Needham Public Schools, MA Demographic Study

November 2017

McKibben Demographics

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Executive Summary

1. The resident total fertility rate for Needham Public Schools over the life of the forecasts is below replacement level. (1.87 vs. the replacement level of 2.1)

2. Most in-migration to the district continues to occur in the 0-to-9 and 30-to-44 year-old age groups.

3. The local 18-to-24 year-old population continues to leave the district, going to college or moving to other urbanized areas. This population group accounts for the largest segment of the district's out-migration flow. The second largest out-migration flow is in the 70 year-old and over population.

4. The primary factors causing the district's enrollment to slightly decline over the next 15 years are a substantial increase in the number of empty nest households (home owners age 70+) "turning over" which will still be smaller than the number of homes (homeowners age 50-to-59) that will become empty nest households.

5. Changes in year-to-year enrollment over the next five years will primarily be due to the size of the grade cohorts entering and moving through the school system in conjunction with the size of the grade cohorts leaving the system.

6. The elementary enrollment will begin a slight decline after the 2021-22 school year. This will be due primarily to the fact that the rising 5th grade cohorts will be greater the 430 in size while the incoming grade cohorts will decline slightly.

7. The median age of the population will increase from 42.9 in 2010 to 43.6 in 2035.

8. As the district will continue to have some level of annual new housing unit construction (most likely the majority of that construction will be rental units), the rate, magnitude, and price of existing home sales will become the increasingly dominant factor affecting the amount of population and enrollment change.

9. Total district enrollment is forecasted to increase by 182 students, or 3.2%, between 2017-18 and 2022-23. Total enrollment is forecasted to grow by 18 students, or 0.3% from 2022-23 to 2027-28.The total enrollment is forecasted to decline by 214 students, or -3.6%, from 2027-28 to 2032-33.

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INTRODUCTION

By demographic principle, distinctions are made between projections and forecasts. A projection extrapolates the past (and present) into the future with little or no attempt to take into account any factors that may impact the extrapolation (e.g., changes in fertility rates, housing patterns or migration patterns) while a forecast results when a projection is modified by reasoning to take into account the aforementioned factors.

To maximize the use of this study as a planning tool, the ultimate goal is not simply to project the past into the future, but rather to assess various factors' impact on the future. A variety of factors influence the future population and enrollment changes of each school district and its individual attendance areas. Not all factors will influence the entire school district at the same level. Some may affect different areas at dissimilar magnitudes and rates causing changes at varying points of time within the same district. The forecaster's judgment, based on a thorough and intimate study of the district, has been used to modify the demographic trends and factors to more accurately predict likely changes. Therefore, strictly speaking, this study is a forecast, not a projection; and the amount of modification of the demographic trends varies between different areas of the district as well as within the timeframe of the forecast.

To calculate population forecasts of any type, particularly for smaller populations such as a school district or its attendance areas, realistic suppositions must be made as to what the future will bring in terms of the residents' general demographic behavior at certain points of the life course. The demographic history of the school district and its interplay with the social and economic history of the area is the starting point and the basis of most of these suppositions particularly on key factors such as the age/sex distribution, local vital rates, housing characteristics and special populations of the area. The unique nature of each district's and attendance area demographic composition and rate of change over time must be assessed and understood to be factors throughout the life of the forecast series. Moreover, no two populations, particularly at the school district and attendance area level, have exactly the same characteristics.

The manifest purpose of these forecasts is to ascertain the demographic factors that will ultimately influence the enrollment levels in the district's schools. There are of course, other non-demographic factors the affect enrollment levels over time. These factors include, but are not limited to: transfer policies within the district, student transfers to and from neighboring districts, placement of "special programs" within school facilities that may serve students from outside the attendance area, state or federal mandates that dictate the movement of students from one facility to another (No Child Left Behind was an excellent example of this factor), the development of charter schools in the district, the prevalence of home schooling in the area, and the dynamics of local private schools.

Unless the district specifically requests the calculation of forecasts that reflect the effects of changes in these non-demographic factors, their influences are held constant for the life of the forecasts. Again, the main function of these forecasts is to determine what impact demographic changes will have on future enrollment. It is quite possible to calculate special "scenario" forecasts to measure the impact of school policy modifications as well as planned economic and financial changes. However in this case the results of these population and enrollment forecast are meant to represent the most likely scenario for changes over the next 10 years in the district and its attendance areas.

The first part of the report will examine the assumptions made in calculating the population forecasts for the Needham Public Schools and its attendance areas. Since the results of the population forecasts drive the subsequent enrollment forecasts, the assumptions listed in this section are paramount to understanding the area's demographic dynamics. The remainder of the report is an explanation and analysis of the district's population forecasts and how they will shape the district's grade level enrollment forecasts.

DATA

The data used for the forecasts come from a variety of sources. Enrollments by grade and attendance center were provided by the Needham Public Schools for school years 2010-11 to 2017-18. Birth and death data were obtained from the Massachusetts State Department of Health for the years 2000 through 2016. The net migration values were calculated using Internal Revenue Service migration reports for the years 2000 through 2015. The data used for the calculation of migration models came from the United States Bureau of the Census, 2005 to 2010, and the models were designed using demographic and economic factors. The base age-sex population counts used is from the results of the 2010 Census.

Recently the Census Bureau began releasing annual estimates of demographic variables at the block group and tract level from the American Community Survey (ACS). There has been wide scale reporting of these results in the national, state and local media. However, due to the methodological problems the Census Bureau is experiencing with their estimates derived from ACS data, particularly in areas with a population of less than 60,000, the results of the ACS are not used in these forecasts. For example, given the sampling framework used by the Census Bureau, each year only 300 of the over 10,500 current households in the district would have been included. For comparison 1,500 households in the district were included in the sample for the long form questionnaire in the 2000 Census. As a result of this small sample size, the ACS survey result from the last 5 years must be aggregated to produce the tract and block group estimates.

To develop the population forecast models, past migration patterns, current age specific fertility patterns, the magnitude and dynamics of the gross migration, the age specific mortality trends, the distribution of the population by age and sex, the rate and type of existing housing unit sales,

housing tenure and amount of future housing unit construction are considered to be primary variables. In addition, the change in household size relative to the age structure of the forecast area was addressed. While there was a drop in the average household size in Needham as well as most other areas of the state during the previous 20 years, the rate of this decline has been forecasted to slow over the next ten years.

ASSUMPTIONS

For these forecasts, the mortality probabilities are held constant at the levels calculated for the year 2010. While the number of deaths in an area are impacted by and will change given the proportion of the local population over age 60, in the absence of an extraordinary event such as a natural disaster or a breakthrough in the treatment of heart disease, death rates rarely move rapidly in any direction, particularly at the school district or attendance area level. Thus, significant changes are not foreseen in district's mortality rates between now and the year 2035. Any increases forecasted in the number of deaths will be due primarily to the general aging of the district's population and specifically to the increase in the number of residents aged 65 and older.

Similarly, fertility rates are assumed to stay fairly constant for the life of the forecasts. Like mortality rates, age specific fertility rates rarely change quickly or dramatically, particularly in small areas. Even with the recently reported rise and subsequent decline in the fertility rates of the United States, overall fertility rates have stayed within a 10% range (Total Fertility Rates of 1.8 to 2.0) for most of the last 40 years. In fact, the vast majority of year to year change in an area's number of births is due to changes in the number of women in child bearing ages (particularly ages 20-to-34) rather than any fluctuation in an area's fertility rate.

The resident total fertility rate (TFR), the average number of births a woman will have in her while living in the district, is estimated to be 1.87 for the non-college population of the total district for the ten years of the population forecasts. A TFR of 2.1 births per woman is considered to be the theoretical "replacement level" of fertility necessary for a population to remain constant in the absence of in-migration. Therefore, over the course of the forecast period, fertility will not be sufficient, in the absence of migration, to maintain the current level of population (or school enrollment) within the Needham Public Schools.

A close examination of data for the Needham Public Schools has shown the age specific pattern of resident net migration will be nearly constant throughout the life of the forecasts. While the number of in and out migrants has changed in past years for the Needham Public Schools (and will change again over the next 10 years), the basic age pattern of the migrants has stayed nearly the same over the last 30 years. Based on the analysis of data it is safe to assume this age specific migration trend will remain unchanged into the future. This pattern of migration shows a large part of the resident out-migration occurring in the 18-to-24 year-old age group (those that grew up in the district) as young adults leave the area to go to college or move to other urbanized areas. A second group of out-migrants are those householders aged 70 and older, usually moving to areas outside of New England. Most of the in-migration occurs in the 0-to-9 and 30-to-44 age groups (bulk of which is from areas within 75 miles of the Needham Public Schools) primarily consisting of younger adults and their children.

As Norfolk County is not currently contemplating any major expansions or contractions, the forecasts also assume the current economic, political, transportation and public works infrastructure (with a few notable exceptions), social, and environmental factors of the Needham Public Schools and its attendance areas will remain the same through the year 2035.

