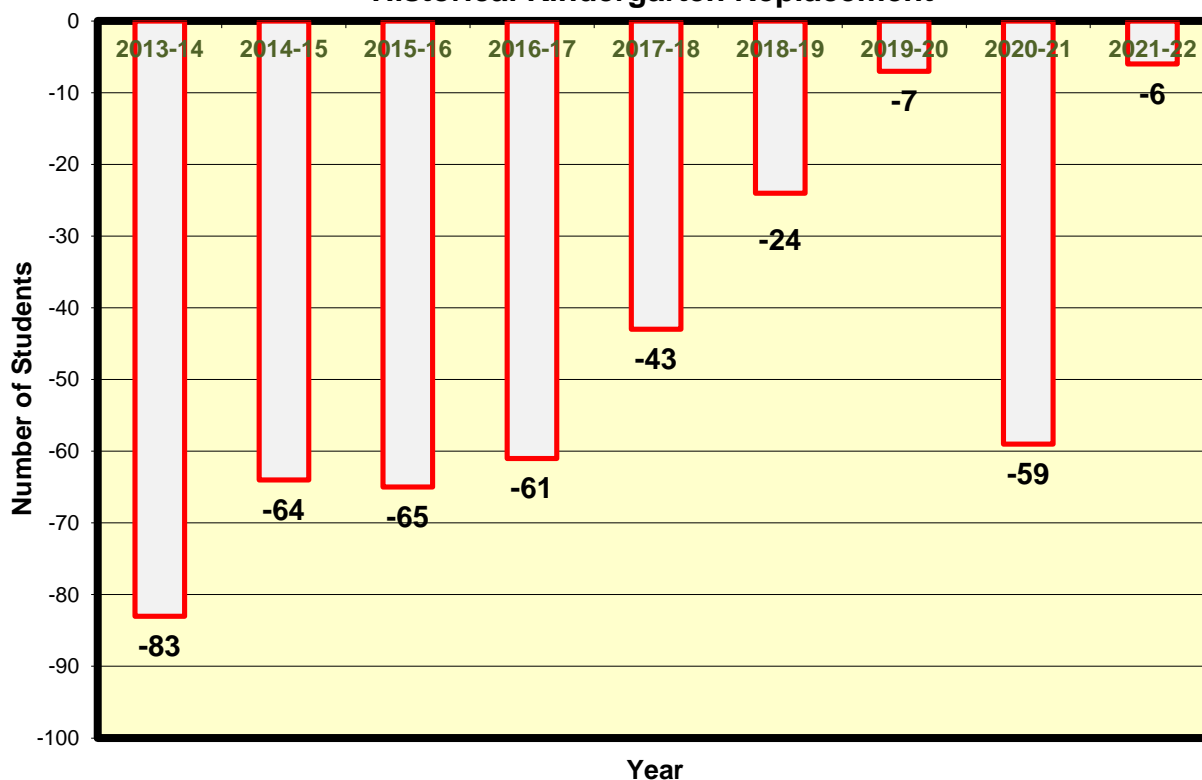
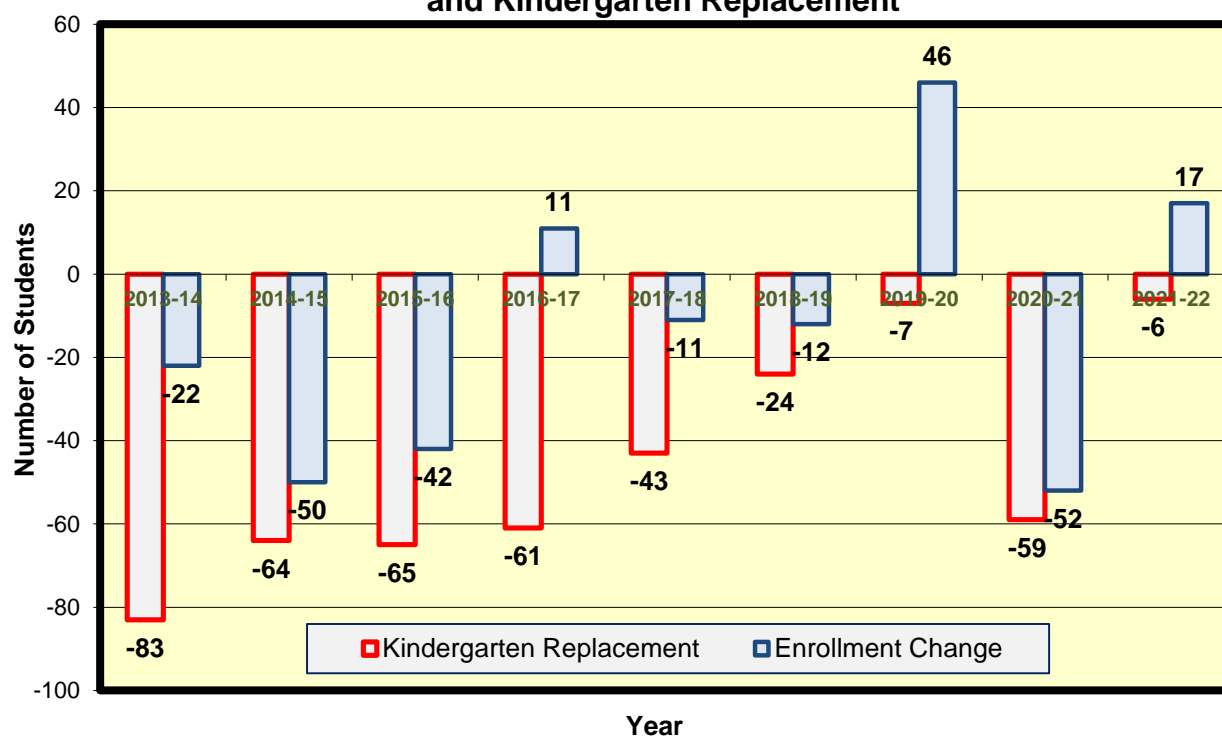


Figure 15 shows the annual change in total enrollment compared to kindergarten replacement. As the figure demonstrates, there appears to be a strong relationship, statistically speaking, between the overall change in enrollment and kindergarten replacement. Although this data represents a small sample, the correlation coefficient between the two variables was +0.717. Correlation coefficients measure the relationship or association between two variables; this does not imply that there is cause and effect between the two variables. Other variables, known as lurking variables, may have an effect on the true relationship between kindergarten replacement and total enrollment change. Negative correlation coefficients indicate that as one variable is increasing (decreasing), the other variable is decreasing (increasing). Positive correlation coefficients indicate that as one of the variables increases (decreases), the other variable increases (decreases) as well. The computed linear correlation coefficient is always between -1 and +1. Values near -1 or +1 indicate a strong linear relationship between the variables while values near zero indicate a weak linear relationship. Based on the correlation of +0.717 there appears to be a strong relationship between kindergarten replacement and enrollment change in the school district in the last nine years.

In each of the last nine years when negative kindergarten replacement occurred, the district's losses due to negative kindergarten replacement were partially offset (or totally, resulting in a net enrollment gain) by a net inward migration of students in the other grades (K to 1, 1 to 2, 2 to 3, etc.). This was confirmed previously as all nine average survival ratios in the five-year trend were above 1.000.

Figure 15
Comparison of PK-8 Enrollment Change
and Kindergarten Replacement



Birth Data

Birth data were needed to compute kindergarten enrollments, which were calculated as follows. Birth data, which are lagged five years behind their respective kindergarten classes, were used to calculate the survival ratio for each birth-to-kindergarten cohort. For instance, in 2016, there were 145 births in Denville. Five years later (the 2021-22 school year), 170 children enrolled in kindergarten, which is equal to a survival ratio of 1.172 from birth to kindergarten. Birth counts and birth-to-kindergarten survival ratios are displayed in Table 5. Values greater than 1.000 indicate that some children are born outside of a community's boundaries and are attending kindergarten in the school district five years later, i.e., an inward migration of children. This type of inward migration is typical in school districts with excellent reputations, because the appeal of a good school district draws families into the community. Inward migration is also seen in communities where there are a large number of new housing starts (or home resales), with families moving into the community having children of age to attend kindergarten. Birth-to-kindergarten survival ratios that are below 1.000 indicate that a number of children born within a community are not attending kindergarten in the school district five years later. This is common in communities where a high proportion of children attend private, parochial, charter, or out-of-district special education facilities, or where there is a net migration of families moving out of the community. It is also common in school districts that have a half-day kindergarten program where parents choose to send their child to a private full-day kindergarten for the first year.

Table 5
Birth Counts and Historical Birth-to-Kindergarten Survival Ratios
Denville Township School District

Birth Year	Number of Births Denville Township ¹	Kindergarten Students 5 Years Later	Birth-to- Kindergarten Survival Ratio
2007	164	118	0.720
2008	194	147	0.758
2009	163	156	0.957
2010	163	137	0.840
2011	153	156	1.020
2012	154	159	1.032
2013	157	165	1.051
2014	139	179	1.288
2015	156	168	1.077
2016	145	170	1.172
2017	156	N/A	N/A
2018	157	N/A	N/A
2019	179	N/A	N/A

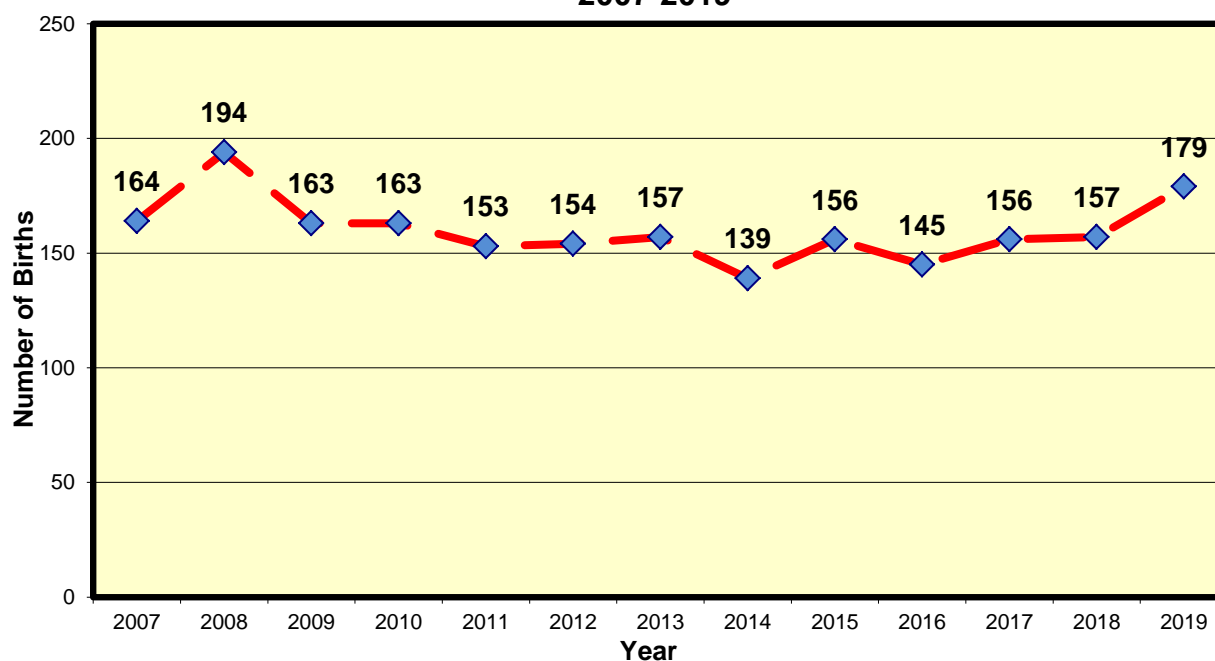
Note: ¹Birth data were provided by the New Jersey Center for Health Statistics.
Blue shaded cells reflect implementation of a full-day kindergarten program.

In the last six years, birth-to-kindergarten survival ratios in the district have been above 1.000, ranging from 1.020-1.288. Full-day kindergarten was implemented in the district beginning in September 2013, which is shaded blue in Table 5. The effect of the district's changing from a half-day to a full-day kindergarten program is evident as birth-to-kindergarten survival ratios were below 1.000 with the half-day program and for the first few years after the full-day program was instituted, ranging from 0.720-0.957. As the birth-to-kindergarten survival ratios have increased over the last decade, this may reflect that a greater number of families with children under the age of five are moving into the community to enroll their children in kindergarten, or that fewer families are moving out of Denville, or that more parents are choosing to enroll their child in public school rather than private or parochial school. As the birth-to-kindergarten survival ratios have been above 1.000 in each of the last six years, this indicates that children who were born in other communities enrolled in the Denville Township School District to attend kindergarten, reflecting inward migration.

Geocoded birth data were provided by the New Jersey Center for Health Statistics ("NJCHS") from 2007-2019 by assigning geographic coordinates to a birth mother based on her street address. Births for 2020 and 2021 were not yet available. Since the NJCHS did not have birth data for 2020 and 2021, estimates were formulated by averaging historical births. Birth counts were needed for 2020 and 2021 since these cohorts will become the kindergarten classes of 2025 and 2026.

Figure 16 shows the annual number of births in Denville from 2007-2019. After peaking at 194 births in 2008, the number of births declined to 139 in 2014 before reversing trend. In 2019, there were 179 births, which is the largest value since 2008.

Figure 16
Denville Township Historical Birth Counts
2007-2019



Using mapping software, elementary school attendance area boundaries, and NJCHS birth data by Census block, the number of births from 2007-2019 was determined for each elementary school attendance area and is displayed in Table 6. In each year, some addresses of the mothers within Denville were unknown. The greatest number of unknown addresses occurred in 2009, accounting for 19 of the 163 births (11.7%) in that year. For the purpose of projecting enrollments, the unknown addresses were redistributed into the two elementary attendance areas using proportional allocations of the births in each school attendance area with respect to the total number of births.

Table 6
Births by Elementary School Attendance Area
Denville Township School District
2007-2019

Birth Year	Lakeview	Riverview	Unknown
2007	119	40	5
2008	123	57	14
2009	94	50	19
2010	95	51	17
2011	102	45	6
2012	97	49	8
2013	105	51	1
2014	81	53	5
2015	107	48	1
2016	92	51	2
2017	93	56	7
2018	101	53	3
2019	121	56	2
Total	1,330	660	

In 2007 and 2019, the greater number of births occurred in the Lakeview attendance area. From 2007-2019, the Lakeview attendance area also had the greater total number of births (1,330), which was twice the amount that occurred in the Riverview attendance area.

Figures 17 and 18 show the specific location(s) where birth counts are changing, as births by census block were mapped for 2007 and 2019. Census blocks are the smallest geographic unit in which data are collected by the Census Bureau. Blocks are typically bound by streets, roads, or bodies of water. In 2007, the greatest number of births, which is shaded dark blue, occurred in the southern section of Denville in the Lakeview attendance area. In 2019, using the same scale, blocks were shaded dark blue in the northern and southern sections of Denville in each attendance area. In general, there are more Census blocks shaded blue or aqua in 2019 as compared to 2007, indicating an increase in the number of births.

Figure 19 shows the aggregated number of births by Census block from 2007-2019. The greatest number of births, which is shaded dark blue, occurred in the northern and southern sections of Denville in each attendance area.