Below is a list of assumptions and issues that are specific to the Needham Public Schools. These issues have been used to modify the population forecast models to more accurately predict the impact of these factors on each attendance area's population change and composition. Specifically, the forecasts for the Needham Public Schools assume that throughout the study period:

a. There will be no short term economic recovery in the next 18 months and the national, state or regional economy does not go into deep recession at any time during the 10 years of the forecasts; (Deep recession is defined as four consecutive quarters where the GDP contracts greater than 1% per quarter)

b. Interest rates have reached a historic low and will not fluctuate more than one percentage point in the short term; the interest rate for a 30 year fixed home mortgage stays below 5.0%;

c. The rate of mortgage approval stays at 1999-2002 levels and lenders do not return to "sub-prime" mortgage practices;

d. There are no additional restrictions placed on home mortgage lenders or additional bankruptcies of major credit providers;

e. The rate of housing foreclosures does not exceed 125% of the 2005-2008 average of the Needham Public Schools for any year in the forecasts;

f. All currently planned, platted, and approved housing units are built and completed by 2025 unless noted differently (see assumption "P");

g. The unemployment rates for Norfolk County will remain below 6.0% for the 10 years of the forecasts;

h. The rate of students transferring into and out of the Needham Public Schools will remain at the 2010-11 to 2017-18 average;

i. The inflation rate for gasoline will stay below 5% per year for the 10 years of the forecasts;

j. There will be no building moratorium within the district;

k. Businesses within the district and the Greater Boston Metropolitan Area will remain viable;

l. The Greendale Mews apartment complex, located in

the Broadmeadow attendance area, will be completed by 2018 and at least 95% occupied by 2019:

m. The Needham Crossing complex, with 390 units, located in the Eliot are will begin occupation in 2018. This complex will be at least 95% occupied by 2021.

n. The number of existing home sales in the district that are a result of "distress sales" (homes worth less than the current mortgage value) will not exceed 20% of total homes sales in the district for any given year;

o. Housing turnover rates (sale of existing homes in the district) will remain at their current levels. The majority of existing home sales are made by home owners over the age of 55;

p. Private school and home school attendance rates will remain constant;

q. The proposed Overlay apartment complex, to be located in the Eliot area, with 250 planned units will be approved. It will start construction no later than 2024 and be at least 95% occupied by 2027;

r. The rate of foreclosures for commercial property remains at the 2004-2008 average for Norfolk County;

If a major employer in the district or in the Greater Boston Metropolitan Area closes, reduces or expands its operations, the population forecasts would need to be adjusted to reflect the changes brought about by the change in economic and employment conditions. The same holds true for any type of natural disaster, major change in the local infrastructure (e.g., highway construction, water and sewer expansion, changes in zoning regulations etc.), a further economic downturn, any additional weakness in the housing market or any instance or situation that causes rapid and dramatic population changes that could not be foreseen at the time the forecasts were calculated.

The sizeable proportion of high school graduates from the Needham Public Schools that attend college or move to urban areas outside of the district for employment is a significant demographic factor. Their departure is a major reason for the high out-migration in the 18-to-24 age group and was taken into account when calculating these forecasts. The out-migration of graduating high school seniors is expected to continue over the period of the forecasts and the rate of this migration has been forecasted to remain the same over the life of the forecast series.

Finally, all demographic trends (i.e., births, deaths, and migration) are assumed to be linear in nature and annualized over the forecast period. For example, if 1,000 births are forecasted for a 5-year period, an equal number, or proportion of the births are assumed to occur every year, 200 per year. Actual year-to-year variations do and will occur, but overall year to year trends are expected to be constant.

METHODOLOGY

The population forecasts presented in this report are the result of using the Cohort-Component Method of population forecasting. (Siegel, and Swanson, 2004: 561-601)

(Smith et. al. 2004) As stated in the **INTRODUCTION**, the difference between a projection and a forecast is in the use of explicit judgment based upon the unique features of the area under study. Strictly speaking, a cohort-component projection refers to the future population that would result if a mathematical extrapolation of historical trends were applied to the components of change (i.e., births, deaths, and migration). Conversely, a cohort-component forecast refers to the future population that is expected because of a studied and purposeful selection of the components of change believed to be critical factors of influence in each specific area.

Five sets of data are required to generate population and enrollment forecasts. These five data sets are:

1. a base-year population (here, the 2010 Census population for the Needham Public Schools and their attendance areas);
2. a set of age-specific fertility rates for each attendance area to be used over the forecast period;
3. a set of age-specific survival (mortality) rates for each attendance area;
4. a set of age-specific migration rates for each attendance area; and
5. the historical enrollment figures by grade.

The most significant part of producing enrollment forecasts is the generation of the population forecasts in which the school age population (and enrollment) is embedded. In turn, the most difficult aspect of generating the population forecasts is found in deriving the rates of change in fertility, mortality, and migration as they relate to the age structure of the district and the attendance areas. From the standpoint of demographic analysis, the Needham Public Schools and its seven elementary attendance center districts are classified as "small area" populations (as compared to the population of the state of Massachusetts or to that of the United States). Small area population forecasts are more difficult to calculate because local variations in fertility, mortality, and migration may be more irregular than those at the state or national scale. Especially challenging to project are migration rates for local areas, because changes in the area's socioeconomic characteristics can quickly change from past and current patterns. (Peters and Larkin, 2002)

The population forecasts for Needham Public Schools and it attendance areas were calculated using a cohort-component method with the populations divided into male and female groups by five-year age cohorts that range from 0-to-4 years of age to 85 years of age and older (85+). Age- and sex-specific fertility, mortality, and migration models were constructed to specifically reflect the unique demographic characteristics of each of the Needham Public Schools attendance areas as well as the total school district.

The enrollment forecasts were calculated using a modified average survivorship method. Average survivor rates (i.e., the proportion of students who progress from one grade level to the next given the average amount of net

migration for that grade level) over the previous five years of year-to-year enrollment data were calculated for grades two through twelve. This procure is used to identify specific grades where there are large numbers of students changing facilities for non-demographic factors, such as private school transfers or enrollment in special programs.

The survivorship rates were modified or adjusted to reflect the average rate of forecasted in and out migration of 5-to-9, 10-to-14 and 15-to-17 year olds cohorts to each of the attendance centers in the Needham Public Schools for the period 2005 to 2010. These survivorship rates then were adjusted to reflect the forecasted changes in age-specific migration the district should experience over the next five years. These modified survivorship rates were used to project the enrollment of grades 2 through 12 for the period 2010 to 2015. The survivorship rates were adjusted again for the period 2015 to 2020 to reflect the predicted changes in the amount of age-specific migration in the districts for the period. The process is repeated by the 2020 to 2025, 2025 to 2030 and 2030 to 2035 time periods.

The forecasted enrollments for kindergarten and first grade are derived from the 5-to-9 year-old population of the age-sex population forecast at the elementary attendance center district level. This procedure allows the changes in the incoming grade sizes to be factors of forecasted population change and not an extrapolation of previous class sizes. Given the potentially large amount of variation in kindergarten enrollment due to parental choice, changes in the state's minimum age requirement, and differing district policies on allowing children to start kindergarten early, first grade enrollment is deemed to be a more accurate and reliable starting point for the forecasts. (McKibben, 1996) The level of the accuracy for both the population and enrollment forecasts at the school district level is estimated to be +2.0% for the life of the forecasts.

RESULTS AND ANALYSIS OF THE POPULATION FORECASTS

From 2010 to 2020, the populations of the Needham Public Schools, Norfolk County; the state of Massachusetts, and the United States are forecasted to change as follows; the Needham Public Schools will increase by 0.6%, Norfolk County will decline by -0.8% Massachusetts will increase by 0.5%; and the United States increase by 8.4% (see Table 1)

Table 1: Forecasted Population Change, 2010 to 2020

	2010	2015	2020	10-Year Change
U.S. (in millions)	308	322	334	8.4%
Massachusetts	6,547,000	6,791,000	6,968,000	6.4%
Norfolk County	670,850	693,500	709,900	5.8%
Needham	28,904	28,960	28,960	0.2%

A number of general demographic factors will influence the growth rate of the Needham Public Schools during this period, and include the following:

a. The Baby Boom generation will have passed through prime childbearing ages by 2003, thereby reducing the overall proportion of the population at risk of having children;

b. The remaining population in childbearing ages (women ages 15-to-45) will have fewer children;

c. The local non-college 18-to-24 year-old population, will continue to leave the area to go to college or to other urban areas, with the magnitude of this out-migration flow staying constant; and,

d. The district will experience little increase in detached single family housing stock. The vast majority of in-migrating families will move into existing housing units or rental units.

The Needham Public Schools will continue to experience in-migration (the movement of single person households and young families into the district) over the next 10 years. However, the size and age structure of the pool of potential in-migrants will change and the effects of the in-migration of families on population growth will be greatly offset by the continued steady growing out-migration of young adults as graduating seniors continue to leave the district and a continues out-migration of households to nearby suburban areas.

From 2010 to 2015, the district's population is forecasted to increase by 56 or 0.2%, to 28,960. From 2015 to 2020, the population is forecasted to remain basically unchanged. During this decade, three of the five attendance areas are forecasted to increase in population with the growth rates ranging from 2.6% in the Mitchell area to 0.2% in the Broadmeadow area. The Newman and Hillside areas will experience a small population decline this decade. (See Table 2 for population forecast results of each elementary attendance area).

While all attendance areas will see some amount of resident gross in-migration, (primarily in the 0-to-9 and 30-to-44 age groups,) all areas also will continue to see gross out-migration. This out-migration primarily will be young adults, 18-to-24 years old, as graduating seniors continue to leave the district to go to college or seek employment in larger urbanized areas. There will also be an important secondary out-migration flow, which is householders, primarily ages 70 and over, moving to areas outside of New England.

As stated in the **ASSUMPTIONS** and emphasized above, the impact of the high proportion of high school graduates that leave the district to continue on to college or to seek employment in large urban areas is significant to the size and structure of the future population of the district. Up to 80% of all births occur to women between the ages of 20 and 34. (This is still true even with the recent rise in fertility rates for women age 30 and over) As the graduating seniors continue leave the district, the number of women at risk of childbirth during the next decade declines. Consequently, even though the district's resident fertility rate is just 0.3 points

below the replacement level, the smaller number of non-college women in the district in prime child bearing ages will keep the number of births low despite the district having a slight increase in population (see the population pyramids in the appendix of this report for a graphic representation of the age distributions of the district and all of the attendance areas). This will require the district to become dependent on the in-migration of children just to maintain current grade cohort sizes.

Another factor that needs to be considered is the birth dynamics of the last twenty years. An examination of national birth trends shows there was a large "Baby Boomlet" born between 1980 and 1995. This Boomlet was nearly as large as the Baby Boom of the 1950s and 1960s. However, unlike the Baby Boom, the Boomlet was a regional and not a national phenomenon. (McKibben, et. al. 1999) Because Massachusetts did not experience a Baby Boomlet, most of the expected enrollment growth will have to result from in-migration and not from an increase in the grade cohort size.

Clearly, the dominant factor that has affected the population growth rates of the Needham Public Schools over the last 20 years has been the number and pace of existing homes sales. However, the dynamics of this in-migration flow are more complex than many realize. There is a common misconception that any changes in the economy, housing market or transportation system will an immediate impact of the size of an area's population and the total impact of that change will be experiences immediately..

This "delayed demographic reaction" is a key issue when attempting to ascertain the impact and duration of a trend. While it is true that the households moving into these new housing units bring many school age (particularly elementary) children into the district, they also bring many preschool age children as well. Consequently, the full impact of the growth in existing home sales is not seen immediately in elementary enrollment as it takes three to seven years for all of the children of a given household to age into the schools. This is a key issue since the number of births in the Needham Public Schools is insufficient to maintain current enrollment levels over the next 10 years. The number of non-college women living in the district ages 20-to-34 (prime child bearing ages) is too small to produce birth cohorts that are the same size as those currently in the elementary grades.

Of additional concern are the issues of the district's aging population and the growing number of "empty nest" households, particularly in the Mitchell area. For example, after the last school age child leaves high school, the household becomes an "empty nest" and most likely will not send any more children to the school system. In most cases, it takes 20 to 30 years before all original (or first time) occupants of a housing area move out and are replaced by new, young families with children. This principle also applies to children leaving elementary school and moving on the middle school. Households can still have school age children in the district's school, but also in effect be "empty nest" of elementary age children.

Note as well the steady increase in the median age of the population in the Needham Public Schools and all of its attendance areas (see population forecasts in the appendix for the median age for each forecast year). The district as a whole will see the median age of its population increase from 42.9 in 2010 to 43.6 in 2035. This rise in median age is due to three factors, local 18-24 years leaving the district, a high proportion of their parents staying in their existing households and the decline in the number of births. (See Table 4)

As a result of the "empty nest" syndrome, the attendance areas in the Needham Public Schools will see a steady rise in the median age of their populations, even while the district as a whole continues to attract some new young families. It should be noted that many of these "childless" households are single persons and/or elderly (See Table 5). Consequently, even if many of these housing units "turnover" and attract households of similar characteristics, they will add little to the number of school age children in the district. Furthermore, several of the empty nest households will "down size" to smaller households within the district. In these cases new housing units may be developed in an area, yet there is no corresponding increase in school enrollment.

RESULTS AND ANALYSIS OF ENROLLMENT FORECASTS

Elementary Enrollment

The total elementary (K-5) enrollment of the district is forecasted to grow from 2,593 in 2017-18 to 2,637 in 2022-23, an increase of 44 students or 1.7%. From 2022-23 to 2027-28, elementary enrollment is expected to drop by 83 students to 2,554. This will represent a -3.1% decrease over the five-year period. From 2027-28 to 2032-33, elementary enrollment is expected to drop by 157 students to 2,397. This will represent a -6.1% decrease over the five-year period. All five attendance areas will experience a net decline in elementary enrollment over the next fifteen years (see Table 5 and the enrollment forecast results for each area).

The reason for this pattern of decline in elementary enrollment is the convergence of the effects of three factors, all fully occurring roughly by 2022. These factors are the reversal of cohort sizes in the elementary grades, the small number of existing housing units turning over, and the dramatic rise in the number of empty nest households. Each of these factors will contribute in part to the decline in elementary enrollment from 2022 to 2032.

One of the main reasons elementary enrollment was increasing over the last several years was due to the fact that the number of children entering kindergarten and 1st grade was larger than the number leaving elementary school after completing 5th grade. This "cohort imbalance' will reverse after 2022 as the size of the rising 5th grade classes will consistently be about 450 students. From 2022 to 2032, the number of students in 5th grade will average about 450 each year as opposed to the 433 average the district experienced

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over the last six years. Thus, even as the number of students entering the school system declines only slightly during the 2022-32 time period, the rate of overall decline is amplified due to the larger number of students moving on to the middle school grades.

The second factor is the trends in the local home sales. While it is true that the Norfolk County and Needham School District housing market has performed better than the national trends the last three years, it is not immune the effects of a tightening of the mortgage market and in increasingly restrictive lending practices. Additionally, the number of existing home for sale in the district is insufficient to insure a large enough in-migration flow of young households with children. The current sales trends of existing homes is brisk and most homes put on the market sell within one month at close to or over the asking price. The fundamental problem is that the number of existing homes sold is far less than the number of homes empty nesting each year. While there is a significant level of rental units scheduled to come on line in the district over the next 10 years, these new units, as a rule tend to have many more school age children in them than elementary age. Additionally, there is the key factor of measuring the rate of increase of existing households that no longer have elementary or preschool age children in them against the in-migration rate of new households (rental and owner) with children ages 0-to-9 years old.

The third factor is the rise of the number of empty nest households in the district. In 2010 the district had 39.7% of their households headed by people ages 35-to-54 (The ages most people have school aged children). The district's proportion of households in these age groups has dropped over the last five years (and will continue to decline over the next 10 years) as people aged and the households became empty nest. Unfortunately, the large bubble of now empty nest households, (particularity empty of elementary age students) will not reach their 70s during the life of these forecasts. Post 70 year-old households are the stage of life when most householders downsize, allowing new young families with children to move in.

An excellent example of this phenomenon is the single year of age counts for the district from the 2010 Census (See Table 6). The population at age six is closely related to the combined 1st grade enrollment of the public and private students in the district (as it is for all elementary grades). However, note the sharp reduction in the number of residents from age five to under one. This trend is an indication of the growing proportion of households in each area that will be beginning to empty nest of elementary age students. Without a substantial in-migration of young families with children under the age of five, this "pre-school dearth" will results in a marked decline in elementary enrollment of the next five years.

This "pre-school dearth" of population has existed in the Needham Public Schools for over 20 years (this phenomena is quite common is suburban school districts). However, the large scale construct of new housing units and the subsequent in-migration of families with pre-school age children would increase to the age cohort sizes. By the time each age cohort would reach age six, (first grade) its relative size would be equal or greater the previous year's first grade group.

The issue over the next five to ten years is that the number of new and existing home sales over the last three years have been more than 60% lower on average that the previous seven years. Without this in-migration flow the district pre-school age cohorts will be of insufficient size to maintain the current elementary enrollment levels. The more dependents an area is on in-migration for students to compensate for a low number of births, the larger the enrollment will decline. While the construction of new rental units will help reduce this problem in the short term, once these units are finished (assumed in these forecasts to be by 2027) they will have no additional impact on the overall age distribution of the district.

The demographic factors that will become the most influential over the next ten years are the growth rate of empty nest household in the attendance areas, the number of sales of existing homes, the rate and magnitude of existing housing unit "turn over," the relative size of the elementary and pre-school age cohorts and each area's fertility rate. Each of these factors will vary in the scale of their influence and timing of impact on the enrollment trends of any particular area.

Attendance areas that are currently experiencing a rise in empty nest households tend to be the same areas that are not the recipients of any large sustained new housing construction. Thus, areas like Mitchell will see net declines in elementary enrollment. While these areas will continue to see net in-migration of families, it will not be at a sufficient rate to maintain current attendance levels.

As more elementary attendance areas become completely dependent upon existing home sales to attract new families, the overall elementary enrollment (after 2018) of the district will decline. Areas such as Newman will see their elementary enrollments peak by the end of the decade and then slowly decline. Thus, the best primary short- and long-term indicator for enrollment change in most of the attendance area will be the year-to-year rate of housing turnover. If the Total Fertility Rates of all the attendance areas remain at their current low levels (and they are forecasted to do so) they will insure that enrollments will continue to see slowing growth (or outright declines) even if the level of net out-migration is greatly reduced.

Additionally, areas that are characterized by the relatively high percentage of rental housing units and large concentrations of young adults tend to have more stable population distribution and enrollment trends. In these cases, young adults or the newly married, move to these areas and establish households. Because the population is in prime child bearing ages, these areas also have both a high absolute number of births and a higher than the district average birth rate. Later, as family size increases, these families often move to single family homes--usually moderately priced single family homes in other parts of the school district.

Consequently, the Eliot area and other sub-attendance areas of the district with similar characteristics, serve as feeder areas for outlying areas in the district. This internal migration

flow is far more important in determining future enrollment trends than the construction of new single family homes as an average of over 15 existing housing units are sold for every new housing unit built. Indeed, a close examination of the year to year trends in the family formation areas will serve as an excellent bellwether for short and medium term changes in areas that depend on in-migration for enrollment growth.

Intermediate and Middle School Enrollment

The intermediate school enrollment at High Rock is forecasted to decline from 450 in 2017-18 to 443 in 2022-23, a 7 student or -1.6% decrease. Between 2022-23 and 2027-28, High Rock enrollment is forecasted to grow to 462, an increase of 19 students or 4.3%%. Between 2027-28 and 2032-33, High Rock enrollment is forecasted to decline to 448, a decrease of 14 student or -3.0%.

The total middle school enrollment at Pollard Middle School is forecasted to grow from 854 in 2017-18 to 874 in 2022-23, a 30 student or 3.5% increase. Between 2022-23 and 2027-28, middle school enrollment is forecasted to grow to 925, an increase of 51 students or 4.3%. Between 2027-28 and 2032-33, middle school enrollment is forecasted to drop to 896, a decrease of 29 students or -3.1%.