Figure 17
Denville Township Births by Census Block
2007

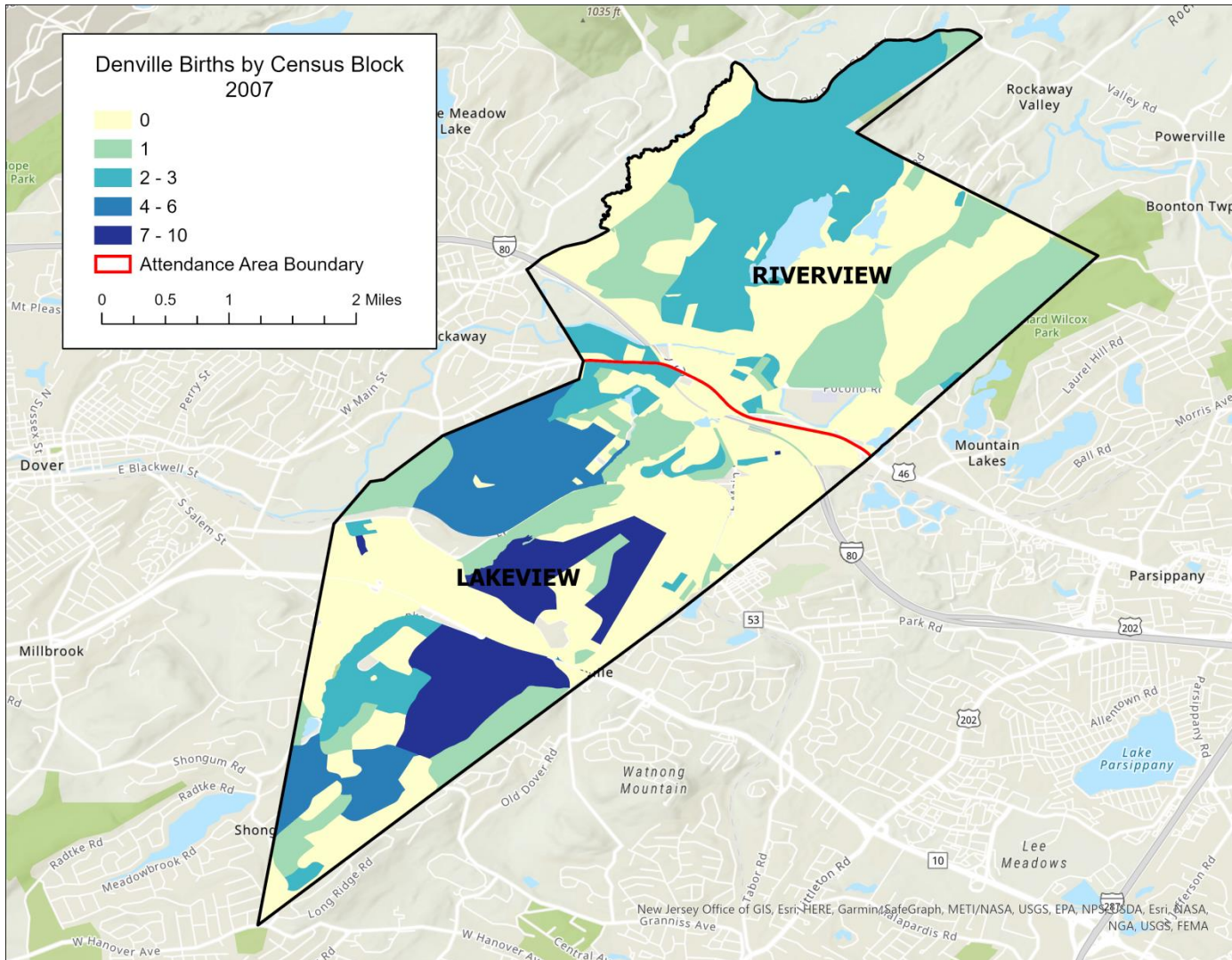


Figure 18
Denville Township Births by Census Block
2019

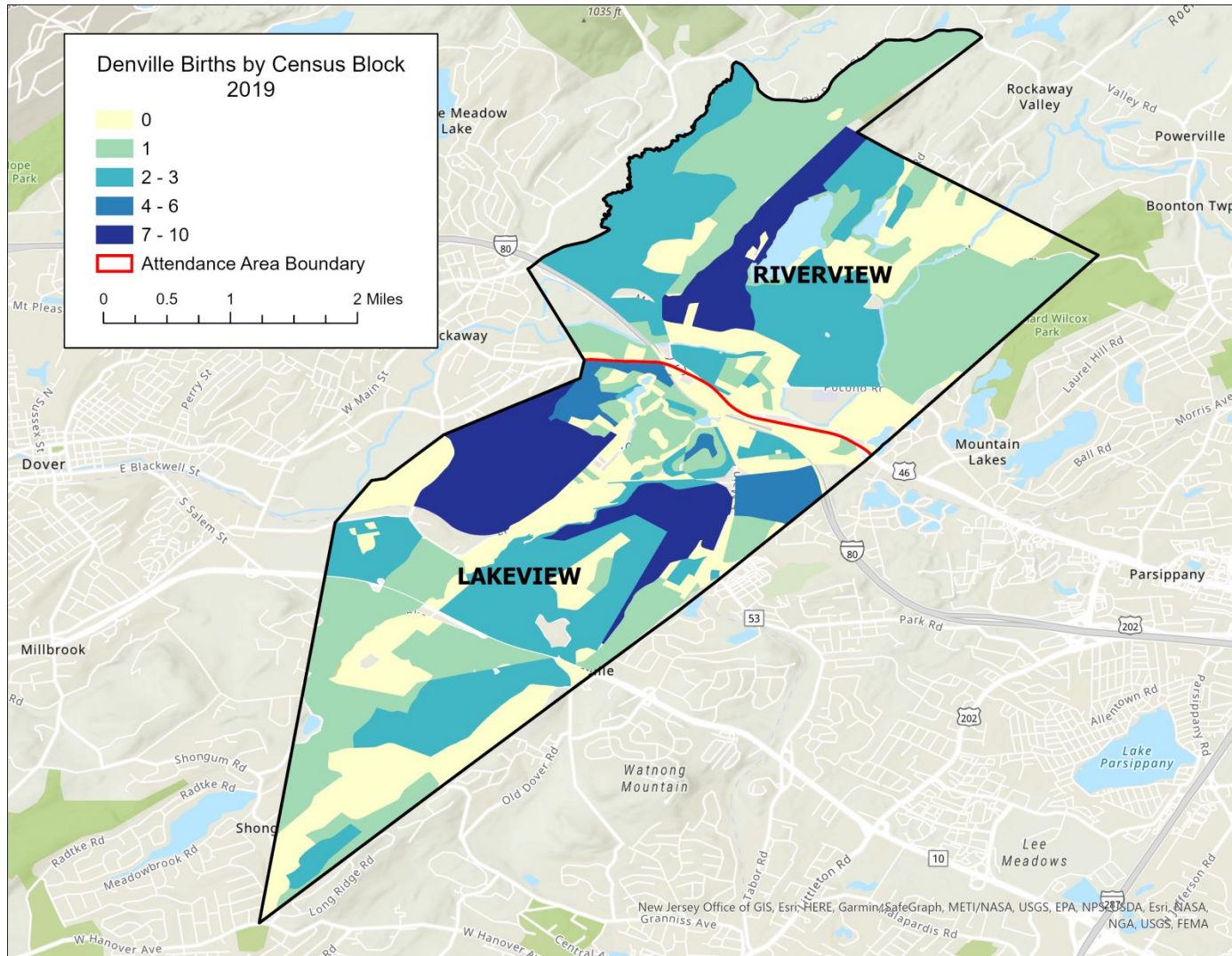
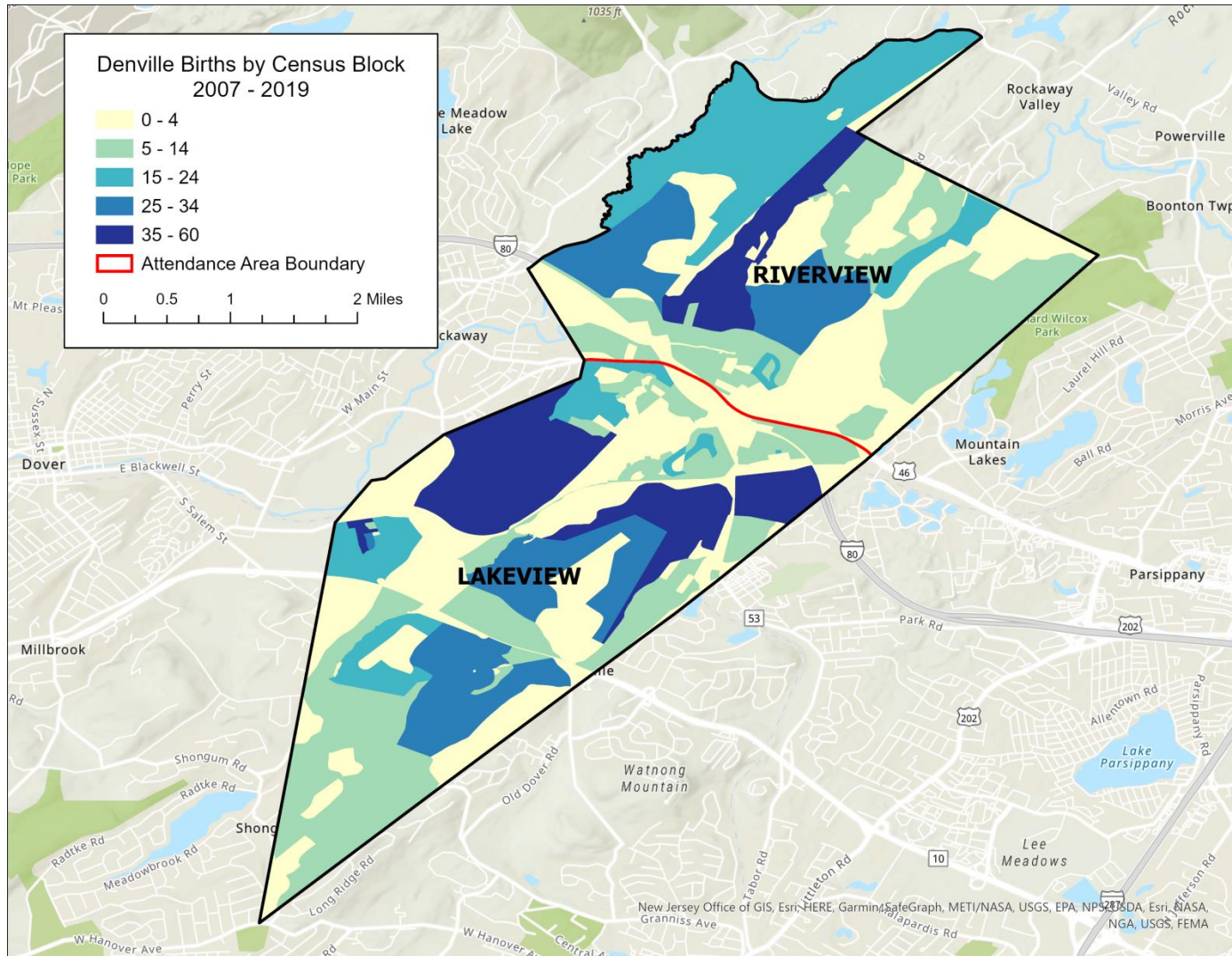


Figure 19
Denville Township Total Number of Births by Census Block
2007-2019



Regarding fertility rates, the fertility rate in Denville is much lower than those of both Morris County and the State of New Jersey. According to the 2015-2019 ACS, the fertility rate of women aged 15 to 50 in Denville was 37 births per 1,000 women. In comparison, as reported by the NJCHS, the 2020 fertility rate in Morris County was 52.9 births per 1,000 women (ages 15-49) and was 58.1 births per 1,000 women in New Jersey. However, it should be noted that while the municipal, county, and state data are all based on a sample, the Denville data has a margin of error that is much higher than the county and state data and may not reflect the “true” fertility rate in the community.

Population Age Structure

Figures 20 and 21 show the age pyramids of males and females in Denville from both the 2010 Census and the 2015-2019 ACS. In 2010, the largest number of individuals was aged 45-49 for both males and females. In communities with little inward or outward migration and low mortality, the largest cohort in subsequent years is typically the next oldest cohort as people advance in age. However, in the 2015-2019 ACS, the largest cohort for males and females was the 60-64 age group. As the largest groups in the 2015-2019 ACS were not the next oldest cohorts, migration is likely occurring in the township. As shown in Table 7, the greatest declines (shaded red) over this time period, both in number and percentage points, occurred in the 55-59 age group for males and the 10-14 age group for females, which corresponds approximately with children in grades 5-9. The greatest gains (shaded blue), both in number and percentage points, occurred in the 65-69 age group for males and the 60-64 age group for females.

Figure 20
Population Pyramid of Denville Township
2010 Census

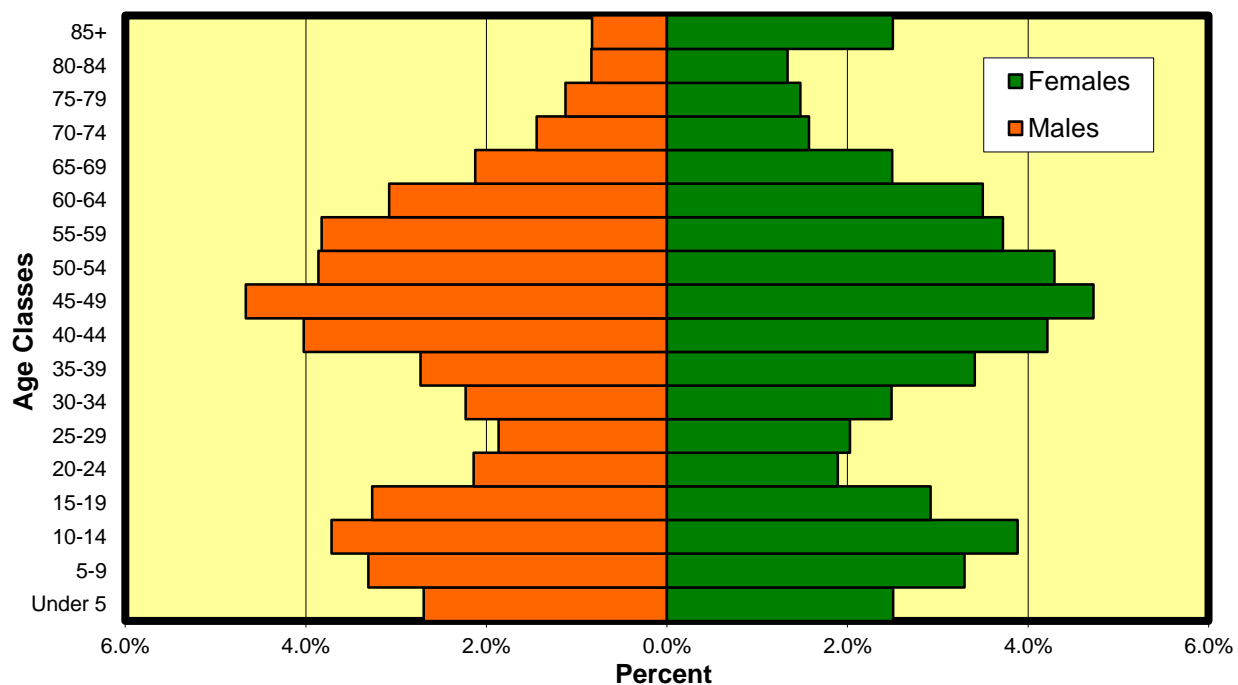


Figure 21
Population Pyramid of Denville Township
2015-2019 ACS

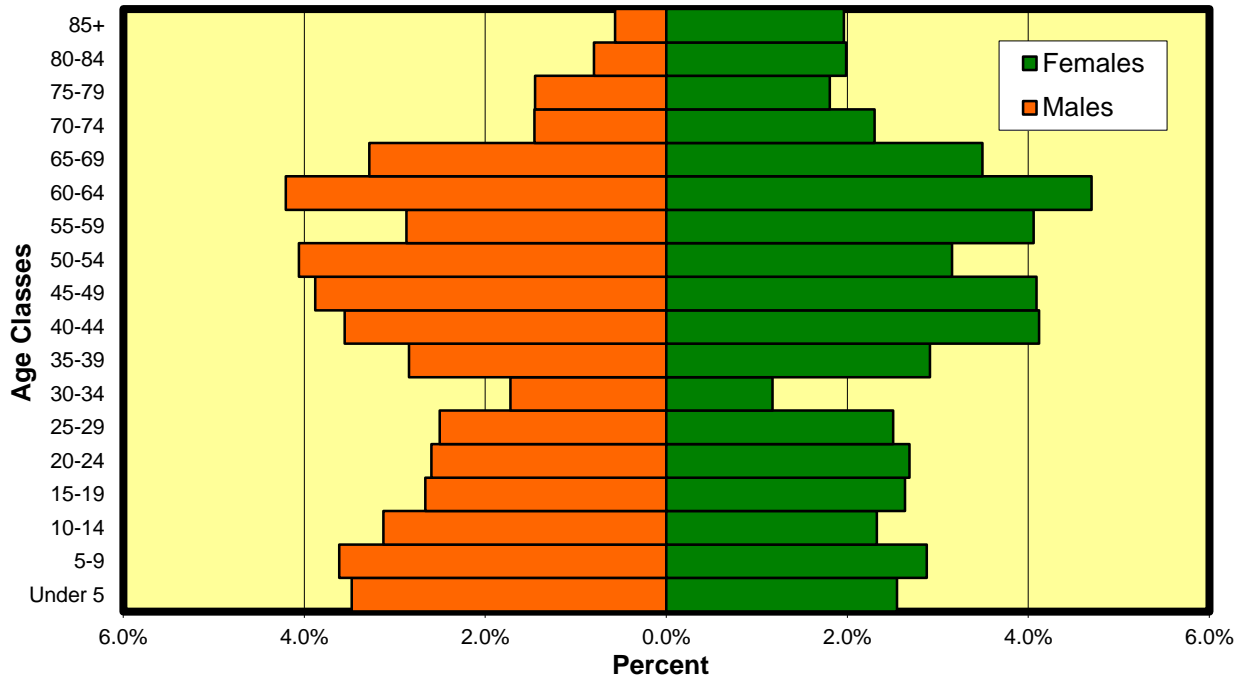


Table 7
Numerical and Percentage Point Changes of Males and Females in Denville
2010 Census to 2015-2019 ACS