The difference in the size of the individual grade cohorts and the aging of students through the school system are the primary reasons why the middle school enrollment trends are different than those of the elementary grades.

There are currently larger grade cohorts enrolled in the elementary school grades compared to those in the intermediate and middle schools' grade cohorts. As these elementary school cohorts "age" into intermediate and middle school and smaller middle school cohorts age into high school, they increase the overall intermediate and middle school enrollment level. Note how the size of the incoming 5th grade class is usually larger than the previous year's 8th grade class, which has now moved on the high school. As long as this "wave" in the enrollment pattern exists, there will be to some degree, a decrease in middle school enrollment at least until the 2025-2026 school year. However, early next decade, the rate of decline moderates significantly as the size of the grade cohorts become more equal in size

After the 2025-2026 school year, this cohort trend will reverse. There will then be grade cohorts entering the intermediate and middle school grades will roughly be the same compared (or slightly smaller) to those leaving. The result is a modest level of decreased or at least a stabilization of middle school enrollment. This trend will most likely continue beyond the end of the forecasts series ending sometime after 2033.

High School Enrollment

The total high school enrollment at Needham High School is forecasted to grow from 1,685 in 2017-18 to 1,810 in 2022-23, a 125 student or 7.4% increase. The net result for the five-year period 2022-23 to 2027-28 will be a increase of 31 students to 1,841 or 1.7%. Between 2027-28 and 2032-33, the high school enrollment is forecasted to drop to 1,827, a decrease of 14 students or -0.8%.

The aforementioned effects of changes in cohort size on middle school enrollment are also affecting the growth patterns of the high school population. The difference here is that in impact begins five years earlier. There are currently larger grade cohorts in the middle school enrollment that will begin to enter high school next year. Until that wave of students (now in the late elementary grades, intermediate and middle school) passes through the high school grades, there will be continued increase at the district's high school. This trend should stabilize by 2024-25 and results in a slight decline after 2028-29 as slightly smaller cohorts begin to enter 9th grade.

It is important to note that the vast majority of this future high school enrollment change will be a result of students aging into those grades. Specifically, students who already live in the district (and not in-migration of students ages 14 to 18) will be the primary cause of the forecasted increase in high school enrollment. Additionally, as was mentioned earlier, these forecasts represent the demographic changes that will affect high school enrollment. Any changes in the district's student transfer policy and/or changes in special high school level programs will need to be added or subtracted from the forecast result.

On that note impact of the new programs at the Minuteman Regional Vocational School were included in the forecast assumptions. While the program will be an attractive draw to students in the district that are interested in pursuing those lines of study, it was estimated that Needham High School would only lose 10 to 15 students per year in additional transfer students.

High school enrollment is the most difficult of all the grade levels to project. The reason for this is the varying and constantly changing dropout rates, particularly in grades 10 and 11. For these forecasts the dropout rates at the high school were calculated for each grade over the last five years. These five-year averages were then held constant for the life of the forecast. The effects of any policy changes dealing with any school's dropout rates, program placement or reassignment of former students to new grade levels will need to be added or subtracted from the forecast results.

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Appendix A: Supplemental Tables

Table 1: Forecasted Elementary Area Population Change, 2010 to 2035

	2010	2015	2010-2015 Change	2020	2015-2020 Change	2025	2020-2025 Change	2030	2025-2030 Change	2035	2030-2035 Change	2010-2035 Change
Broadmeadow ES	5,498	5,510	0.2%	5,510	0.0%	5,480	-0.5%	5,410	-1.3%	5,300	-2.0%	-3.6%
Eliot ES	4,537	4,600	1.4%	4,640	0.9%	4,760	2.6%	4,880	2.5%	5,020	2.9%	10.6%
Hillside ES	6,030	5,970	-1.0%	5,940	-0.5%	5,920	-0.3%	5,860	-1.0%	5,790	-1.2%	-4.0%
Mitchell ES	4,521	4,590	1.5%	4,640	1.1%	4,690	1.1%	4,700	0.2%	4,650	-1.1%	2.9%
Newman ES	8,319	8,290	-0.3%	8,230	-0.7%	8,190	-0.5%	8,110	-1.0%	7,950	-2.0%	-4.4%
District Total	28,905	28,960	0.2%	28,960	0.0%	29,040	0.3%	28,960	-0.3%	28,710	-0.9%	-0.7%

Table 2: Household Characteristics by Elementary Area, 2010 Census

	HH w/ Pop Under 18	% HH w/ Pop Under 18	Total Households	Household Population	Persons Per Household
Broadmeadow ES	876	47.0%	1,863	5,496	2.95
Eliot ES	638	37.8%	1,687	4,434	2.63
Hillside ES	744	32.2%	2,313	5,529	2.39
Mitchell ES	719	47.5%	1,515	4,521	2.98
Newman ES	1,210	40.7%	2,971	8,152	2.74
District Total	4,187	40.5%	10,349	28,131	2.72

Table 3: Householder Characteristics by Elementary Area, 2010 Census

	Percentage of Householders aged 35-54	Percentage of Householders aged 65+	Percentage of Householders Who Own Homes
Broadmeadow ES	47.7%	27.1%	97.0%
Eliot ES	44.6%	27.0%	74.4%
Hillside ES	38.8%	35.3%	72.3%
Mitchell ES	49.3%	22.9%	95.9%
Newman ES	45.4%	26.4%	82.9%
District Total	44.8%	28.1%	83.6%

McKibben Demographics

Table 4: Percentage of Households that are Single Person Households and Single Person Households that are over age 65 by Elementary Area , 2010 Census

	Percentage of Single Person Households	Percentage of Single Person Households and are 65+
Broadmeadow ES	16.0%	9.8%
Eliot ES	24.0%	10.2%
Hillside ES	32.7%	21.4%
Mitchell ES	13.8%	7.8%
Newman ES	19.9%	10.7%
District Total	**21.8%**	**12.4%**

Table 5: Elementary Enrollment (K-5), 2017, 2022, 2027, 2032

	2017	2022	2017-2022 Change	2027	2022-2027 Change	2032	2027-2032 Change	2017-2032 Change
Broadmeadow ES	543	535	-1.5%	529	-1.1%	501	-5.3%	-7.7%
Eliot ES	393	408	3.8%	446	9.3%	433	-2.9%	10.2%
Hillside ES	487	535	9.9%	509	-4.9%	468	-8.1%	-3.9%
Mitchell ES	498	466	-6.4%	441	-5.4%	404	-8.4%	-18.9%
Newman ES	672	693	3.1%	629	-9.2%	591	-6.0%	-12.1%
District Total	**2,593**	**2,637**	**1.7%**	**2,554**	**-3.1%**	**2,397**	**-6.1%**	**-7.6%**

Table 6: Age Under One to Age Ten Population Counts, by Year of Age, by Elementary Area: 2010 Census

	Under 1 year	1 year	2 years	3 years	4 years	5 years	6 years	7 years	8 years	9 years	10 years
Broadmeadow ES	63	58	87	92	92	105	116	99	128	115	108
Eliot ES	65	45	52	67	52	74	63	79	79	76	66
Hillside ES	66	57	71	74	73	78	80	80	75	97	74
Mitchell ES	52	59	63	78	93	78	102	96	87	99	97
Newman ES	80	111	102	107	115	111	140	125	154	155	162
District Total	**325**	**329**	**374**	**418**	**425**	**445**	**501**	**478**	**523**	**541**	**506**

Table 7: Comparison of District Enrollment by Grade with 2010 Census Counts by Age, 2011-2017

2010 Census	Under 1 year	1 year	2 years	3 years	4 years	5 years	6 years	7 years	8 years	9 years	10 years	11 years	12 years	13 years
Needham Public Schools Total	325	329	374	418	425	445	501	478	523	541	506	507	491	486
2017 Enrollment	411	448	396	481	453	450	408	446	435	414	441	395		
	126.5%	136.2%	105.9%	115.1%	106.6%	101.1%	81.4%	93.3%	83.2%	76.5%	87.2%	77.9%		
2016 Enrollment	369	433	397	473	455	425	421	445	431	416	446	396	401	
	113.5%	131.6%	106.1%	113.2%	107.1%	95.5%	84.0%	93.1%	82.4%	76.9%	88.1%	78.1%	81.7%	
2015 Enrollment		404	387	471	450	415	415	451	439	400	449	396	407	412
		122.8%	103.5%	112.7%	105.9%	93.3%	82.8%	94.4%	83.9%	73.9%	88.7%	78.1%	82.9%	84.8%
2014 Enrollment			365	449	444	416	409	439	451	404	457	400	418	416
			97.6%	107.4%	104.5%	93.5%	81.6%	91.8%	86.2%	74.7%	90.3%	78.9%	85.1%	85.6%
2013 Enrollment				406	441	419	413	444	436	427	467	404	414	417
				97.1%	103.8%	94.2%	82.4%	92.9%	83.4%	78.9%	92.3%	79.7%	84.3%	85.8%
2012 Enrollment					414	419	390	450	419	427	482	421	410	420
					97.4%	94.2%	77.8%	94.1%	80.1%	78.9%	95.3%	83.0%	83.5%	86.4%
2011 Enrollment						398	384	447	417	431	491	438	413	419
						89.4%	76.6%	93.5%	79.7%	79.7%	97.0%	86.4%	84.1%	86.2%