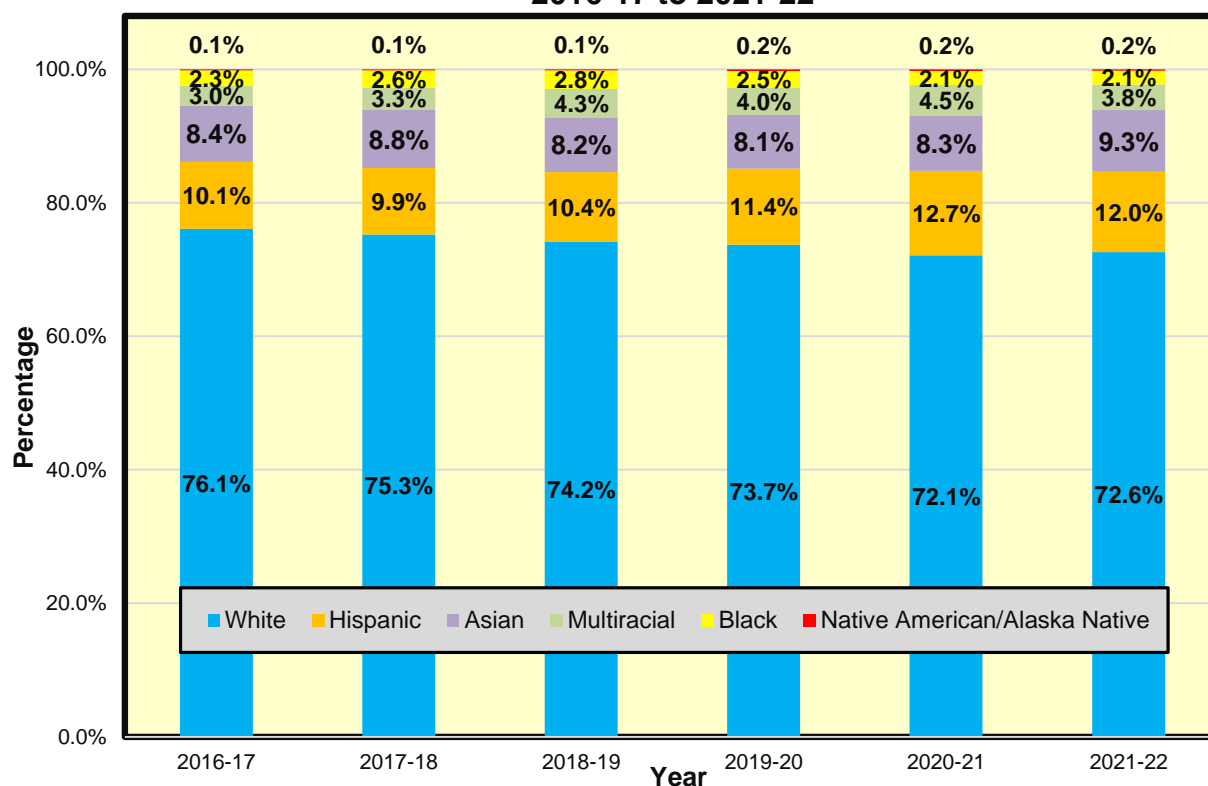
Age Group	Males		Females	
	Numerical Change	Percentage Point Change	Numerical Change	Percentage Point Change
Under 5	+129	+0.8	+6	0.0
5-9	+50	+0.3	-70	-0.4
10-14	-99	-0.6	-260	-1.6
15-19	-101	-0.6	-48	-0.3
20-24	+75	+0.5	+131	+0.8
25-29	+106	+0.6	+79	+0.5
30-34	-85	-0.5	-219	-1.3
35-39	+18	+0.1	-83	-0.5
40-44	-79	-0.5	-17	-0.1
45-49	-132	-0.8	-107	-0.6
50-54	+32	+0.2	-190	-1.1
55-59	-159	-1.0	+55	+0.3
60-64	+186	+1.1	+198	+1.2
65-69	+192	+1.2	+165	+1.0
70-74	+2	0.0	+120	+0.7
75-79	+54	+0.3	+54	+0.3
80-84	-6	0.0	+108	+0.7
85+	-44	-0.3	-90	-0.5

Notes: Cells shaded blue reflect the greatest gains over the ten-year period.
 Cells shaded red reflect the greatest losses over the ten-year period.

Historical Enrollments by Race

In Figure 22, enrollments are shown by race for the Denville Township School District from 2016-17 to 2021-22. In the NJDOE enrollment database, the races listed are White, Hispanic/Latino (“Hispanic”), Asian or Native Hawaiian/Other Pacific Islander (“Asian”), Black or African American (“Black”), Native American or Alaska Native, and Two or more races (“Multiracial”). While Whites are the largest race in the district, the White percentage has been slowly declining over time. In 2021-22, 72.6% of the student population is White as compared to 76.1% in 2016-17, a loss of 3.5 percentage points. Conversely, the Hispanic population, which is the second-largest race, has slowly increased from 10.1% to 12.0% over this time period, a gain of 1.9 percentage points. The Asian student percentage has been fairly stable, ranging from 8.1%-9.3%. The Black student percentage has also been fairly stable, ranging from 2.1%-3.8%. Of the four major races, Blacks are the smallest race in the district. The percentage of Multiracial students has ranged from 3.0%-4.5%. The number and percentage of Native American or Alaska Native students were insignificant.

Figure 22
Denville Township School District Enrollments by Race
2016-17 to 2021-22



In Table 8, enrollments by race from 2016-17 are displayed for each of the schools in the district, as well as the districtwide totals. The largest race in each school is shaded blue. Whites were the largest race in each school. In the elementary schools, Whites ranged from 70.3% at Lakeview to 81.4% at Riverview. Hispanics were the second-largest race in each school and ranged from 8.2% at Riverview to 12.6% at Lakeview. Asians were the third-largest race in each school and ranged from 7.1% at Riverview to 10.1% at Lakeview. The Black percentages were very small in each school, ranging from 0.5%-3.1%. Of the four major racial subgroups, Blacks were the smallest race in each school. The Multiracial percentages ranged from 2.7%-3.6%, while the number and percentage of Native American or Alaska Native students were insignificant.

In Valleyview, Whites were the largest race (79.8%) followed by Hispanics (8.2%) and Asians (7.1%). Blacks were the smallest racial subgroup of the four major races at 2.4%. While the Multiracial percentage was 2.4%, there were no Native American or Alaska Native students in the school.

Table 8
Enrollments by Race and School in the Denville Township School District
2016-17

School	White	Black	Hispanic	Asian	Alaska Native/ Native American	Multiracial	Total
Lakeview E.S. (PK-5)	492	22	88	71	2	25	700
	70.3%	3.1%	12.6%	10.1%	0.3%	3.6%	100.0%
Riverview E.S. (K-5)	298	2	30	26	0	10	366
	81.4%	0.5%	8.2%	7.1%	0.0%	2.7%	100.0%
Valleyview M.S. (6-8)	459	14	47	41	0	14	575
	79.8%	2.4%	8.2%	7.1%	0.0%	2.4%	100.0%
Total	1,249	38	165	138	2	49	1,641
	76.1%	2.3%	10.1%	8.4%	0.1%	3.0%	100.0%

Source: New Jersey Department of Education (<http://www.nj.gov/education/data/enr/>)

Note: Cells highlighted blue are the largest race in the school.

In Table 9, enrollments by race from 2021-22 are displayed for each of the schools in the district, as well as the districtwide totals. The largest race in each school is shaded blue. Whites continue to be the largest race in each elementary school. Whites range from 68.4% at Lakeview to 80.1% at Riverview. The White student percentage has declined slightly in each school (-1.9 percentage points at Lakeview and -1.3 percentage points at Riverview) since 2016-17. Hispanics are the second-largest race at Riverview but are the third-largest race at Lakeview. Hispanics range from 10.6% at Riverview to 11.7% at Lakeview, which is fairly similar. While Riverview had a 2.4 percentage-point gain in the Hispanic population, there was little change in the Hispanic population at Lakeview. Asians, which are the second-largest race in Lakeview and third-largest race in Riverview, range from 4.6% at Riverview to 12.4% at Lakeview. Over this time period, while there was a small percentage-point gain (+2.3) in the Asian percentage at Lakeview, there was a small percentage-point decline at Riverview (-2.5). The Black percentage is very small in

each school, ranging from 1.2%-2.7%. Of the four major racial subgroups, Blacks remain the smallest race in each elementary school. The Multiracial percentages range from 3.5% at Riverview to 4.4% at Lakeview. The number and percentage of Native American or Alaska Native students are insignificant.

At Valleyview, while Whites remain the largest race in 2021-22 at 71.7%, there was an 8.1 percentage-point decline in the White population from 2016-17. Hispanics are the second-largest race in the school at 13.6%, which is a gain of 5.4 percentage points in the last five years. Asians are the third-largest race in the school at 9.1%, which is a gain of 2.0 percentage points from the 2016-17 percentage. Blacks are the smallest race in the school at 2.0%, which is nearly unchanged from 2016-17. The Multiracial percentage is 3.4%, which is a 1.0 percentage-point gain in the last five years. The number and percentage of Native American or Alaska Native students are insignificant.

Table 9
Enrollments by Race and School in the Denville Township School District
2021-22

School	White	Black	Hispanic	Asian	Alaska Native/ Native American	Multiracial	Total
Lakeview E.S. (PK-5)	451	18	77	82	2	29	659
	68.4%	2.7%	11.7%	12.4%	0.3%	4.4%	100.0%
Riverview E.S. (K-5)	347	5	46	20	0	15	433
	80.1%	1.2%	10.6%	4.6%	0.0%	3.5%	100.0%
Valleyview M.S. (6-8)	385	11	73	49	1	18	537
	71.7%	2.0%	13.6%	9.1%	0.2%	3.4%	100.0%
Total	1,183	34	196	151	3	62	1,629
	72.6%	2.1%	12.0%	9.3%	0.2%	3.8%	100.0%

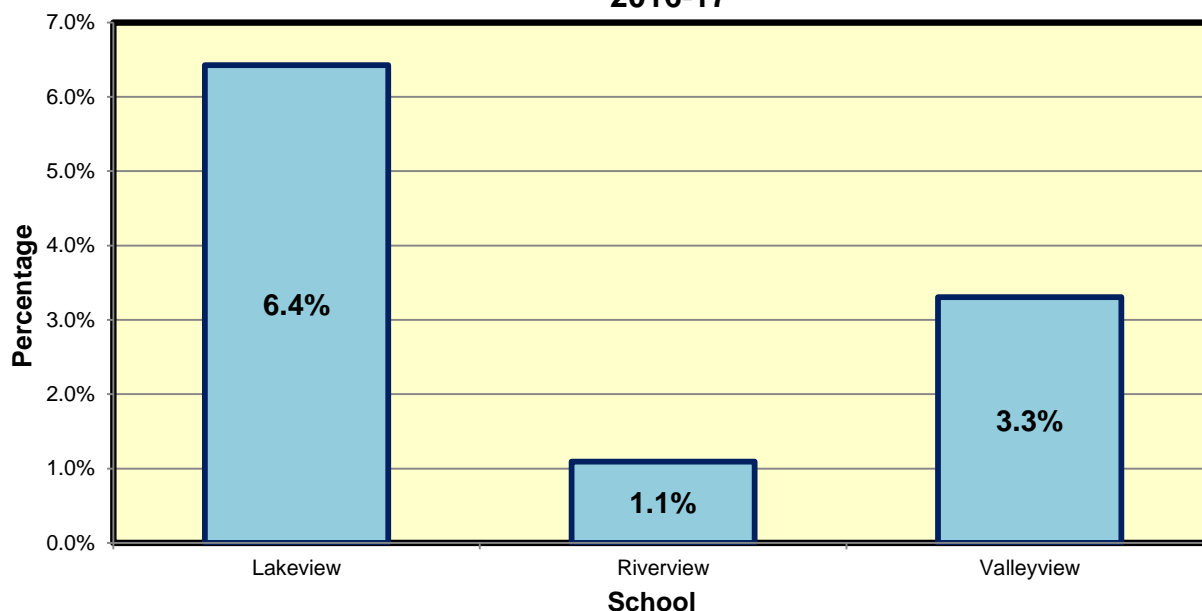
Sources: New Jersey Department of Education (<http://www.nj.gov/education/data/enr/>) and the Denville Township School District

Note: Cells highlighted blue are the largest race in the school.

Economically Disadvantaged Students

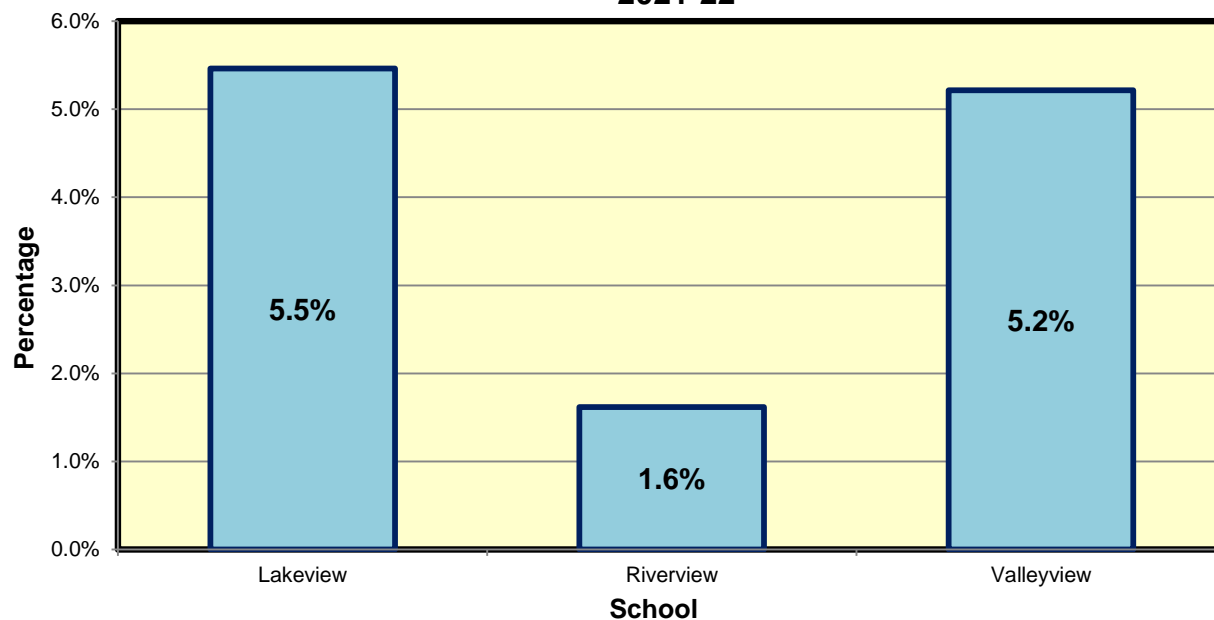
As a proxy for measuring poverty in the school district, counts of students receiving free or reduced lunch were compiled from 2016-17 through 2021-22. In Figure 23, the within school percentages of students that were economically disadvantaged in 2016-17 are shown. The percentage of economically disadvantaged students was fairly low in each of the district's schools. At the elementary level, Lakeview (6.4%) had a higher percentage of economically disadvantaged students than Riverview (1.1%). At Valleyview, the percentage of economically disadvantaged students was 3.3%.

Figure 23
Denville Township Economically Disadvantaged by School
2016-17



In Figure 24, the within school percentages of students that are economically disadvantaged in 2021-22 are shown. The percentages of economically disadvantaged students are low in each of the district's schools, ranging from 1.6%-5.5%. At the elementary level, Lakeview continues to have a higher percentage (5.5%) of economically disadvantaged students than Riverview (1.6%). At Valleyview, the percentage of economically disadvantaged students is 5.2%.

Figure 24
Denville Township Economically Disadvantaged by School
2021-22



In Table 10, the number of economically disadvantaged students was compiled by school from 2016-17 through 2021-22, while the within school percentages are shown in Table 11. Table 10 also shows the overall percentage of students that are economically disadvantaged with respect to the district's total enrollment and the change in the number of students that are economically disadvantaged over this time period for each school. At the district level, the number and percentage of students that are economically disadvantaged have not had a clearly defined increasing or declining trend in the last six years. Whereas 68 students (4.1%) were economically disadvantaged in the school district in 2016-17, 71 students (4.4%) are economically disadvantaged in 2021-22, which is not significantly different. In the last six years, the percentage of students that are economically disadvantaged has ranged from 3.2%-5.2%.

At the elementary level, Lakeview has consistently had a much greater number of economically disadvantaged students than Riverview. In the last six years, the number of economically disadvantaged students at Lakeview has ranged from 30-49 while the number at Riverview has ranged from 4-9. Neither school has had a significant change in the number of economically disadvantaged students when comparing the counts in 2021-22 to 2016-17. At Valleyview, the number of economically disadvantaged students has ranged from 16-28 in the last six years. Like the elementary schools, there has not been a significant change in the number of economically disadvantaged students when comparing the counts in 2021-22 to 2016-17.

The percentages of students that are economically disadvantaged within each school are shown from 2016-17 through 2021-22 in Table 11. In general, the percentages of economically disadvantaged students are very low in each school and have not changed significantly over time. At the elementary level, Lakeview has consistently had a greater percentage of economically

disadvantaged students as compared to Riverview. In the last six years, the percentage of economically disadvantaged students has ranged from 4.7%-7.1% at Lakeview as compared to 1.1%-2.3% at Riverview.

At Valleyview, the percentage of economically disadvantaged students has not changed significantly in the last six years, ranging from 2.9%-5.2%.