Revised: 11/26/2017

United States Census Bureau Building Permits

Year	Name	Single Family Units		Dual Occupancy Units		Three or Four Units		Five or More Units		Total	
		Buildings	Total Units	Buildings	Total Units	Buildings	Total Units	Buildings	Total Units	Buildings	Total Units
2000	Needham town	70	70	0	0	0	0	0	0	70	70
2001	Needham town	71	71	0	0	0	0	0	0	71	71
2002	Needham town	60	60	0	0	0	0	0	0	60	60
2003	Needham town	12	12	0	0	0	0	0	0	12	12
2004	Needham town	58	58	0	0	0	0	0	0	58	58
2005	Needham town	8	8	0	0	0	0	0	0	8	8
2006	Needham town	6	6	0	0	0	0	0	0	6	6
2007	Needham town	88	88	0	0	0	0	0	0	88	88
2008	Needham town	24	24	0	0	0	0	0	0	24	24
2009	Needham town	51	51	0	0	0	0	0	0	51	51
2010	Needham town	58	58	0	0	0	0	0	0	58	58
2011	Needham town	43	43	0	0	0	0	0	0	43	43
2012	Needham town	73	73	0	0	0	0	0	0	73	73
2013	Needham town	104	104	0	0	0	0	0	0	104	104
2014	Needham town	9	9	0	0	0	0	0	0	9	9
2015	Needham town	99	99	0	0	0	0	0	0	99	99
2016	Needham town	114	114	0	0	1	4	6	36	121	154

Needham, MA: Total Building Permits
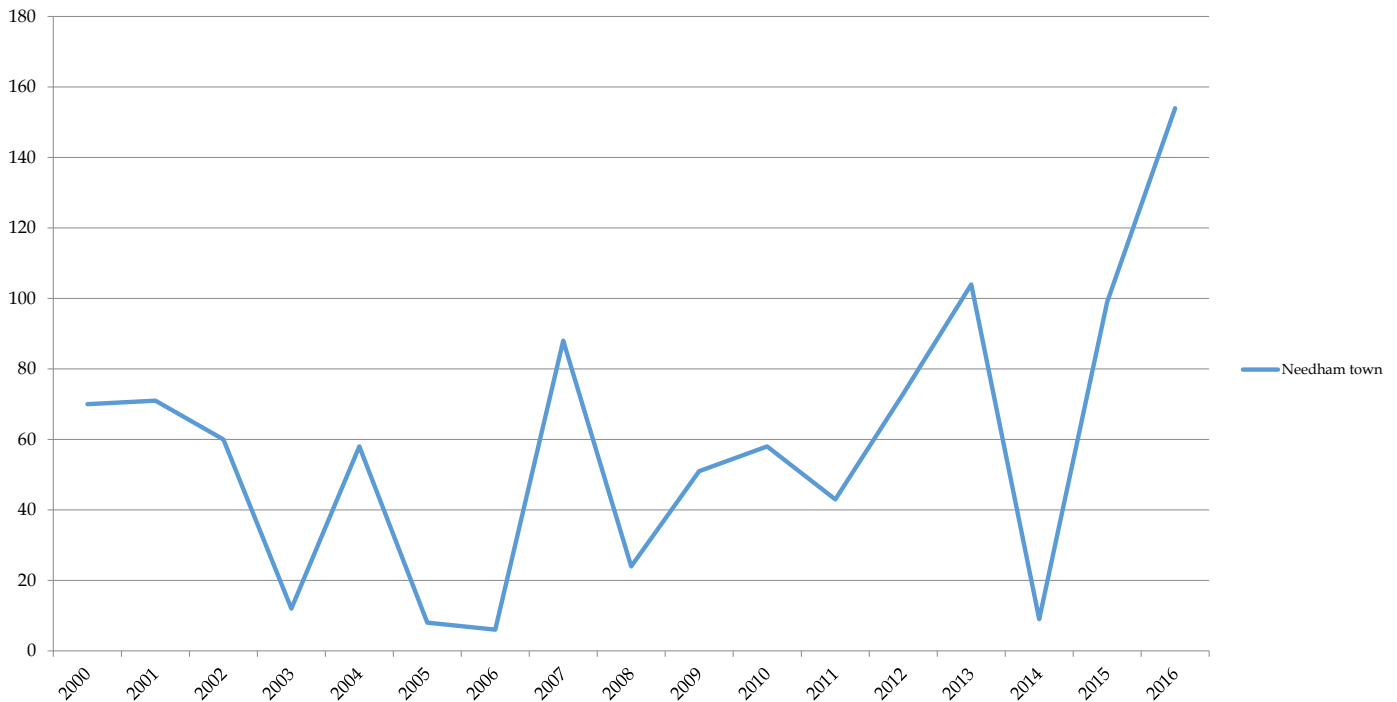
Needham Public Schools

Total	2010	2015	2020	2025	2030	2035
0-4	1,871	1,770	1,760	1,710	1,620	1,610
5-9	2,488	2,260	2,370	2,390	2,290	2,100
10-14	2,467	2,550	2,340	2,450	2,460	2,360
15-19	1,863	1,960	1,910	1,730	1,850	1,980
20-24	981	1,090	1,060	1,010	940	1,030
25-29	713	770	950	860	840	830
30-34	979	1,110	1,220	1,450	1,370	1,290
35-39	1,755	1,380	1,610	1,630	1,870	1,730
40-44	2,293	1,810	1,480	1,730	1,730	1,980
45-49	2,523	2,270	1,780	1,500	1,780	1,770
50-54	2,419	2,480	2,260	1,760	1,460	1,740
55-59	2,045	2,380	2,440	2,210	1,750	1,420
60-64	1,801	1,930	2,240	2,300	2,060	1,610
65-69	1,185	1,620	1,690	1,990	2,070	1,880
70-74	874	950	1,300	1,400	1,630	1,700
75-79	830	760	800	1,130	1,180	1,380
80-84	776	800	690	740	1,040	1,100
85+	1,041	1,070	1,060	1,050	1,020	1,200
Total	28,904	28,960	28,960	29,040	28,960	28,710
Median Age	42.9	44.4	44.3	43.7	43.6	43.6

	2010 to 2015	2015 to 2020	2020 to 2025	2025 to 2030	2030 to 2035
Births	1,070	1,080	1,110	1,140	1,150
Deaths	1,410	1,490	1,510	1,580	1,720
Natural Increase	-340	-410	-400	-440	-570
Net Migration	390	430	420	390	340
Change	50	20	20	-50	-230

Differences between period Totals may not equal Change due to rounding.

McKibben Demographics

Broadmeadow School

Total	2010	2015	2020	2025	2030	2035
0-4	391	350	400	370	340	310
5-9	562	500	480	510	490	440
10-14	545	580	520	490	520	500
15-19	340	410	420	380	360	420
20-24	138	130	170	140	140	160
25-29	97	80	60	70	50	60
30-34	127	160	160	200	190	150
35-39	378	260	320	300	320	290
40-44	465	390	280	340	310	330
45-49	512	460	380	280	340	310
50-54	441	500	460	380	270	330
55-59	394	430	500	450	380	270
60-64	329	380	420	480	430	360
65-69	207	280	330	360	430	390
70-74	172	150	210	270	290	340
75-79	155	150	100	190	230	240
80-84	142	150	140	90	170	210
85+	107	150	160	180	150	190
Total	5,498	5,510	5,510	5,480	5,410	5,300
Median Age	41.9	43.7	44.0	44.1	44.8	44.8

	2010 to 2015	2015 to 2020	2020 to 2025	2025 to 2030	2030 to 2035
Births	170	160	160	160	160
Deaths	230	250	270	270	310
Natural Increase	-60	-90	-110	-110	-150
Net Migration	70	80	70	60	50
Change	10	-10	-40	-50	-100

Differences between period Totals may not equal Change due to rounding.

Eliot School

Total	2010	2015	2020	2025	2030	2035
0-4	281	290	280	310	310	350
5-9	370	350	360	390	410	380
10-14	350	380	370	380	420	430
15-19	245	300	320	280	280	330
20-24	142	170	170	160	160	130
25-29	157	160	210	210	200	210
30-34	225	230	260	340	360	340
35-39	279	280	300	300	410	420
40-44	385	270	280	300	330	450
45-49	369	380	270	280	300	320
50-54	384	360	380	270	270	290
55-59	306	380	360	370	270	270
60-64	245	260	320	300	300	210
65-69	160	200	210	270	240	250
70-74	137	120	150	190	210	180
75-79	165	110	110	130	130	160
80-84	141	160	90	100	120	130
85+	197	200	200	180	160	170
Total	4,537	4,600	4,640	4,760	4,880	5,020
Median Age	42.8	42.6	40.9	40.2	38.7	39.0

	2010 to 2015	2015 to 2020	2020 to 2025	2025 to 2030	2030 to 2035
Births	200	210	220	240	240
Deaths	240	250	230	230	230
Natural Increase	-40	-40	-10	10	10
Net Migration	90	90	110	120	110
Change	50	50	100	130	120

Differences between period Totals may not equal Change due to rounding.

Revised: 11/26/2017

Hillside School

Total	2010	2015	2020	2025	2030	2035
0-4	341	350	350	330	300	300
5-9	410	410	460	460	430	380
10-14	373	420	410	470	470	440
15-19	445	300	220	270	350	370
20-24	353	300	230	180	220	270
25-29	191	240	230	160	120	170
30-34	230	280	320	300	220	170
35-39	337	350	420	440	410	320
40-44	416	370	350	420	440	410
45-49	475	410	360	350	420	430
50-54	463	470	410	360	340	410
55-59	388	460	460	400	360	330
60-64	362	370	440	440	380	340
65-69	238	330	340	390	400	360
70-74	179	200	290	270	300	330
75-79	165	160	180	230	230	270
80-84	217	160	140	170	210	210
85+	449	390	330	280	260	280
Total	6,030	5,970	5,940	5,920	5,860	5,790
Median Age	44.0	44.5	44.7	44.2	44.7	45.8

	2010 to 2015	2015 to 2020	2020 to 2025	2025 to 2030	2030 to 2035
Births	280	270	250	240	240
Deaths	400	370	350	350	360
Natural Increase	-120	-100	-100	-110	-120
Net Migration	60	70	70	60	50
Change	-60	-30	-30	-50	-70

Differences between period Totals may not equal Change due to rounding.