Table 10
Denville Township School District
Economically Disadvantaged Students
2016-17 to 2021-22

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Change
Lakeview E.S. (PK-5)	45	49	35	31	30	36	-9
Riverview E.S. (K-5)	4	8	7	9	6	7	+3
Valleyview M.S. (6-8)	19	27	27	20	16	28	+9
Total	68	84	69	60	52	71	+3
Total District Enrollment	1,641	1,630	1,618	1,664	1,612	1,629	-12
Percent of Total	4.1%	5.2%	4.3%	3.6%	3.2%	4.4%	

Sources: New Jersey Department of Education (<http://www.nj.gov/education/data/enr/>), the NJ School Performance Report <https://rc.doe.state.nj.us/school/list>, and the Denville Township School District

Table 11
Denville Township School District
Economically Disadvantaged Students Within School Percentages
2016-17 to 2021-22

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Percentage Point Change
Lakeview E.S. (PK-5)	6.4%	7.1%	5.4%	4.8%	4.7%	5.5%	-0.9
Riverview E.S. (K-5)	1.1%	2.3%	1.8%	2.1%	1.4%	1.6%	+0.5
Valleyview M.S. (6-8)	3.3%	4.6%	4.6%	3.4%	2.9%	5.2%	+1.9

New Housing in Denville Township

Denville municipal representatives provided information regarding current and future residential development in the community. A list of approved and proposed developments, location, affected elementary attendance areas, number of units, bedroom distribution (if available), housing type, and project status is shown in Table 12. The table excludes new houses to be built on single in-fill lots, or the subdivision of existing lots, or homes that are built after the demolition of an existing older home. In the latter instance, there is no net gain in the number of housing units.

In August 2020, Denville approved a settlement agreement with the Fair Share Housing Center regarding its affordable housing obligation. The developments shown in the table will help to address the township's affordable housing obligation. In total, there is the potential for 299 non age-restricted housing units³ in four separate developments, all of which are multi-family units such as duplexes, townhouses, or apartments. The location of each of the developments is shown in Figure 25.

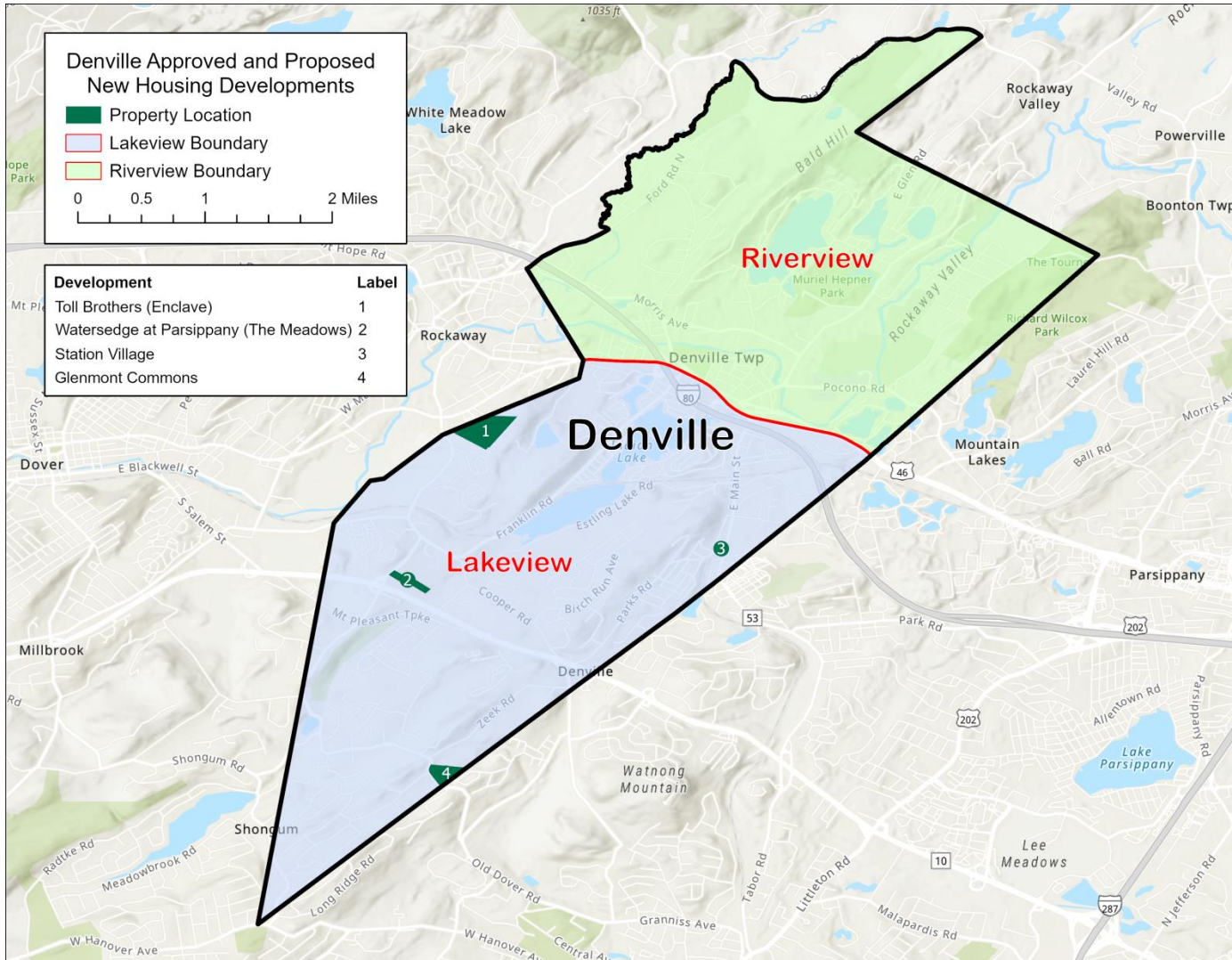
Table 12
Approved and Proposed Residential Developments in Denville Township

Subdivision/ Developer	Elementary Attendance Area	Number of Units	Bedroom Distribution	Housing Type	Notes
Glenmont Commons (Casterline Road)	Lakeview	65	Market-Rate Duplex (10) 2-BR Affordable Duplex (10) Market-Rate TH (45) 2-3 BR	Duplex (Market-Rate and Affordable) Townhouse (Market-Rate)	Exact bedroom distribution is unavailable. Units will be constructed in nine buildings. Has been approved (December 2018) but has not begun construction. 10 duplex units will be set aside for Low-Moderate Income households.
Enclave at Denville (360 Franklin Avenue)	Lakeview	116	Market-Rate TH (92) 92 3-BR Affordable TH (24) 5 1-BR 14 2-BR 5 3-BR	Townhouse (Market-Rate and Affordable)	Has been approved (March 2019) but has not begun construction. 24 units will be set aside for Low-Moderate Income households.
The Meadows (382 and 384 Franklin Road)	Lakeview	60	Market-Rate TH (48) 2-3 BR Affordable TH (12)	Townhouse (Market-Rate and Affordable)	Exact bedroom distribution is unavailable. Has not been approved. Units will be constructed in nine buildings. 12 units will be set aside for Low-Moderate Income households.
Station Village (Route 53 and Station Road)	Lakeview	58	Market-Rate Apts. (49) Affordable Apts. (9) 28 1-BR 28 2-BR 2 3-BR	Apartment (Market-Rate and Affordable)	Has not been approved. Three-story building to be constructed. Nine (9) units will be set aside for Low-Moderate Income households.
Total		299			

Source: Denville Township Planning & Zoning Board Department

³ It should be noted that the former proposed development of 106 units by Lennar is not included in the table as the new developer D.R. Horton has yet to submit an application to the Denville Township Planning Board. It is not clear what type of units this will be, or the bedroom distribution, as the site plan is very conceptual in nature. The development would be located on Thurmont Road in the Lakeview attendance area.

Figure 25
Denville Township Approved and Proposed New Housing by Elementary Attendance Area



Of the 299 proposed units, 18% (55) will be set aside to meet affordable housing requirements. Based on the district's current elementary attendance boundaries, the impact would be greatest on Lakeview, as all of the developments are located within its boundaries.

The first development, known as Glenmont Commons, would be located on Casterline Road and will have 65 units. While the project has been approved, it has not yet begun construction. The development will consist of a mix of duplexes and townhouses, where ten duplex units will be set aside to meet affordable housing requirements. While the exact bedroom distribution was unavailable, there will be 20 duplex units with primarily two bedrooms and 45 townhouse units consisting of primarily two or three bedrooms.

The second development, Enclave at Denville by Toll Brothers, will be located at 360 Franklin Avenue. While the project has been approved, it has not yet begun construction. The development will consist of 116 townhouse units, where 24 units will be set aside to meet affordable housing requirements. While the market-rate units will have three-bedrooms, the affordable units will contain a mix of one-, two-, and three-bedroom units.

The third proposed development, which has not been approved, would consist of 60 market-rate and affordable townhouse units on 382 and 384 Franklin Road. While the exact bedroom distribution was unavailable, the development, which will be known as The Meadows, would consist of primarily two- and three-bedroom units.

Finally, the fourth development, Station Village, which has not been approved, would consist of 58 apartment units in a three-story building with a mix of primarily 1-2 bedrooms, where nine (9) units would be set aside to meet affordable housing requirements.

Student Yield Analysis of One- to Four-Family Homes

To determine the number of children per housing unit (student yield) in Denville, the township's parcel-level MOD IV database was joined to the school district's 2021-22 student database. Age-restricted housing units, condominiums, townhouses, and apartments were removed from the property database, whereby the majority of remaining homes are detached single-family or duplexes. A total of 1,384 children living in 5,226 one- to four-family homes were identified. The remaining children in the school district either live in apartments, townhouses/condominiums, or mixed-use units (commercial and residential properties).

The simplest way to compute student yields is to divide the total number of students by the total number of homes. However, there are several drawbacks in computing yields in this fashion. First, the *type* of housing unit helps determine the magnitude of the student yield, as yields are typically greatest for detached single-family homes and smallest for multi-family homes such as apartments and townhouses/condominiums. A second drawback of this computation is that the student yield would include homes owned by all age segments of the population, such as empty-nesters and senior citizens, which would lower the overall student yield. Yields computed in this fashion are likely underestimating the future number of children in proposed developments or from home resales, where families with children are likely to be the buyers, particularly if the school district has an excellent reputation.

Instead, the length of ownership of the housing unit was considered, as student yields are typically highest from 0-10 years of ownership and are lowest at 20 or more years of ownership. As such, a unique student yield distribution by length of ownership was created for Denville. It also should be noted that the forthcoming student yield distribution is a snapshot in time. If the percentage of children in the population changes, or the demographics of the community change where ethnic groups of larger or smaller sizes enter, or if the school district's reputation changes and more or less children attend the district, student yields are likely to change as well.

To determine length of ownership, parcel-level records of all one- to four-family homes in Denville were obtained from the Monmouth County Tax Board⁴ MOD IV database. Besides the property address, other variables include block and lot, sale dates and prices, and in most instances, the year that the home was built. To compute student yields by length of ownership, it was necessary to know the year of the most recent sale, where reliable sales data in the database were available from 1993-2021, a 28-year period. Determining the most recent sale date was not always obvious. Some of the most recent sale dates had a sales price of \$1 or \$100. These "paper sales" were coded as a non-usable deed transaction. These transactions include sales between members of the immediate family, resulting in a change in title but often not a change of the occupant. If there were no secondary sale dates, the length of ownership exceeded 28 years but the exact number of years was unknown.

One of the limitations of the database was the lack of recorded sales prior to 1993. Since a significant number of homes ($n = 1,557$) have never been sold since 1993, the earliest sale date recorded, the length of ownership exceeded 28 years for these homes but the exact length of ownership was unknown. Denville also had homes constructed after 1993 that had never been sold. However, in these instances, the length of ownership could be computed by simply subtracting the year that the home was built from 2021.

⁴ The database provides information for all municipalities in the state.

Student Yields by Length of Ownership for One- to Four-Family Homes

Student yields by length of ownership for one- to four-family homes was determined by joining the parcel-level property database with 2021-22 student address data, which was provided by the school district. It is expected that longer-held homes will have fewer children, as they would have graduated from the district. Figure 26 shows that student yields increase with length of ownership, peaking at 0.72 children per housing unit with ten years of ownership. Student yields then begin to decline as length of ownership increases. For homes with 19 or more years of ownership, the student yield was below 0.20. Table 13 shows the student yields by length of ownership for the PK-8 student population (public school students only).

Figure 26
Denville Township Student Yields by Length of Ownership
One- to Four-Family Homes

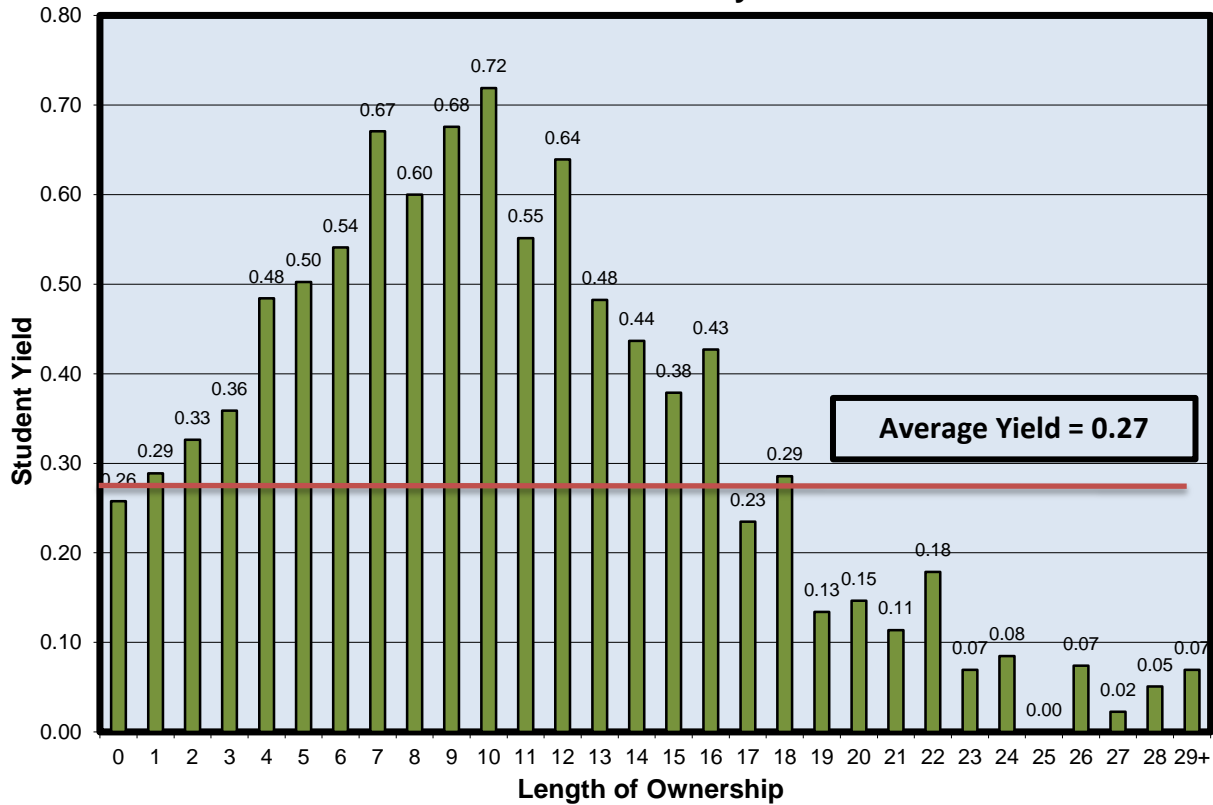


Table 13
Student Yields (PK-8) by Current Length of Ownership in Denville Township
One- to Four-Family Homes

Years of Ownership	Housing Units	Students 2021-22	Student Yield
0	66	17	0.26
1	315	91	0.29
2	193	63	0.33
3	223	80	0.36
4	188	91	0.48
5	207	104	0.50
6	183	99	0.54
7	167	112	0.67
8	105	63	0.60
9	111	75	0.68
10	89	64	0.72
11	78	43	0.55
12	97	62	0.64
13	85	41	0.48
14	87	38	0.44
15	95	36	0.38
16	96	41	0.43
17	115	27	0.23
18	112	32	0.29
19	97	13	0.13
20	116	17	0.15
21	123	14	0.11
22	123	22	0.18
23	130	9	0.07
24	118	10	0.08
25	101	0	0.00
26	81	6	0.07
27	89	2	0.02
28	79	4	0.05
29+	1557	108	0.07
Total	5,226	1,384	0.265

Since the length of ownership is a distribution, how can one determine what is the likely student yield in a home resale or newly constructed unit? Since the distribution is a snapshot in time, what is a reasonable student yield to use? Computing the average over the entire length of ownership underestimates the number of children, since there are so few children at longer lengths of ownership as children graduate from the school district. Unfortunately, there is no research-based metric to determine what part of the distribution should be used to estimate future schoolchildren. Instead, we propose computing an average using all of the years up to the peak student yield, which estimates the maximum impact before student yields begin to decline.

As discussed above, the average student yield computed from the entire housing stock, which is 0.265 children per home, likely underestimates the actual student yield when a family either moves into a new (or resale) one- to four-family home. If the average student yield is computed for the first ten years of ownership when the peak student yield occurs, the yield increases to 0.465. This is likely a better estimate of the student yield of one- to four-family homes in Denville.

Student Yield Analysis for Townhouses and Condominiums

Student yields were also computed for townhouses and condominiums in Denville. In Table 14, student yields are shown for each development. Lengths of ownership were not computed as there is a lot of variation of the student yields based on the development's bedroom distribution and whether it has child-friendly amenities, such as a playground or swimming pool. Through internet research, we were able to identify the approximate sales price, the year the development was built, bedroom distribution, and the number of units. A total of 157 public school children (K-8) were identified living in 717 units in eight separate developments, which is an average student yield of 0.219. The largest student yields, in developments with at least 20 units, were in The Forges (0.530) and Berkshire Hills (0.133), which predominantly consist of a mix of two- and three-bedroom units. Regency at Denville, which contains 140 age-restricted units, was excluded from the table as it does not contain public school children.