McKibben Demographics

Mitchell School

Total	2010	2015	2020	2025	2030	2035
0-4	344	270	260	250	240	240
5-9	461	420	440	420	380	360
10-14	417	470	440	460	430	400
15-19	270	350	410	380	400	380
20-24	120	140	170	190	160	200
25-29	85	70	80	70	90	90
30-34	148	170	160	160	170	170
35-39	294	190	220	210	240	230
40-44	400	310	210	270	230	260
45-49	407	400	310	230	290	260
50-54	383	400	390	300	230	290
55-59	351	380	390	390	300	210
60-64	299	340	360	370	370	280
65-69	174	270	280	340	360	350
70-74	116	130	210	250	300	310
75-79	86	100	100	190	220	250
80-84	79	80	100	90	170	200
85+	88	100	110	120	120	170
Total	4,521	4,590	4,640	4,690	4,700	4,650
Median Age	41.5	43.5	43.3	43.8	45.2	44.9

	2010 to 2015	2015 to 2020	2020 to 2025	2025 to 2030	2030 to 2035
Births	160	150	170	180	190
Deaths	170	190	210	230	270
Natural Increase	-10	-40	-40	-50	-80
Net Migration	80	90	80	70	60
Change	70	50	40	20	-20

Differences between period Totals may not equal Change due to rounding.

Newman School

Total	2010	2015	2020	2025	2030	2035
0-4	514	510	470	450	430	410
5-9	685	580	630	610	580	540
10-14	783	700	600	650	620	590
15-19	563	600	540	420	460	480
20-24	230	350	320	340	260	270
25-29	183	220	370	350	380	300
30-34	249	270	320	450	430	460
35-39	467	300	350	380	490	470
40-44	628	470	360	400	420	530
45-49	761	620	460	360	430	450
50-54	749	750	620	450	350	420
55-59	607	730	730	600	440	340
60-64	566	580	700	710	580	420
65-69	406	540	530	630	640	530
70-74	271	350	440	420	530	540
75-79	259	240	310	390	370	460
80-84	197	250	220	290	370	350
85+	201	230	260	290	330	390
Total	8,319	8,290	8,230	8,190	8,110	7,950
Median Age	43.9	46.2	46.7	45.6	44.8	44.3

	2010 to 2015	2015 to 2020	2020 to 2025	2025 to 2030	2030 to 2035
Births	260	290	310	320	320
Deaths	370	430	450	500	550
Natural Increase	-110	-140	-140	-180	-230
Net Migration	90	100	90	80	70
Change	-20	-40	-50	-100	-160

Differences between period Totals may not equal Change due to rounding.

Appendix C: Population Pyramids

Needham Public Schools Total Population – 2010 Census

Broadmeadow School Total Population – 2010 Census

Revised: 11/26/2017
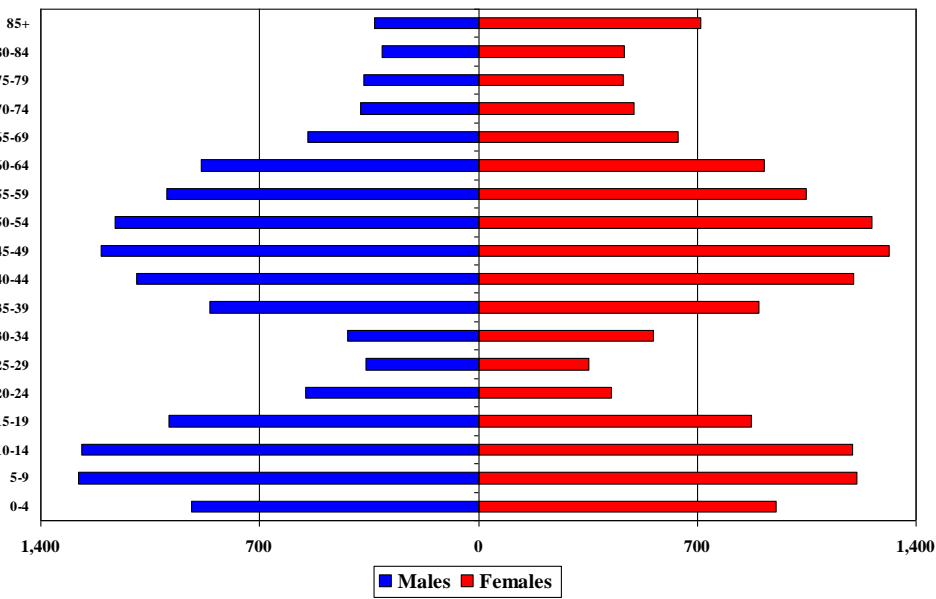
McKibben Demographics
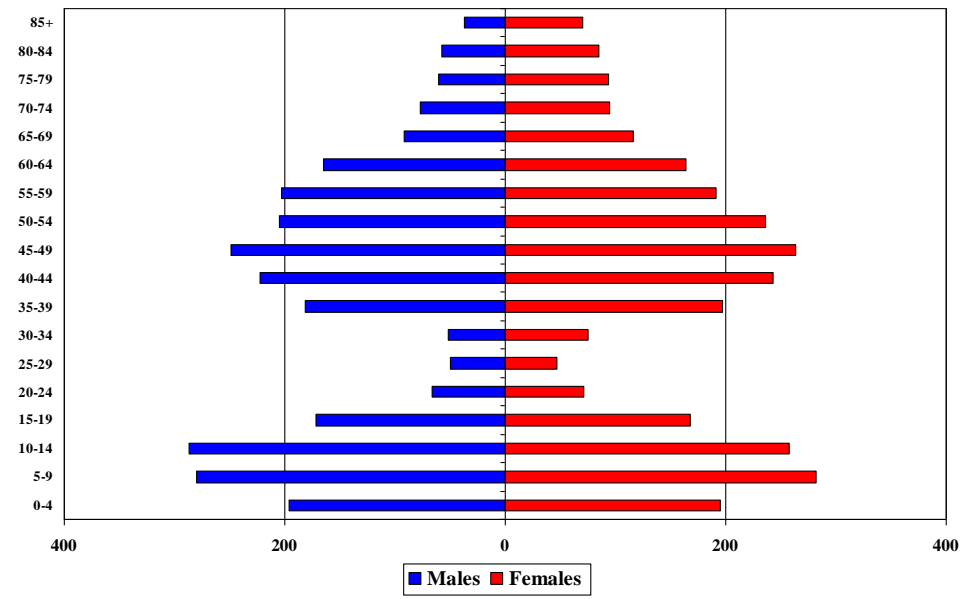
Eliot School Total Population – 2010 Census
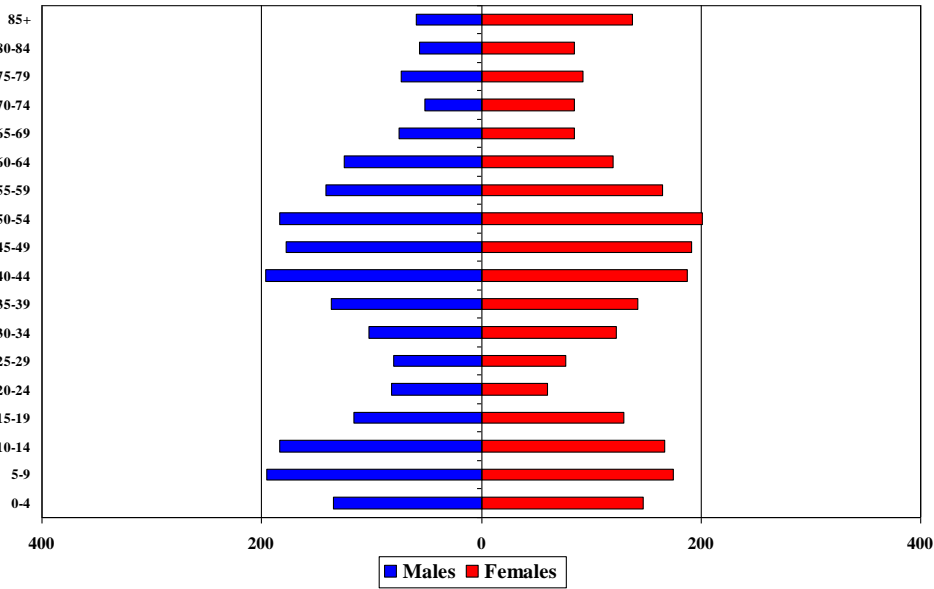
Hillside School Total Population – 2010 Census
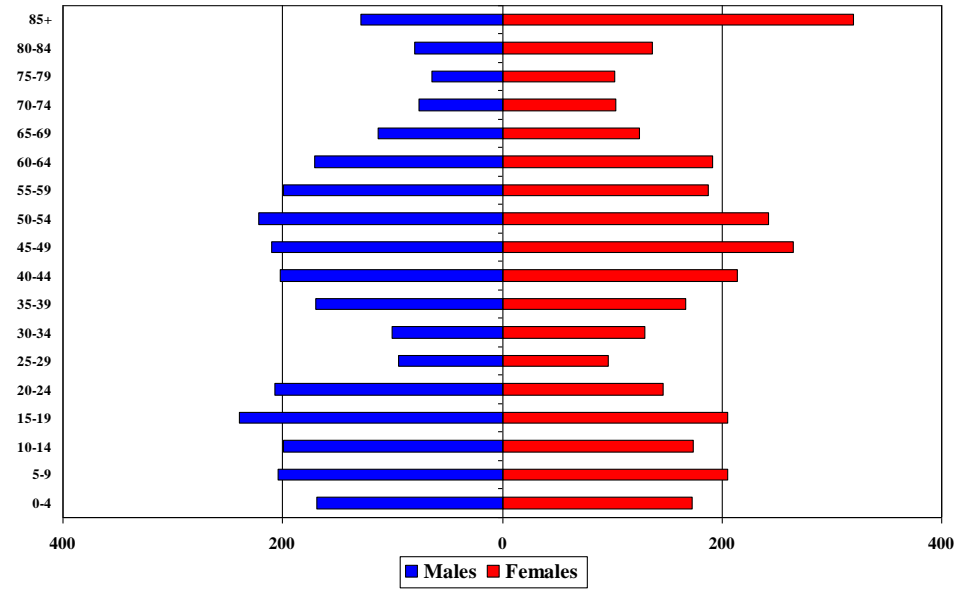
Mitchell School Total Population – 2010 Census
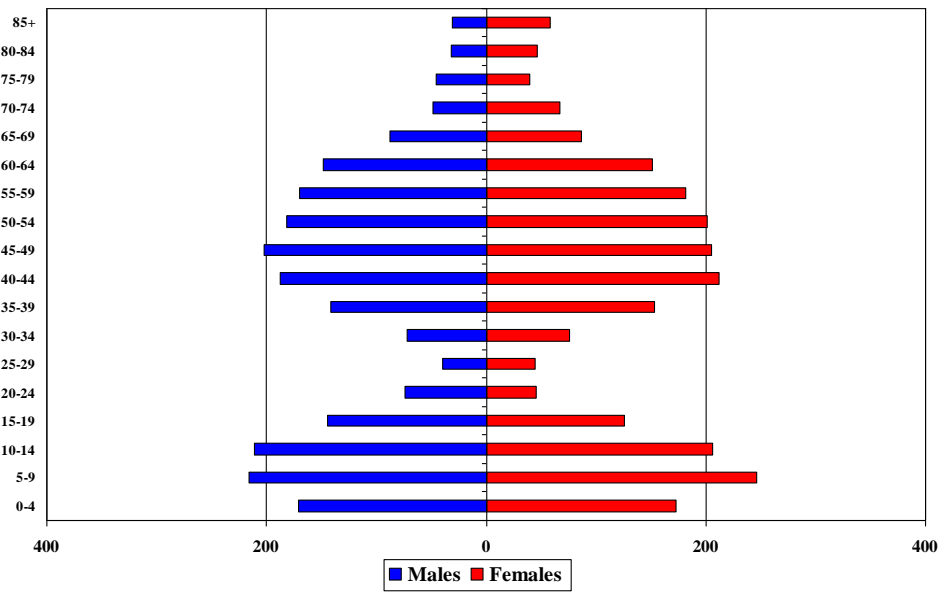
Newman School Total Population – 2010 Census

McKibben Demographics
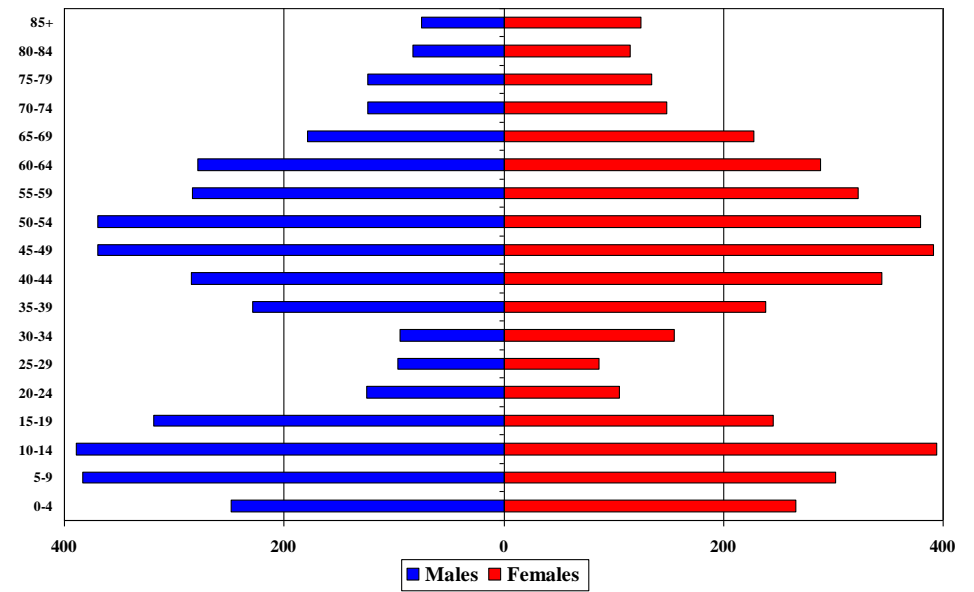
Appendix D: Enrollment Forecasts

Needham Public Schools: Total District Enrollment

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
PK	76	74	82	84	82	82	80	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82
K	363	398	414	406	365	404	369	404	406	403	401	401	399	399	396	393	391	383	376	370	366	359	358
1	439	384	419	441	449	387	433	411	440	435	432	430	427	422	422	419	416	413	406	399	393	386	379
2	422	447	390	419	444	471	397	448	423	453	448	444	441	438	433	434	429	427	424	417	409	403	396
3	436	417	450	413	416	450	473	396	452	427	457	454	451	448	445	441	442	436	434	431	425	417	411
4	485	431	419	444	409	415	455	481	398	454	429	459	457	454	451	449	444	447	441	439	436	429	421
5	430	491	427	436	439	415	425	453	482	399	455	430	462	459	456	453	451	448	451	445	442	439	432
Total: K-5	2,575	2,568	2,519	2,559	2,522	2,542	2,552	2,593	2,601	2,571	2,622	2,618	2,637	2,620	2,603	2,589	2,573	2,554	2,532	2,501	2,471	2,433	2,397
6	448	438	482	427	451	451	421	450	469	499	413	469	443	476	473	467	464	462	459	462	454	451	448
7	424	413	421	467	404	439	445	408	448	467	497	411	467	441	474	471	465	462	460	457	460	452	449
8	405	419	410	404	457	400	431	446	402	441	460	490	407	462	437	469	466	463	460	458	452	455	447
Total: 7-8	829	832	831	871	861	839	876	854	850	908	957	901	874	903	911	940	931	925	920	915	912	907	896
9	380	400	420	414	400	449	416	435	455	410	450	469	497	413	469	444	474	471	468	465	463	457	460
10	373	371	398	417	418	396	446	414	433	453	408	448	467	495	411	467	442	472	469	466	463	461	455
11	367	378	369	382	416	407	396	441	410	429	448	404	444	462	490	407	462	438	467	464	461	458	456
12	329	373	366	363	389	412	401	395	439	408	427	446	402	442	460	488	405	460	436	465	462	459	456
SP	-	-	9	6	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total: 9-12	1,449	1,522	1,562	1,582	1,631	1,672	1,659	1,685	1,737	1,700	1,733	1,767	1,810	1,812	1,830	1,806	1,783	1,841	1,840	1,860	1,849	1,835	1,827
Total: PK-12	5,377	5,434	5,476	5,523	5,547	5,586	5,588	5,664	5,739	5,760	5,807	5,837	5,846	5,893	5,899	5,884	5,833	5,864	5,833	5,820	5,768	5,708	5,650
Total: K-12	5,377	5,434	5,476	5,523	5,547	5,586	5,588	5,664	5,739	5,760	5,807	5,837	5,846	5,893	5,899	5,884	5,833	5,864	5,833	5,820	5,768	5,708	5,650
Change		57	42	47	24	39	2	76	75	21	47	30	9	47	6	-15	-51	31	-31	-13	-52	-60	-58
%-Change		1.1%	0.8%	0.9%	0.4%	0.7%	0.0%	1.4%	1.3%	0.4%	0.8%	0.5%	0.2%	0.8%	0.1%	-0.3%	-0.9%	0.5%	-0.5%	-0.2%	-0.9%	-1.0%	-1.0%
Total: K-5	2,575	2,568	2,519	2,559	2,522	2,542	2,552	2,593	2,601	2,571	2,622	2,618	2,637	2,620	2,603	2,589	2,573	2,554	2,532	2,501	2,471	2,433	2,397
Change		-7	-49	40	-37	20	10	41	8	-30	51	-4	19	-17	-17	-14	-16	-19	-22	-31	-30	-38	-36
%-Change		-0.3%	-1.9%	1.6%	-1.4%	0.8%	0.4%	1.6%	0.3%	-1.2%	2.0%	-0.2%	0.7%	-0.6%	-0.6%	-0.5%	-0.6%	-0.7%	-0.9%	-1.2%	-1.2%	-1.5%	-1.5%
Total: 6	448	438	482	427	451	451	421	450	469	499	413	469	443	476	473	467	464	462	459	462	454	451	448
Change		-10	44	-55	24	0	-30	29	19	30	-86	56	-26	33	-3	-6	-3	-2	-3	3	-8	-3	-3
%-Change		-2.2%	10.0%	-11.4%	5.6%	0.0%	-6.7%	6.9%	4.2%	6.4%	-17.2%	13.6%	-5.5%	7.4%	-0.6%	-1.3%	-0.6%	-0.4%	-0.6%	0.7%	-1.7%	-0.7%	-0.7%
Total: 7-8	829	832	831	871	861	839	876	854	850	908	957	901	874	903	911	940	931	925	920	915	912	907	896
Change		3	-1	40	-10	-22	37	-22	-4	58	49	-56	-27	29	8	29	-9	-6	-5	-5	-3	-5	-11
%-Change		0.4%	-0.1%	4.8%	-1.1%	-2.6%	4.4%	-2.5%	-0.5%	6.8%	5.4%	-5.9%	-3.0%	3.3%	0.9%	3.2%	-1.0%	-0.6%	-0.5%	-0.5%	-0.3%	-0.5%	-1.2%
Total: 9-12	1,449	1,522	1,562	1,582	1,631	1,672	1,659	1,685	1,737	1,700	1,733	1,767	1,810	1,812	1,830	1,806	1,783	1,841	1,840	1,860	1,849	1,835	1,827
Change		73	40	20	49	41	-13	26	52	-37	33	34	43	2	18	-24	-23	58	-1	20	-11	-14	-8
%-Change		5.0%	2.6%	1.3%	3.1%	2.5%	-0.8%	1.6%	3.1%	-2.1%	1.9%	2.0%	2.4%	0.1%	1.0%	-1.3%	-1.3%	3.3%	-0.1%	1.1%	-0.6%	-0.8%	-0.4%