Table 14
Denville Township Student Yields (K-8) for Condominiums and Townhouses

Development	Price (\$)¹ +/-	Year Built	Bedrooms	Number of Units²	K-5 Students	6-8 Students	K-8 Students³	2021-22 Student Yield
Berkshire Hills	\$375,000	1995-1998	2-3 BR	420	34	22	56	0.133
Forges (The)	\$325,000 mid- rise; \$525,000 TH	2004-2005	2-4 BR	183	62	35	97	0.530
Landmark Belltower	\$235,000	1986-1987	1-2 BR	15	0	0	0	0.000
Orchard Street	\$437,000	2015	2-BR	5	2	1	3	0.600
Schoolhouse Plaza	\$195,000	1985	0-2 BR	30	0	0	0	0.000
Seneca Estates	\$350,000	1995	2 BR	14	0	0	0	0.000
Valley Stream	\$200,000	1986	1-2 BR	47	0	0	0	0.000
53-57 Old Boonton Road	\$129,000	2012	2-BR	3	1	0	1	0.333
Total				717	99	58	157	0.219

Notes: ¹Sale price information was obtained from www.njcondos.net or public sale records.

²As derived from the Denville Township property database

³Based on 2021-22 enrollments in the Denville Township School District

Student Yield Analysis for Apartments

Student yields were also computed for apartment complexes in Denville as shown in Table 15. The table is not an all-inclusive list of all apartment units, as it only includes large apartment complexes. The table does not include small multi-family buildings with fewer than five units or mixed-use properties with apartments above retail space. Through internet research, we were able to identify the rental price, the year the development was built, bedroom distribution (if available), and the number of units. A total of 23 public school children (K-8) were identified living in 254 units, which is an average student yield of 0.091. In general, student yields are quite low. The largest student yield, in developments with at least 20 units, was in Estling Village (0.150), which has a mix of one- and two-bedroom apartment units.

Table 15
Denville Township Student Yields (K-8) for Apartments

Development (Property Address)	Rent (\$)¹	Year Built	Bedrooms	Number of Units¹	K-5 Students	6-8 Students	K-8 Students²	2021-22 Student Yield
Denville Manor (60 Manor Road)	\$1,475-\$1,875	1960	1-2 BR	50	2	2	4	0.080
Estling Village (30 Estling Lake Road)	\$3,000-\$3,200	2015	1-2 BR	100	11	4	15	0.150
Pinefield Manor (20 Memorial Court)	\$1,575-\$1,650	1965	1-2 BR	98	1	2	3	0.031
60-62 Indian Road	N/A	1975	N/A	6³	1	0	1	0.167
Total				254	15	8	23	0.091

Notes: ¹As derived from internet research

²Based on 2021-22 enrollments in the Denville Township School District

³Estimated as unit count was unavailable

Table 16 summarizes the student yields for townhouses/condominiums and apartments for the K-5 and 6-8 grade configurations. Student yields are greatest for children in grades K-5, which is not unexpected since there are six grades. The overall student yield for townhouses/condominiums is greater than that of apartments.

Table 16
Student Yields by Housing Type in Denville Township

Housing Type	K-5 Student Yield	6-8 Student Yield	K-8 Student Yield¹
Townhouse/ Condominium	0.138	0.081	0.219
Apartment	0.059	0.032	0.091

Note: ¹Student yields are based on 2021-22 enrollments in the Denville Township School District.

Estimate of Public School Children from New Housing

An estimate was made of the number of public school children that could potentially come from the proposed housing developments. **It should be clearly stated that this is a rough estimate, as the bedroom distributions of some of the developments were unavailable, which are needed to compute the estimated number of public school children. In addition, two developments have not been approved and may not come to fruition or may change in scope before being approved.**

Since there are no comparable affordable apartment/townhouse developments in Denville, *Who Lives in New Jersey Housing?*⁵, published by the Rutgers University Center for Urban Policy Research (“CUPR”), was also utilized. The resource provides statewide housing multipliers (student yields) based on housing type, number of bedrooms, housing value, housing tenure (ownership versus rental), and whether the housing units are market-rate or affordable. To project the number of public school children from the new housing units, several assumptions were made:

1. The student yield multipliers used from CUPR are from a sample of New Jersey homes and these multipliers would be representative of the families moving into Denville.
2. When not available, all affordable apartment/townhouse/duplex units were assumed to have the following bedroom distribution: 1-bedroom = 20%, 2-bedroom = 60%, 3-bedroom = 20%.
3. All affordable apartment/townhouse/duplex units were assumed to have the following student yield multipliers: 1-bedroom = 0.054, 2-bedroom = 0.307, 3-bedroom = 0.766.
4. All market-rate townhouse/duplex units were assumed to have the average existing student yield multiplier for The Forges and Berkshire Hills: 0.254.
5. All market-rate apartment units were assumed to have the township’s average student yield multiplier for market-rate apartment units: 0.091.
6. The full build-out and occupation of Glenmont Commons and Enclave at Denville, which have been approved, would be completed over a two-year period (2022-23 and 2023-24).
7. The full build-out and occupation of The Meadows and Station Village, which have not been approved, would be completed over a two-year period (2023-24 and 2024-25).

⁵ Listokin, David, and Voicu, Alexandru. (2018). *Who Lives in New Jersey Housing?* Updated New Jersey Demographic Multipliers. Rutgers University Center for Urban Policy Research.

All of the multipliers utilized were for grades K-8. Additional children are expected for grades 9-12 but they are not considered here as they would not impact the school district. In total, 75 public school children (K-5 = 48 and 6-8 = 27) are projected according to the following distribution:

- Glenmont Commons – 17 (K-5 = 11, 6-8 = 6)
- Enclave at Denville – 31 (K-5 = 20, 6-8 = 11)
- The Meadows – 19 (K-5 = 12, 6-8 = 7)
- Station Village – 8 (K-5 = 5, 6-8 = 3)

Historical Residential Construction

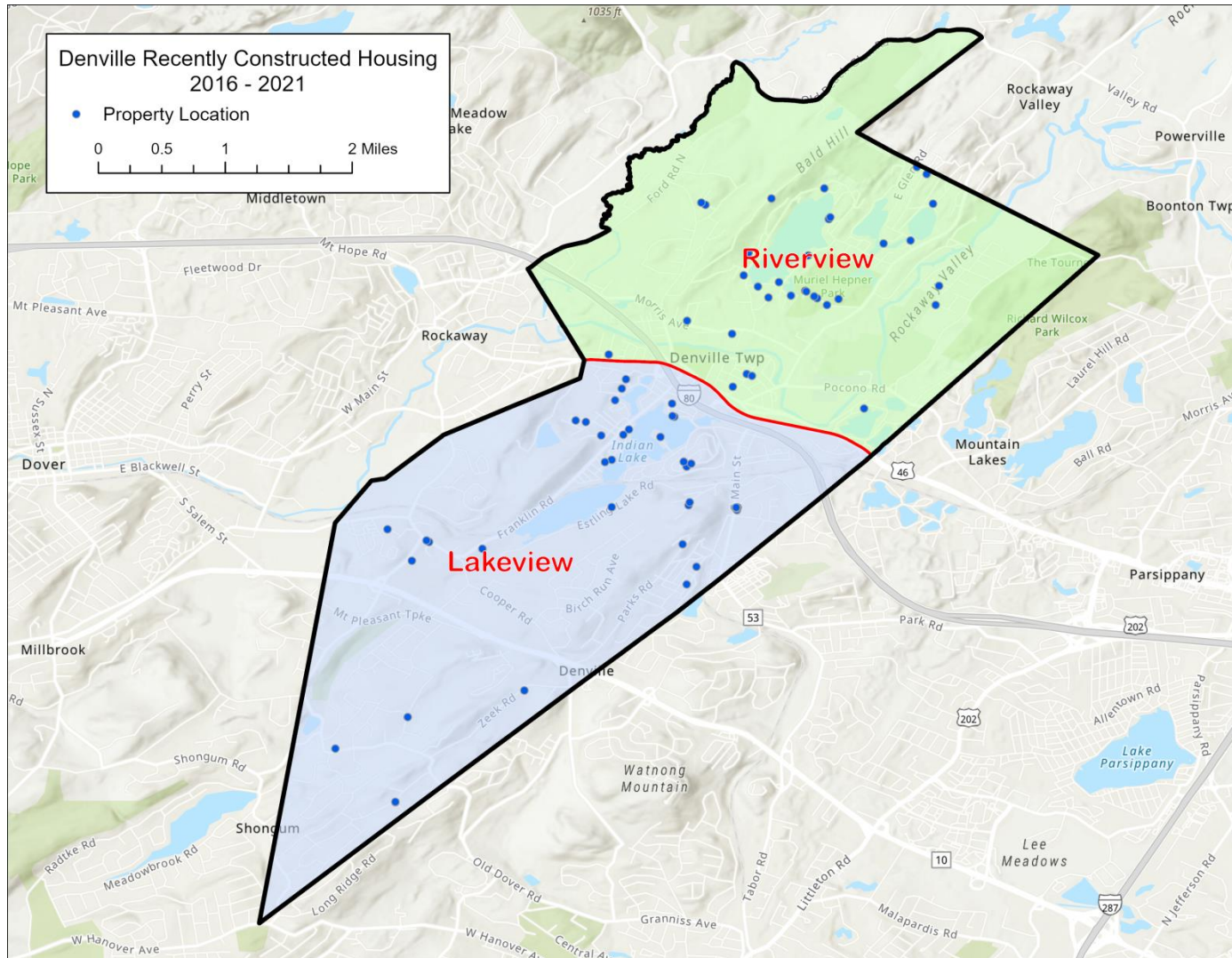
With respect to historical new construction, the number of new homes in Denville from 2016-2021 is shown by elementary attendance area in Table 17. Figure 27 shows the location of each new housing unit. A total of 72 homes were built over this time period, with a slightly greater number (39) occurring in the Lakeview attendance area. Most of the homes constructed were detached single-family homes. While not shown in the table, 29 single-family or two-family housing units were demolished during the same time period as reported by the New Jersey Department of Community Affairs, which results in a net gain of 43 housing units since 2016.

Table 17
Number of New Homes by Elementary Attendance Area
2016-2021

Year	Elementary Attendance Area ¹		
	Lakeview	Riverview	Total
2016	8	3	11
2017	11	8	19
2018	4	1	5
2019	3	7	10
2020	8	9	17
2021	5	5	10
Total	39	33	72

Note: ¹As derived from the Denville Township property tax database

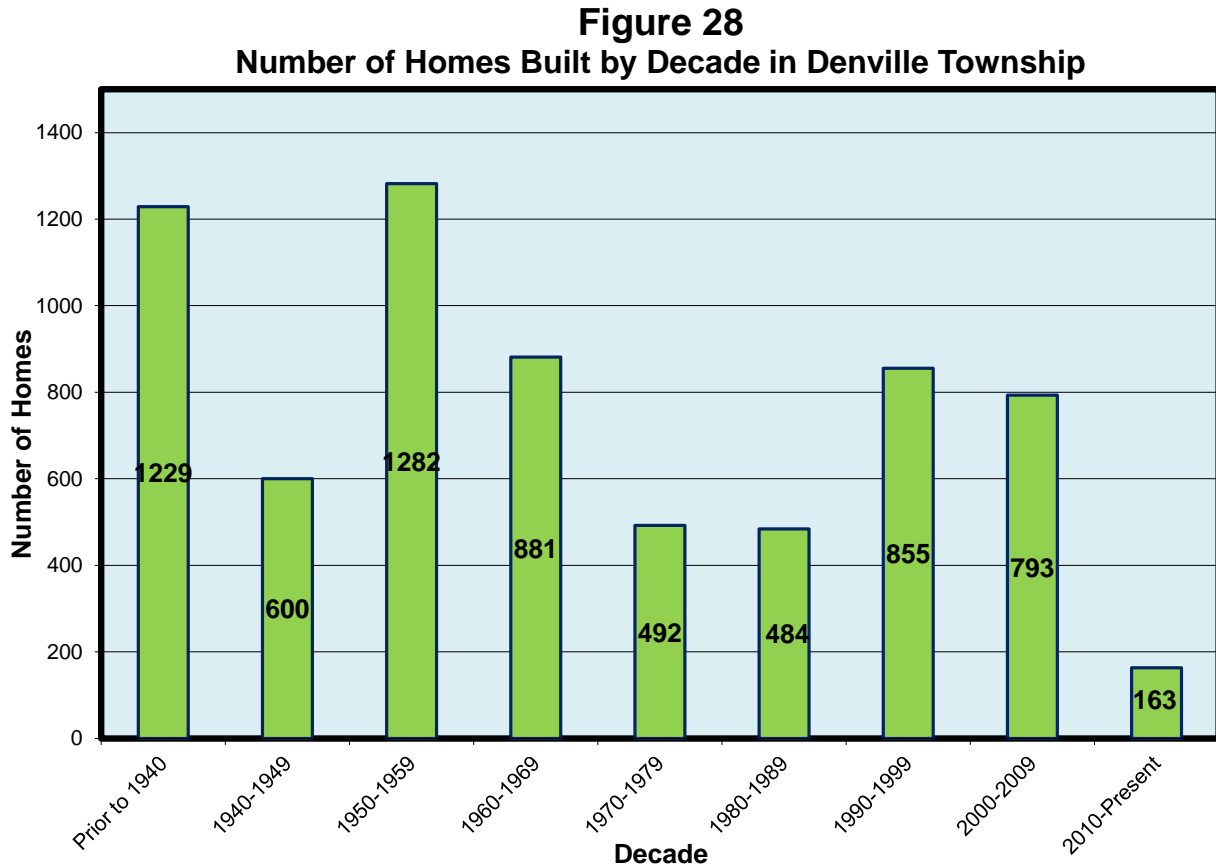
Figure 27
Denville Township Recently-Constructed Housing by Elementary Attendance Area
2016-2021



When determining the impact of future new housing, it should be clearly stated that enrollment projections utilize cohort survival ratios that do take into account prior new home construction growth. Children who move into new homes during the historical period are captured by the survival ratios, as these ratios will be used to project future enrollments. Therefore, it is not appropriate to add all of the new children generated from future housing units without considering the historical period, as double counting would occur, since the survival ratios have already increased due to the new children. The baseline enrollment projections should only be adjusted if the projected housing growth is significantly greater than prior housing growth. From 2016-2021, there was a net gain of 43 new housing units in Denville. Based on this data and that 299 non age-restricted housing units are proposed, it appears that future residential construction in Denville will be significantly greater than that which occurred since 2016. Therefore, the baseline enrollment projections were subsequently modified to account for additional children from the new housing. The modifications occurred in the attendance area where the new housing is being constructed. **The modification to the enrollment projections assumes that all potential developments listed in Table 12 will be built and occupied in the next five years. Two of these developments have yet to be approved and could be constructed outside of the enrollment projection timeframe.**

Distribution of Homes by Decade Built

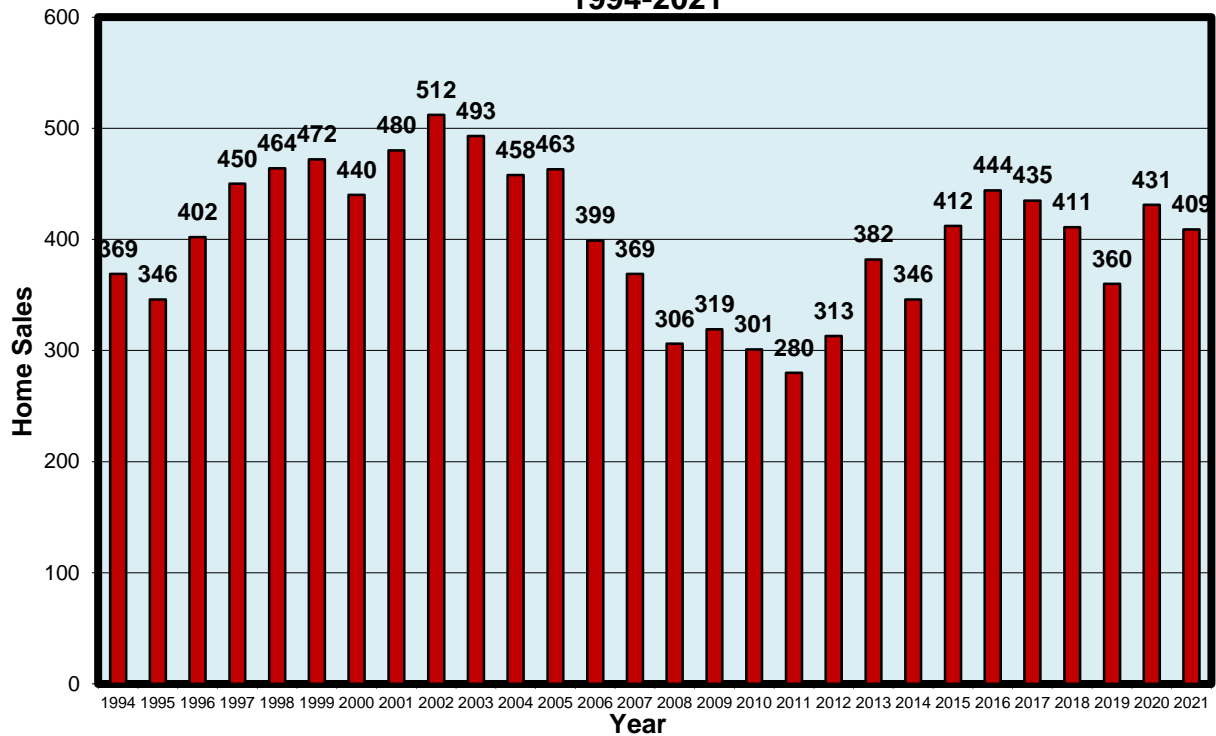
Figure 28 shows the number of homes built by decade in Denville as provided by the 2015-2019 ACS. As shown in the figure, Denville has an older housing stock, as two-thirds (66%) of the homes were built before 1980. After peaking in the 1950s, the number of homes built per decade declined before reversing trend in the 1990s. New home construction has been very limited since 2010 with only 163 units constructed. Of the decades shown, Denville had the greatest number of homes built in the 1950s, which is 19% of the housing stock and corresponds to the sizable population gain in Denville (+75.6%) shown previously in Table 1.



Home Sales

In Figure 29, the number of annual home sales in Denville is shown from 1994-2021. The information was retrieved from the Monmouth County Tax Board database, which possesses tax records and home sales for all municipalities in the state. “Paper sales” were once again excluded from the totals. The number of home sales peaked at 512 in 2002 before declining to 280 in 2011 due to the housing market crash and banking crisis. During this period (2008-2012), the annual number of home sales was low, ranging from 280-319. Since then, home sales have rebounded. From 2013-2016, home sales steadily increased before stabilizing. In the last five years, the annual number of sales has ranged from 360-435, which is an average of 409 sales per year. Despite the increase in recent years, the annual number of sales is still lower than prior to the housing market crash and banking crisis.

Figure 29
Denville Township Home Sales
1994-2021



Enrollment Projections

In two separate projections, enrollments were calculated at the school level from 2022-23 through 2026-27, a five-year period. The first set of projections (referred to as “baseline”) do not reflect the anticipated housing growth in Denville. If the housing developments shown previously do not come to fruition or are not built within the anticipated construction timeline, the baseline enrollment projections would best reflect the future enrollments in the school district. The second set of projections (referred to as “adjusted”) reflects projected enrollments adjusted for housing growth, assuming the timeline of construction and occupancy discussed previously. In the latter projections, it was also assumed that the number of pre-kindergarten and special education students shown in the baseline projections would remain the same. Since the grade counts in the school-level projections are smaller as compared to computing districtwide grade counts, the reliability of the school projections are lower than the overall districtwide projections. In general, the smaller the forecasted population, the higher the probability of error associated with the projection.

Enrollments for the self-contained special education/ungraded classes were computed by calculating the historical proportions of self-contained special education/ungraded students with respect to the regular education subtotals at each grade configuration (PK-5 and 6-8) and multiplying that value by the future regular education subtotals.

With respect to grade-level pre-kindergarten students, enrollments were projected by computing an average based on historical data from the last five years and using this value throughout the five-year projection period. In the last five years, pre-kindergarten enrollments have been fairly stable, ranging from 30-41 students per year. It was estimated that there would be 34 students in the program annually in the future. Pre-kindergarten children with special needs (if any) were not included in these counts and were instead included with the special education projections.

On September 10, 2010, former New Jersey Governor Chris Christie signed into law the Interdistrict School Choice Program (“Choice”), which took effect in the 2011-12 school year. This enables students the choice in attending a school outside their district of residence if the selected school is participating in the Choice program. The Choice district sets the number of openings per grade level. The Denville Township School District does not participate in the program and therefore has no impact on the enrollment projections.

As part of the School Funding Reform Act of 2008 (“SFRA”), all school districts in New Jersey are to provide expanded Abbott-quality pre-school programs for at-risk 3- and 4-year olds as outlined in N.J.A.C. 6A:13A. The State of New Jersey intends to provide aid for the full-day program based on projected enrollment. School districts categorized as District Factor Group⁶ (“DFG”) A, B, and CD with a concentration of at-risk pupils equal to or greater than 40 percent, must offer a pre-school program to all pre-school aged children regardless of income, known as “Universal” pre-school. For all other school districts, a pre-school program must be offered only

⁶ Introduced by the New Jersey Department of Education in 1975, DFG provides a system of ranking school districts in the state by their socio-economic status. While the system is no longer used, the number of pre-kindergarten students was determined by the former DFG rankings.

to at-risk children, known as “Targeted” preschool. School districts may educate the pre-school children in district, by outside providers, or through Head Start programs. School districts were required to offer these programs to at least 90% of the eligible pre-school children by 2013-14.

Due to budgetary constraints, the NJDOE postponed the roll-out of the program, which was scheduled for the 2009-10 school year. According to a recent conversation with Ms. Karin Garver, Educational Program Development Specialist in the NJDOE Early Childhood Education, there are no plans in the imminent future by the State Legislature to fund the program, which would prevent school districts from implementing the program. The pre-school program would have been rolled out over a five-year period according to the following schedule:

- At least 20% of the eligible pre-school universe in Year 1
- At least 35% of the universe in Year 2
- At least 50% of the universe in Year 3
- At least 65% of the universe in Year 4
- At least 90% of the universe in Year 5

The universe of pre-school children in “Universal” districts is computed by multiplying the 1st grade enrollment in 2007-08 by two. The universe of pre-school children in “Targeted” districts is computed by multiplying the 1st grade enrollment in 2007-08 by two and then multiplying by the percentage of students having free or reduced lunch in the district. The Denville Township School District is a “Targeted” district since its DFG is “I” with a concentration of at-risk pupils less than 40 percent (1.49%). In Table 18, the estimated number of total eligible pre-school students is provided with the estimated five-year rollout. For the purpose of this study, it has been assumed that the district would educate its pre-school children in-house. As the table shows, there is the potential for only six (6) pre-kindergarten students as a result of the SFRA, which would have little impact on the district. Since it is unclear if and when the program will be funded and subsequently mandated, the forthcoming enrollment projections do not include additional pre-kindergarten students from the SFRA.

Table 18
Estimated Number of Eligible Pre-School Students
as Per School Funding Reform Act of 2008

DFG (2000)	Total eligible	Year 1	Year 2	Year 3	Year 4	Year 5
I	6	1	2	3	4	5

Source: New Jersey Department of Education, Division of Early Childhood Education

In a different pre-school initiative, the administration of Governor Phil Murphy announced the availability of Preschool Education Expansion Aid (“PEEA”) in 2018. In September 2018, the first round of funding (\$20.6 million) was publicized, where 31 districts received aid to expand their pre-kindergarten programs. A second round of funding was announced in January 2019, providing 33 additional school districts with roughly \$27 million in funding. The second round targeted districts whose free and reduced lunch percentage was

above 20% and who have not previously received State preschool aid. Some districts that were eligible to apply for PEEA would fall under the “Universal” category under SFRA while others would be considered “Targeted” districts. However, the main difference with this expansion aid is that districts under SFRA were restricted to serve low-income children where now districts can educate all pre-school age children through PEEA. It appears that the Murphy administration may be moving towards a pre-school program for all children, rather than just for those who are low-income. The Denville Township School District did not receive a PEEA grant in either the first or second round of funding and therefore has no bearing on the outcome of this study.

Projected PK-8 enrollments follow in Table 19. In the baseline projections, enrollments are projected to increase throughout the projection period. Enrollment is projected to be 1,819 in 2026-27, which would be a gain of 190 students from the 2021-22 enrollment of 1,629. In the adjusted projections, enrollments are projected to also increase throughout the projection period, albeit at a faster rate. Enrollment is projected to be 1,877 in 2026-27, which would be a gain of 248 students from the 2021-22 enrollment.

Table 19
Denville Township School District Projected Enrollments
2022-23 to 2026-27

Year	PK	K	1	2	3	4	5	6	7	8	SE ¹	Total
Baseline												
2022-23	34	182	175	179	189	189	182	169	165	189	1	1,654
2023-24	34	182	188	181	182	195	190	188	169	165	1	1,675
2024-25	34	206	188	194	184	187	196	196	188	169	1	1,743
2025-26	34	186	212	194	197	189	188	203	196	188	1	1,788
2026-27	34	190	192	219	197	203	190	194	203	196	1	1,819
Adjusted for Housing Growth												
2022-23	34	185	177	182	191	192	185	172	168	192	1	1,679
2023-24	34	186	195	187	189	202	197	195	177	172	1	1,735
2024-25	34	208	193	202	192	195	204	206	196	179	1	1,810
2025-26	34	190	214	199	205	197	196	211	206	196	1	1,849
2026-27	34	194	196	221	202	211	198	203	211	206	1	1,877

Note: ¹Self-contained special education enrollment/ungraded students

Projections by School

Lakeview Elementary School

Historical enrollments for Lakeview from 2012-13 to 2021-22, and projected enrollments from 2022-23 to 2026-27, are shown in Table 20. After peaking at 700 students in 2016-17, enrollments declined through 2020-21 before reversing trend. In 2021-22, enrollment is 659, which is a loss of 32 students from the 2012-13 enrollment of 691. In the baseline and adjusted projections, enrollments are projected to increase throughout the projection period. In the baseline projections, enrollment is projected to be 720 in 2026-27, which would be a gain of 61 students from the 2021-22 enrollment. In the adjusted projections, enrollment is projected to be 751 in 2026-27, which would be a gain of 92 students from the 2021-22 enrollment.

Table 20
Historical and Projected Enrollments of Lakeview Elementary School

Year	PK	K	1	2	3	4	5	SE ²	Total
Historical¹									
2012-13	22	81	104	103	111	116	152	2	691
2013-14	29	92	107	110	109	110	115	0	672
2014-15	24	103	96	112	112	108	113	0	668
2015-16	23	88	106	106	116	115	107	0	661
2016-17	34	104	95	111	110	124	122	0	700
2017-18	33	96	109	93	120	111	125	0	687
2018-19	33	97	97	101	93	117	111	0	649
2019-20	41	98	97	100	104	94	116	0	650
2020-21	30	101	98	105	97	104	97	0	632
2021-22	34	99	106	102	110	102	106	0	659
CSR 5-Yr. Ratios		1.0555 ³	1.0150	1.0202	1.0118	1.0093	1.0106	0.0000 ⁴	
Projected – Baseline									
2022-23	34	102	100	108	103	111	103	0	661
2023-24	34	109	104	102	109	104	112	0	674
2024-25	34	129	111	106	103	110	105	0	698
2025-26	34	110	131	113	107	104	111	0	710
2026-27	34	113	112	134	114	108	105	0	720
Projected – Adjusted for Housing Growth									
2022-23	34	105	102	111	105	114	106	0	677
2023-24	34	113	111	108	116	111	119	0	712
2024-25	34	131	116	114	111	118	113	0	737
2025-26	34	114	133	118	115	112	119	0	745
2026-27	34	117	116	136	119	116	113	0	751

Notes: ¹ Data were provided by the New Jersey Department of Education (<http://www.nj.gov/education/data/enr/>) and the Denville Township School District.

² Self-contained special education enrollment/ungraded students

³ Birth-to-kindergarten survival ratio based on birth data five years prior using the last three years of historical data

⁴ Average proportion of self-contained special education/ungraded students with respect to PK-5 subtotals

Riverview Elementary School

Historical enrollments for Riverview from 2012-13 to 2021-22, and projected enrollments from 2022-23 to 2026-27, are shown in Table 21. Enrollments declined through 2017-18 before reversing trend. Enrollments have increased in each of the last four years. In 2021-22, enrollment is 433, which is a gain of 42 students from the 2012-13 enrollment of 391. In the baseline projections, enrollments are projected to increase throughout the projection period. In 2026-27, enrollment is projected to be 505, which would be a gain of 72 students from the 2021-22 enrollment. As there are no housing units planned in the Riverview attendance area, the baseline projections were not adjusted.

Table 21
Historical and Projected Enrollments of Riverview Elementary School

Year	PK	K	1	2	3	4	5	SE ²	Total
Historical¹									
2012-13	0	37	71	62	77	77	67	0	391
2013-14	0	55	44	78	63	78	80	1	399
2014-15	0	53	58	46	84	65	75	1	382
2015-16	0	49	59	63	47	84	66	1	369
2016-17	0	52	49	61	67	49	87	1	366
2017-18	0	63	51	53	66	66	51	1	351
2018-19	0	68	71	52	56	70	65	0	382
2019-20	0	81	73	81	55	60	69	0	419
2020-21	0	67	82	75	80	60	63	0	427
2021-22	0	71	67	84	74	79	58	0	433
CSR 5-Yr. Ratios		1.3558 ³	1.0532	1.0531	1.0222	1.0526	0.9968	0.0006 ⁴	
Projected – Baseline									
2022-23	0	80	75	71	86	78	79	0	469
2023-24	0	73	84	79	73	91	78	0	478
2024-25	0	77	77	88	81	77	91	0	491
2025-26	0	76	81	81	90	85	77	0	490
2026-27	0	77	80	85	83	95	85	0	505

Notes: ¹ Data were provided by the New Jersey Department of Education (<http://www.nj.gov/education/data/enr/>) and the Denville Township School District.

² Self-contained special education enrollment/ungraded students

³ Birth-to-kindergarten survival ratio based on birth data five years prior

⁴ Average proportion of self-contained special education/ungraded students with respect to PK-5 subtotals

Valleyview Middle School

Historical enrollments for Valleyview from 2012-13 to 2021-22, and projected enrollments from 2022-23 to 2026-27, are shown in Table 22. Enrollments have been generally declining over the last decade. In 2021-22, enrollment is 537, which is a loss of 125 students from the 2012-13 enrollment of 662. In the baseline and adjusted projections, enrollments are projected to decline for the next 1-2 years before reversing trend. In 2026-27, enrollment is projected to be 594 in the baseline projections, which would be a gain of 57 students from the 2021-22 enrollment. In the adjusted projections, enrollment is projected to be 621 in 2026-27, which would be a gain of 84 students from the 2021-22 enrollment.

Table 22
Historical and Projected Enrollments of Valleyview Middle School

Year	6	7	8	SE ²	Total
Historical¹					
2012-13	208	224	230	0	662
2013-14	221	210	220	0	651
2014-15	197	223	202	0	622
2015-16	185	198	217	0	600
2016-17	182	191	202	0	575
2017-18	221	182	189	0	592
2018-19	178	222	186	1	587
2019-20	190	177	227	1	595
2020-21	187	189	176	1	553
2021-22	165	189	183	0	537
CSR 5-Yr. Ratios	1.0332 ³	1.0011	1.0018	0.0010 ⁴	
Projected – Baseline					
2022-23	169	165	189	1	524
2023-24	188	169	165	1	523
2024-25	196	188	169	1	554
2025-26	203	196	188	1	588
2026-27	194	203	196	1	594
Projected – Adjusted for Housing Growth					
2022-23	172	168	192	1	533
2023-24	195	177	172	1	545
2024-25	206	196	179	1	582
2025-26	211	206	196	1	614
2026-27	203	211	206	1	621

Notes: ¹ Data were provided by the New Jersey Department of Education (<http://www.nj.gov/education/data/enr/>) and the Denville Township School District.

² Self-contained special education enrollment/ungraded students

³ Survival ratio based on aggregated 5th grade enrollments

⁴ Average proportion of self-contained special education/ungraded students with respect to 6-8 subtotals

Projected Enrollments by Grade Configuration

In Table 23, projected enrollments are shown by grade configuration (PK-5 and 6-8). Ungraded special education students were reassigned into each of the grade configurations.

For grades PK-5, enrollments are projected to increase throughout the projection period in both the baseline and adjusted projections. In the baseline projections, enrollment is projected to be 1,225 in 2026-27, which would be a gain of 133 students from the 2021-22 enrollment of 1,092. In the adjusted projections, enrollment is projected to be 1,256 in 2026-27, which would be a gain of 164 students from the 2021-22 enrollment.

For Valleyview (grades 6-8), the projected enrollments were discussed in the previous section.

Table 23
Projected Enrollments for Grades PK-5 and 6-8
for Each Projection Method

Historical	PK-5		6-8	
2021-22	1,092		537	
Projected	PK-5 Baseline	PK-5 Adjusted	6-8 Baseline	6-8 Adjusted
2022-23	1,130	1,146	524	533
2023-24	1,152	1,190	523	545
2024-25	1,189	1,228	554	582
2025-26	1,200	1,235	588	614
2026-27	1,225	1,256	594	621
5-year Change	+133	+164	+57	+84

Capacity Analysis

Table 24 shows the educational capacities of the school buildings in the Denville Township School District in comparison to both the current enrollments in 2021-22 and the enrollment projections in the 2026-27 school year. Since there were two sets of projections (baseline and adjusted for housing growth), only the adjusted projections are shown, as this reflects the full impact on the school district if all of the proposed housing is constructed and occupied. Using the building capacities from the district's LRFP, the differences between capacity and current/projected number of students were computed. Positive values indicate available extra seating while negative values indicate inadequate seating (also known as "unhoused students"). It should be noted that the capacity values are not fixed and can change from year-to-year based on classroom usage. For instance, additional special education classes in a building would reduce the building's capacity. On the other hand, districts with unhoused students can accommodate these children by increasing class sizes, which in turn increases the school's capacity. As such, the capacity of a school is not a fixed value and can be changed depending on how the building is used.

In 2021-22, there is a small shortage of seating in Lakeview (-24). In Riverview, there is a small surplus in seating (+10) if the Riverview Annex (the former St. Mary's Prep School) is included. If the Riverview Annex is not included in the capacity calculation, there are 112 unhoused students in the school. Regarding Valleyview, the school is nearing capacity (+7) in 2021-22.

Due to a projected increase in enrollment from the new housing developments, the number of unhoused students in Lakeview is projected to be much higher (-116) in 2026-27. As enrollments are also projected to increase in Riverview, a shortage of seating (-62) is projected when the Riverview Annex is included in the capacity calculation. If the Riverview Annex is not included in the capacity calculation, there would be 184 unhoused students at the school. Valleyview is projected to have a shortage of seating (-77) in 2026-27 due to a projected gain in enrollment.

Table 24
Capacity Analysis
Denville Township School District

School	Capacity ^{1,2}	Current Enrollment 2021-22	Difference	Projected Enrollment 2026-27	Difference
Lakeview E.S. (PK-5)	635	659	-24	751	-116
Riverview E.S. (K-5)	321 ³	433	-112	505	-184
	443 ⁴		+10		-62
Valleyview M.S. (6-8)	544	537	+7	621	-77

Note: ¹District Practices Capacity from the Denville Township School District LRFP (2019)

²As the capacities were last calculated in 2019, the actual capacities of the buildings in 2022 may have changed if the buildings' instructional spaces are being used differently than when the capacities were computed.

³Capacity of Riverview E.S. not including Riverview Annex, the former St. Mary's Prep School

⁴Capacity of Riverview E.S. including Riverview Annex, the former St. Mary's Prep School

Housing Turnover Analysis

In a completely independent analysis, historical housing turnover rates by length of ownership in Denville were used along with student yields by length of ownership to project the number of students from 2021-2025, a five-year period. To accomplish this task, housing turnover rates for one- to four-family homes were analyzed. The majority of units were detached single-family homes or duplexes. Mixed-use properties (commercial and residential combined) were removed from the database, as well as townhouses/condominiums. Apartments were also excluded since the length of time a tenant occupies a residence cannot be determined. Age-restricted units were also excluded from this investigation. To complete this analysis, three inputs were needed:

1. housing turnover rates by length of ownership,
2. current distribution of homes by length of ownership, and
3. student yields by length of ownership.

Turnover Rates

To compute turnover rates for one- to four-family homes, parcel-level data were once again obtained from the Monmouth County Tax Board database, which possesses tax records for all counties and municipalities in the state. The parcel-level data includes the year the home was built, the most recent sale dates, and the sale prices. The earliest sale date recorded in the database was 1994⁷, providing 26 years of historical sale data through 2020. Sales data for 2021 were incomplete and were excluded from the analysis.

Each cohort of homes was followed to see when it was sold next to compute the housing turnover rate by length of ownership. As an example, we will assume that a house was built in 1980 and its three most recent sale dates in the database were 1999, 2005, and 2009. We cannot assume that the first length of ownership is 19 years since the house may have been sold prior to 1994, the earliest year sales were recorded. The first length of ownership is six years (1999 to 2005) whereby the home then becomes part of the 2005 cohort. After being sold four years later in 2009, the house becomes part of the 2009 cohort. Each time a home is sold, it becomes part of a different cohort of homes. In this example, the house was in three separate cohorts. Turnover rates were then computed by dividing the number of homes sold at a particular length of ownership by the total number of homes in the cohort. For instance, in Denville's 2003 cohort, 18 homes sold in the first year of ownership out of 279 homes, resulting in a turnover rate of 6.5%. An additional 15 homes were sold in the second year of ownership, resulting in a turnover rate of 5.4%. Turnover rates by length of ownership were computed and capped at 17 years for this cohort, since 2020 is the most recent year that sales data were available. Since the oldest sales were from 1994, computing turnover rates was possible on homes with lengths of ownership up to 26 years. Unfortunately, one of the drawbacks of the analysis was that sales data were not available prior to 1994, which prevented computation of turnover rates on long-held homes exceeding 26 years of ownership.

⁷ A small number of sale dates were also available prior to 1994, but the data were incomplete and were not used.

In short, for each year from 1994-2020, there is a distribution of turnover rates by length of ownership. Obviously, there is not much information for homes with recent sale dates, such as 2017, since these homes may not have been sold again or would only have turnover rates by length of ownership of up to three years.

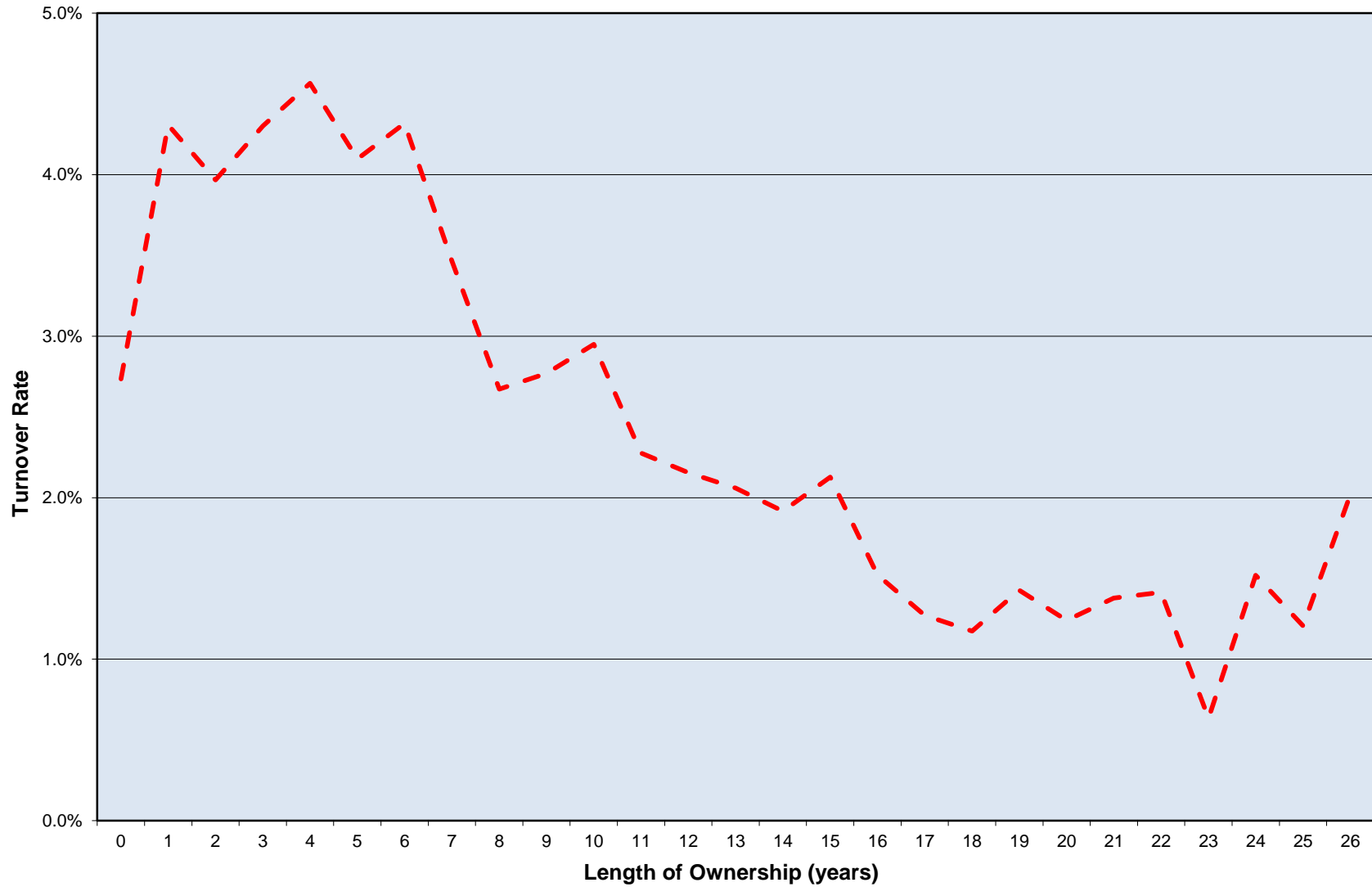
Turnover rates by length of ownership also vary according to the housing market. For instance, when the housing market was very strong in the early-2000s, the turnover rate for the first year of ownership in Denville ranged from 5-6%, as sellers tried to maximize their housing profits or move up into a bigger home. However, in the period following the housing market crash of 2008, the turnover rate in the first year of ownership ranged from 2-4%, which is a much lower rate, as homeowners had difficulty selling their homes or fewer homeowners put their homes up for sale.

Figure 31 shows the distribution of turnover rates by length of ownership for one- to four-family homes in Denville from 1994-2014. Although data were collected from 1994-2020, turnover rates for homes from 2015-2020 are not shown, as they would only have maximum lengths of ownership of five years or less. Figure 32 shows the distribution of turnover rates by length of ownership for one- to four-family homes using a 3-year moving average to smooth out unusual year-to-year variations in the turnover rates. While there is still a lot of variation even after using the three-year moving average, both figures shows that turnover rates decrease as lengths of ownership increase.

In Figure 33, the weighted average turnover rates by length of ownership are shown, which combines length of ownership data from all of the historical years. This data takes into account all housing market cycles, both when the housing market was very strong, such as the early to mid-2000s, and when it was weak, such as the period after the banking and financial crises of 2008. As the figure shows, turnover rates are greatest in Denville with four years of ownership (4.6%) before declining, as turnover rates are lowest for longer lengths of ownership. For homes with 16 or more years of ownership, average turnover rates were typically less than 2.0%. While it appears that turnover rates are rising at 24-26 years of ownership, this is misleading since there are very few homes at this length of ownership and one or two additional sales had a great impact on the turnover rate. Based on our experience with school districts that had 35-40 years of sales data available to compute lengths of ownership, turnover rates remain low, or decline further, at the longest lengths of ownership.

One of the central tenets of the housing turnover analysis is to better understand the relationship between residents aging in place and student yields. While most of the homes are owner-occupied, some are likely occupied by renters. In our analysis, the property address and the owner's address matched for 95.4% of the housing units, which are likely owner-occupied. For the remaining units (4.6%) that are likely occupied by renters, they are included in the study as the analysis captures the turnover rates of all properties since 1994, irrespective of ownership.

Figure 33
Historical Weighted-Average of Denville Turnover Rates by Length of Ownership
One- to Four-Family Homes



Current Distribution of Homes by Length of Ownership

The second input variable, current length of ownership, was computed by simply subtracting the most recent sale date from 2020. Paper sales were excluded and the next most recent sale date was used instead. Table 25 and Figure 34 show the current length of ownership distribution for one- to four-family homes in Denville. Since some homes did not have a sale date, they have been owned at least 26 years, as the oldest sales data were from 1994. The greatest number of homes occurs at two years of ownership. The number of homes then declines through ten years of ownership before reversing trend. A total of 1,624 homes (32.5%) have never been sold, which is a relatively large percentage of the housing population, and therefore have been owned more than 26 years. This is not shown in the figure, as it would skew the end of the distribution.

Student Yields by Length of Ownership

The third variable, student yields by length of ownership, was determined by joining the Denville parcel-level property database with 2020-21 student address data, which was provided by the school district. Table 25 and Figure 26 show the student yields by length of ownership for one- to four-family homes. It is expected that longer-held homes will have fewer children, as they would have graduated from the district. In 2020-21, there were 1,612 students in the school district's database. Of this number, we were able to match 1,424 Denville resident students to an address in the Denville property database. The remaining 188 children lived in apartments, townhouses/condominiums, or were unmatched. Some of the unmatched students lived in mixed-use units or had no physical address (just a P.O. box was listed).

Figure 35 shows that student yields slowly increase with length of ownership, peaking at 0.72 children per housing unit with seven (8) years of ownership. Student yields are then fairly stable through 15 years of ownership before declining. After 20 years of ownership, student yields are below 0.20 children per home.

It should be noted that student yields by length of ownership may change over time. The distribution shown represents the student yields based on the 2020-21 enrollment data and should be considered as a "snapshot" in time. The student yield distribution can be affected by a number of factors, such as an inward migration of students due to a school district's excellent reputation, or perhaps a change in the age structure of the community where there may be more or less children as a percentage of the population. There is no way of predicting what the future student yield distribution by length of ownership will be.

Table 25
Student Yields by Current Length of Ownership in Denville Township
One- to Four-Family Homes

Years of Ownership	Housing Units	Students 2020-21	Student Yield
0	156	43	0.28
1	197	64	0.32
2	219	81	0.37
3	198	92	0.46
4	196	99	0.51
5	186	92	0.49
6	159	99	0.62
7	114	67	0.59
8	110	79	0.72
9	87	58	0.67
10	83	38	0.46
11	100	67	0.67
12	78	52	0.67
13	79	50	0.63
14	99	42	0.42
15	95	58	0.61
16	124	43	0.35
17	112	40	0.36
18	108	19	0.18
19	111	24	0.22
20	114	13	0.11
21	128	22	0.17
22	124	12	0.10
23	118	12	0.10
24	99	1	0.01
25	86	4	0.05
26	88	2	0.02
27+	1624	151	0.09
Total	4,992	1,424	0.285

Figure 34
Denville Township Current Number of One- to Four-Family Homes
by Length of Ownership

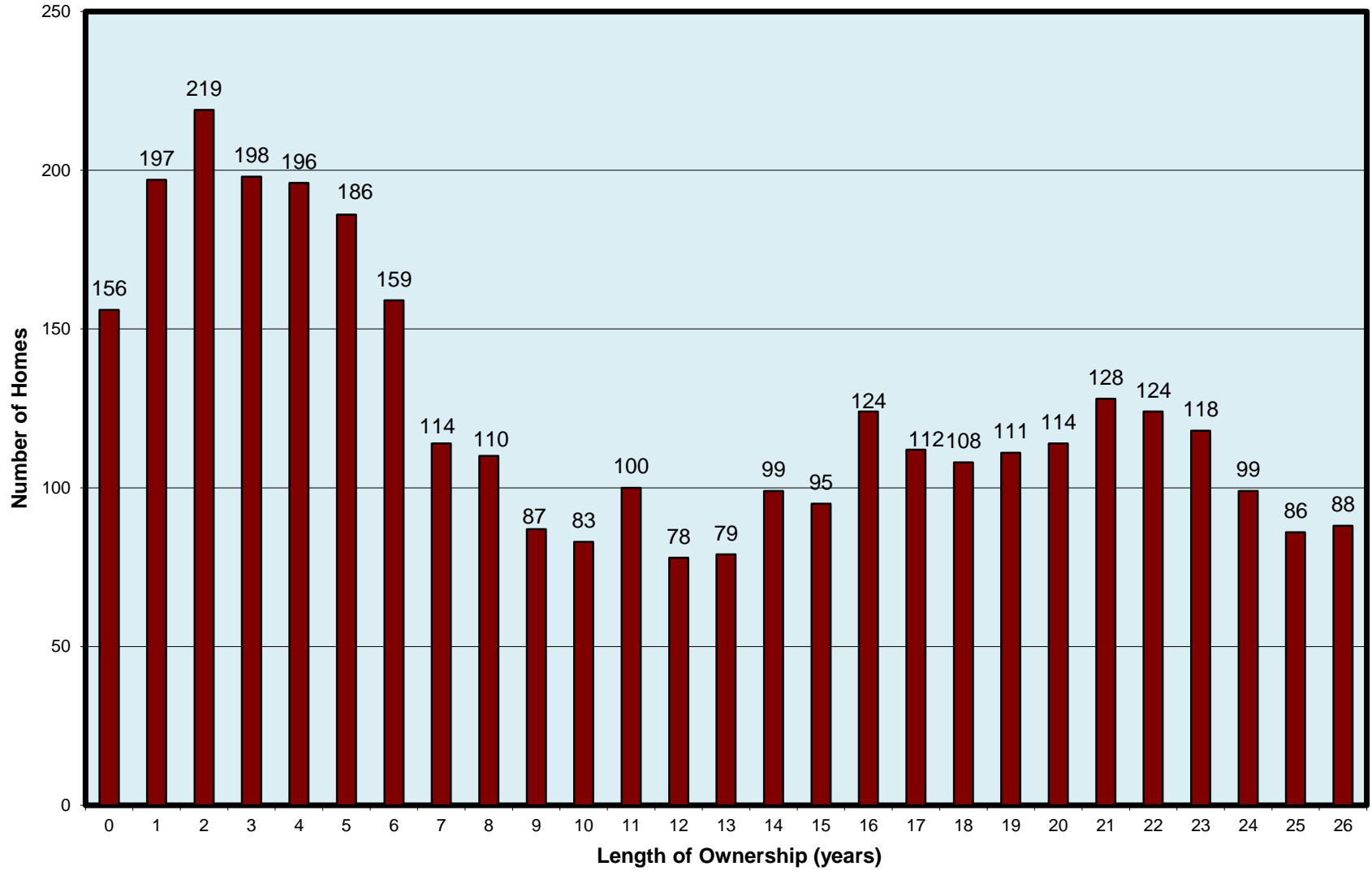
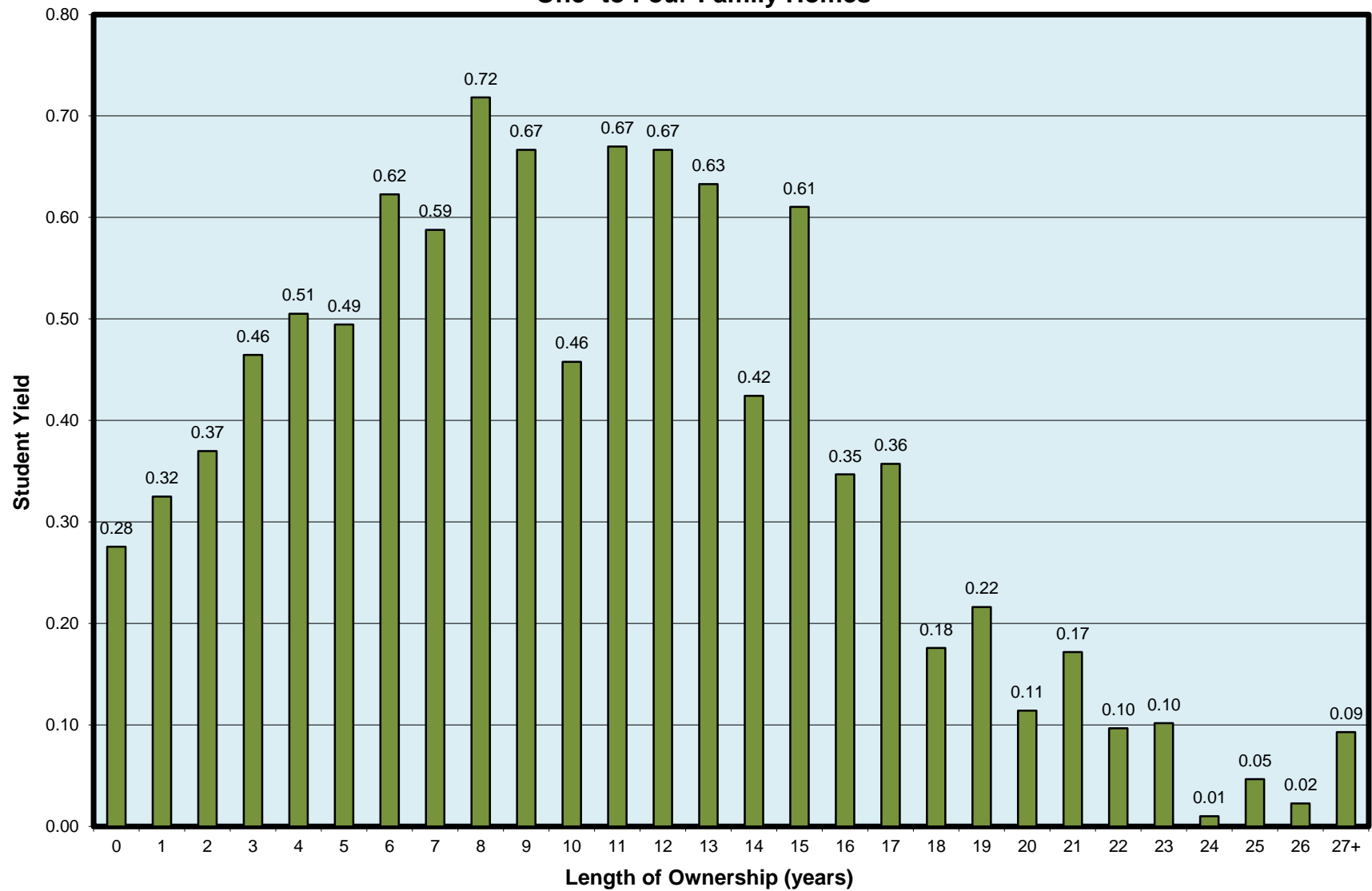


Figure 35
Denville Township Student Yields by Length of Ownership
One- to Four-Family Homes



Enrollment Projections Based on Housing Turnover

Projecting enrollment based on housing turnover is a process very similar to the Cohort-Survival Ratio (“CSR”) method, which is often used by demographers to project future student enrollments. As discussed previously, when using CSR, enrollments are projected based on historical “survival” ratios of students from one grade to the next. Average survival ratios are used to advance the current number of students into future grades. In the housing turnover method⁸, instead of students, the current length of home ownership distribution and historical turnover rates are used to project the future number of homes by either advancing homes to one more year of ownership, or if they are sold, returning them to zero years of ownership. For example, if there are 100 homes with eight years of ownership and the historical turnover rate for this length of ownership is 3%, 97 homes will gain another year of ownership while three homes will be sold and will have zero years of ownership in the next year. In the forthcoming section, this process of aging homes based on historical turnover rates was completed for a five-year period.

Table 26 shows the process in greater detail. The Denville historical average turnover rates by length of ownership for one- to four-family homes are shown along with the current length of ownership distribution. The projected number of turnovers is computed (Column D) by multiplying the turnover rate at a length of ownership (Column B) by the number of homes at that same length of ownership (Column C). The number of homes that “survive” to be one year older is shown in Column E. Column F is identical to Column E except that the projected total number of homes sold in 2021, 120 from Column D, becomes the number of homes with zero years of ownership in the following year. However, if the average turnover rates are used in this analysis, the predicted annual number of home sales (120 as shown in the table) would be much lower than the current number of homes with zero years of ownership ($n = 156$), which reflects the number of one- to four-family homes sold in 2020. The average turnover rates reflect home selling patterns from an older historical period that may not be reflective of the current housing market. Therefore, two scenarios were modeled to increase the number of sales to current levels.

Scenario 1

In the first scenario, the average turnover rate at each length of ownership from each of the last 26 years was used to project the number of future homes. In addition, one of the key variables affecting future enrollments in the housing turnover model is the number of long-held homes (27 or more years). As shown previously, the student yield for homes with 27 or more years of ownership is very low (0.09). The greater the number of long-held homes in a community, the greater the probability that enrollment will decline since yields are low for long-held homes. For enrollments to be stable (or to increase), turnover rates would need to be higher for homes with 27 or more years of ownership. Therefore, the turnover rate for homes with 27 or more years of ownership was increased to 4.0%. The higher turnover rate also simulates a greater percentage of baby boomers/empty nesters selling their homes than experienced currently.

⁸The rationale behind this method was taken from *An Alternate K-12 Enrollment Forecast Method for Older Neighborhoods* by Shelley Lapkoff Ph.D. of Lapkoff and Gobalet Demographic Research, Inc.

Table 26
Sample of Process in Forecasting Length of Ownership

A	B	C	D	E	F
Years of Ownership	Turnover Rate	Current Number of Homes by Length of Ownership In Year Y	Turnovers During Year Y (D = B*C)	Unsold Homes During Year Y Homes Now Have One More Year of Ownership (E = C-D)	Forecasted Length of Ownership Distribution (Year Y + 1)
0	2.8%	156	4		↑ 120
1	4.5%	197	9	152	152
2	4.0%	219	9	188	188
3	4.4%	198	9	210	210
4	4.5%	196	9	189	189
5	4.0%	186	8	187	187
6	4.4%	159	7	178	178
7	3.3%	114	4	152	152
8	2.7%	110	3	110	110
9	2.9%	87	3	107	107
10	3.0%	83	2	84	84
11	2.3%	100	2	81	81
12	2.3%	78	2	98	98
13	2.0%	79	2	76	76
14	1.9%	99	2	77	77
15	2.0%	95	2	97	97
16	1.4%	124	2	93	93
17	1.3%	112	1	122	122
18	1.2%	108	1	111	111
19	1.4%	111	2	107	107
20	1.2%	114	1	109	109
21	1.4%	128	2	113	113
22	1.4%	124	2	126	126
23	0.6%	118	1	122	122
24	1.5%	99	2	117	117
25	1.2%	86	1	97	97
26	2.0%	88	2	85	85
27 and up	1.6% ¹	1624	26	1684	1684
Total		4,992	120		4,992

Note: ¹Homes not sold since 1994 were assumed to have a future turnover rate of 1.6%.

Table 28 shows the projected number of Denville students by length of ownership for one- to four-family homes from 2021-2025. This was computed by multiplying the projected number of homes by length of ownership with the student yields by length of ownership. After summing the projected number of students at each length of ownership, the output is the total number of students residing in one- to four-family homes in each year. These values are then added to the number of resident students living in townhouses/condominiums, apartments, or mixed-use units, those who had no address, or was unmatched. These values were assumed to remain constant throughout the projection period. As the table shows, the total number of students is projected to slowly increase for the next five years. Enrollment is projected to be 1,632 in 2025, which would be slightly higher than the 2020-21 enrollment (1,612), with the assumption that the turnover rates of long-held homes (27 or more years) would be much higher than experienced historically.

Table 28
Projected Number of Denville Township Students
Based on Length of Ownership and Student Yields
Scenario 1

Years of Ownership	Student Yield	2021	2022	2023	2024	2025
0	0.28	44	44	43	43	42
1	0.32	49	50	50	49	49
2	0.37	70	54	54	54	54
3	0.46	98	84	65	66	66
4	0.51	95	102	87	67	68
5	0.49	92	89	95	81	63
6	0.62	111	111	108	115	98
7	0.59	89	100	101	97	103
8	0.72	79	106	118	119	114
9	0.67	71	71	95	107	107
10	0.46	38	48	48	64	71
11	0.67	54	55	68	68	90
12	0.67	65	53	53	66	66
13	0.63	48	61	49	49	61
14	0.42	33	32	40	32	32
15	0.61	59	46	45	56	45
16	0.35	32	33	26	25	31
17	0.36	44	33	34	26	26
18	0.18	20	21	16	16	13
19	0.22	23	24	26	19	20
20	0.11	12	12	12	13	10
21	0.17	19	19	18	18	20
22	0.10	12	11	10	10	10
23	0.10	12	13	11	11	10
24	0.01	1	1	1	1	1
25	0.05	5	5	6	6	5
26	0.02	2	2	3	3	3
27 and up	0.09	153	155	157	161	166
Students from One- to Four-Family Homes		1,430	1,435	1,439	1,442	1,444
Students from Townhouses, Condos, Apartments, Mixed-use units, no address, or unmatched (constant)		188	188	188	188	188
Total		1,618	1,623	1,627	1,630	1,632

Scenario 2

In the first scenario, the average turnover rates utilized likely reflect home selling patterns from an older historical period that may not be reflective of the current housing market. Figure 36 shows the minimum, maximum, and average turnover rates by length of ownership in Denville for the last 26 years. While it is not likely that Denville will experience the maximum historical turnover rates at each length of ownership simultaneously going forward, it is likely to experience turnover rates in between the average and maximum values. Figure 36 also shows a modified turnover rate, which reflects an increase of the historical average turnover rate by a constant (typically 150% or 175% of the average turnover rate) so that each turnover rate is above the historical average turnover rate, yet is below the historical maximum turnover rate. In the second scenario, the modified turnover rates were used to project the number of homes by length of ownership, which is shown in Table 29. In addition, for homes with 27 or more years of ownership, the turnover rate was changed to 1.3%, which is lower than in the previous scenario. In this scenario, the predicted annual number of home sales ranges from 151-163, which is comparable to the number of sales that occurred in 2020.

Figure 36
Historical Housing Turnover Rates in Denville Township
One- to Four-Family Homes
1994-2020

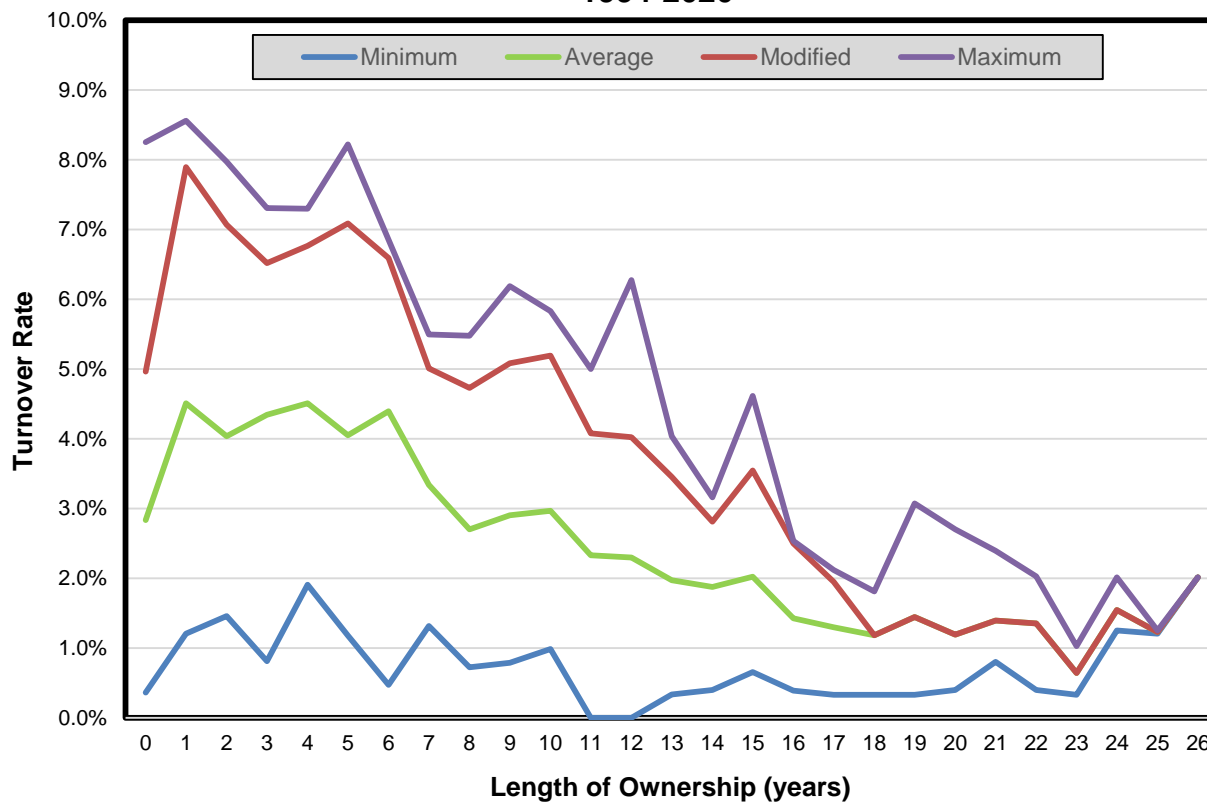


Table 30 shows the projected number of Denville students by length of ownership from 2021-2025. Unlike the prior scenario, enrollment is projected to slowly decline throughout the five-year period. Enrollment is projected to be 1,540 in 2025, which would be a loss of 72 students from the 2020-21 enrollment (1,612), with the assumption that the turnover rates of long-held homes (27 or more years) would be comparable to that experienced historically.

Table 30
Projected Number of Denville Township Students
Based on Length of Ownership and Student Yields
Scenario 2

Years of Ownership	Student Yield	2021	2022	2023	2024	2025
0	0.28	45	44	43	43	42
1	0.32	48	50	49	48	48
2	0.37	67	50	53	51	51
3	0.46	95	78	59	62	60
4	0.51	93	96	79	60	63
5	0.49	91	85	88	72	54
6	0.62	108	106	100	103	85
7	0.59	88	95	93	88	91
8	0.72	78	102	111	108	102
9	0.67	70	69	90	98	96
10	0.46	38	46	45	59	64
11	0.67	53	53	64	62	81
12	0.67	64	51	51	61	59
13	0.63	47	58	46	46	55
14	0.42	32	31	38	30	30
15	0.61	59	45	43	53	42
16	0.35	32	32	25	24	29
17	0.36	43	32	33	25	24
18	0.18	19	21	15	16	12
19	0.22	23	24	26	19	19
20	0.11	12	12	12	13	10
21	0.17	19	19	18	18	20
22	0.10	12	11	10	10	10
23	0.10	12	13	11	11	10
24	0.01	1	1	1	1	1
25	0.05	5	5	6	6	5
26	0.02	2	2	3	3	3
27 and up	0.09	157	163	169	177	186
Students from One- to Four-Family Homes		1,413	1,394	1,381	1,367	1,352
Students from Townhouses, Condos, Apartments, Mixed-use units, no address, or unmatched (constant)		188	188	188	188	188
Total		1,601	1,582	1,569	1,555	1,540

In comparing the projections from both scenarios, the enrollments in Scenario 2 are more plausible as it reflects turnover rates that are more likely to occur in the next five years as opposed to historical averages, which reflect a period with lower turnover rates. In addition, the turnover rate used for homes owned 27 or more years in Scenario 2 (1.3%) is more realistic than the one used in Scenario 1 (4.0%).

The results in Tables 28 and 30 assume that student yields and turnover rates by length of ownership will remain constant over the five-year projection period. As previously stated, student yields are likely to change over time, but there is no way of projecting what they might be. Similarly, the model assumes that turnover rates by length of ownership will remain constant over the five-year projection period. Figure 31 showed the variability in the turnover rates with length of ownership.

It should be clearly stated that the purpose of this analysis is not to use the projections for future planning since the CSR method is the most accurate method available. Rather, it is an independent process to see whether future enrollments may be affected by housing turnover. In the second scenario, which is more plausible, it appears enrollment is likely to decline due to housing turnover, controlling for all other factors, such as fertility rates, births, inward migration, or new residential construction.