Forecasts developed November 2017
Green Cells (2017-18 and earlier) are historical data
Blue Cells (2018-19 and later) are forecasted years

Revised: 11/26/2017

Broadmeadow School

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
K	79	83	100	84	76	81	71	71	79	80	81	81	81	81	80	79	78	78	77	76	76	75	74
1	116	84	89	108	104	83	89	85	86	87	88	89	89	88	88	87	86	85	84	83	82	81	80
2	87	117	88	92	106	107	84	90	88	89	90	91	92	92	91	91	90	89	88	87	86	85	84
3	107	87	119	94	93	104	110	85	92	90	91	93	94	95	95	94	94	93	92	91	90	89	88
4	117	105	87	120	89	91	107	106	83	90	88	89	92	93	94	94	93	93	92	91	90	89	88
5	104	115	105	87	113	92	92	106	105	82	89	87	87	90	91	92	92	91	91	90	89	88	87
Total: K-5	610	591	588	585	581	558	553	543	533	518	527	530	535	539	539	537	533	529	524	518	513	507	501

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
Total: K-5	610	591	588	585	581	558	553	543	533	518	527	530	535	539	539	537	533	529	524	518	513	507	501
Change		-19	-3	-3	-4	-23	-5	-10	-10	-15	9	3	5	4	0	-2	-4	-4	-5	-6	-5	-6	-6
% Change		-3.1%	-0.5%	-0.5%	-0.7%	-4.0%	-0.9%	-1.8%	-1.8%	-2.8%	1.7%	0.6%	0.9%	0.7%	0.0%	-0.4%	-0.7%	-0.8%	-0.9%	-1.1%	-1.0%	-1.2%	-1.2%

Forecasts developed November 2017

Green Cells (2017-18 and earlier) are historical data

Blue Cells (2018-19 and later) are forecasted years

Eliot School

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
K	53	62	59	58	57	61	57	64	64	63	63	64	65	68	70	72	74	71	69	67	66	65	66
1	73	54	65	65	67	61	64	58	67	67	66	66	67	67	70	72	74	76	75	73	71	69	68
2	69	68	56	67	71	73	57	65	59	68	68	67	67	68	68	72	74	76	78	77	74	72	70
3	70	69	66	61	63	72	73	57	66	60	69	69	68	68	69	70	74	76	78	80	78	75	73
4	83	70	70	62	67	63	74	75	58	67	61	70	70	69	69	71	71	75	77	79	81	79	76
5	61	86	71	74	65	65	67	74	76	59	68	62	71	71	70	70	72	72	76	78	80	82	80
Total: K-5	409	409	387	387	390	395	392	393	390	384	395	398	408	411	416	427	439	446	453	454	450	442	433

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
Total: K-5	409	409	387	387	390	395	392	393	390	384	395	398	408	411	416	427	439	446	453	454	450	442	433
Change		0	-22	0	3	5	-3	1	-3	-6	11	3	10	3	5	11	12	7	7	1	-4	-8	-9
% Change		0.0%	-5.4%	0.0%	0.8%	1.3%	-0.8%	0.3%	-0.8%	-1.5%	2.9%	0.8%	2.5%	0.7%	1.2%	2.6%	2.8%	1.6%	1.6%	0.2%	-0.9%	-1.8%	-2.0%

Forecasts developed November 2017

Green Cells (2017-18 and earlier) are historical data

Blue Cells (2018-19 and later) are forecasted years

Hillside School

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
K	61	73	72	71	57	82	76	83	82	83	82	82	81	80	79	77	76	73	72	71	70	68	67
1	64	67	76	73	79	62	82	82	86	87	88	87	86	85	84	83	81	80	78	77	76	74	72
2	73	63	66	72	75	88	71	85	85	89	90	91	90	89	88	87	85	84	83	81	80	79	77
3	72	76	61	73	72	80	87	72	86	86	90	91	93	92	91	90	89	87	86	85	83	82	81
4	100	68	77	59	76	76	79	86	73	87	87	91	92	94	93	92	91	92	90	89	88	85	84
5	59	98	67	81	62	77	77	79	87	74	88	88	93	94	96	95	94	93	94	92	91	90	87
Total: K-5	429	445	419	429	421	465	472	487	499	506	525	530	535	534	531	524	516	509	503	495	488	478	468

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
Total: K-5	429	445	419	429	421	465	472	487	499	506	525	530	535	534	531	524	516	509	503	495	488	478	468
Change		16	-26	10	-8	44	7	15	12	7	19	5	5	-1	-3	-7	-8	-7	-6	-8	-7	-10	-10
% Change		3.7%	-5.8%	2.4%	-1.9%	10.5%	1.5%	3.2%	2.5%	1.4%	3.8%	1.0%	0.9%	-0.2%	-0.6%	-1.3%	-1.5%	-1.4%	-1.2%	-1.6%	-1.4%	-2.0%	-2.1%

Forecasts developed November 2017

Green Cells (2017-18 and earlier) are historical data

Blue Cells (2018-19 and later) are forecasted years

Mitchell School

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
K	71	78	80	74	78	82	77	68	72	71	71	71	70	69	68	67	67	65	64	63	62	61	60
1	84	77	80	88	75	79	91	85	78	77	76	76	75	74	73	72	71	70	68	67	66	65	64
2	81	89	80	79	86	79	82	92	87	80	79	78	78	77	76	75	74	73	72	70	69	68	67
3	86	79	90	87	78	89	80	84	93	88	81	81	80	80	79	78	77	75	74	73	71	70	69
4	71	85	81	88	87	78	89	79	85	94	89	82	82	81	81	80	79	78	76	75	74	72	71
5	81	74	84	82	86	86	76	90	78	84	93	88	81	81	80	80	79	80	79	77	76	75	73
Total: K-5	474	482	495	498	490	493	495	498	493	494	489	476	466	462	457	452	447	441	433	425	418	411	404

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
Total: K-5	474	482	495	498	490	493	495	498	493	494	489	476	466	462	457	452	447	441	433	425	418	411	404
Change		8	13	3	-8	3	2	3	-5	1	-5	-13	-10	-4	-5	-5	-5	-6	-8	-8	-7	-7	-7
% Change		1.7%	2.7%	0.6%	-1.6%	0.6%	0.4%	0.6%	-1.0%	0.2%	-1.0%	-2.7%	-2.1%	-0.9%	-1.1%	-1.1%	-1.1%	-1.3%	-1.8%	-1.8%	-1.6%	-1.7%	-1.7%

Forecasts developed November 2017

Green Cells (2017-18 and earlier) are historical data

Blue Cells (2018-19 and later) are forecasted years

McKibben Demographics

Revised: 11/26/2017

Newman School

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
K	99	102	103	119	97	98	88	118	109	106	104	103	102	101	99	98	96	96	94	93	92	90	91
1	102	102	109	107	124	102	107	101	123	117	114	112	110	108	107	105	104	102	101	99	98	97	95
2	112	110	100	109	106	124	103	116	104	127	121	117	114	112	110	109	106	105	103	102	100	99	98
3	101	106	114	98	110	105	123	98	115	103	126	120	116	113	111	109	108	105	104	102	103	101	100
4	114	103	104	115	90	107	106	135	99	116	104	127	121	117	114	112	110	109	106	105	103	104	102
5	125	118	100	112	113	95	113	104	136	100	117	105	130	123	119	116	114	112	111	108	106	104	105
Total: K-5	653	641	630	660	640	631	640	672	686	669	686	684	693	674	660	649	638	629	619	609	602	595	591

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
Total: K-5	653	641	630	660	640	631	640	672	686	669	686	684	693	674	660	649	638	629	619	609	602	595	591
Change		-12	-11	30	-20	-9	9	32	14	-17	17	-2	9	-19	-14	-11	-11	-9	-10	-10	-7	-7	-4
% Change		-1.8%	-1.7%	4.8%	-3.0%	-1.4%	1.4%	5.0%	2.1%	-2.5%	2.5%	-0.3%	1.3%	-2.7%	-2.1%	-1.7%	-1.7%	-1.4%	-1.6%	-1.6%	-1.1%	-1.2%	-0.7%

Forecasts developed November 2017

Green Cells (2017-18 and earlier) are historical data

Blue Cells (2018-19 and later) are forecasted years

High Rock School

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
6	448	438	482	427	451	451	421	450	469	499	413	469	443	476	473	467	464	462	459	462	454	451	448
Total: 6	448	438	482	427	451	451	421	450	469	499	413	469	443	476	473	467	464	462	459	462	454	451	448

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
Total: 6	448	438	482	427	451	451	421	450	469	499	413	469	443	476	473	467	464	462	459	462	454	451	448
Change		-10	44	-55	24	0	-30	29	19	30	-86	56	-26	33	-3	-6	-3	-2	-3	3	-8	-3	-3
% Change		-2.2%	10.0%	-11.4%	5.6%	0.0%	-6.7%	6.9%	4.2%	6.4%	-17.2%	13.6%	-5.5%	7.4%	-0.6%	-1.3%	-0.6%	-0.4%	-0.6%	0.7%	-1.7%	-0.7%	-0.7%

Forecasts developed November 2017

Green Cells (2017-18 and earlier) are historical data

Blue Cells (2018-19 and later) are forecasted years

Revised: 11/26/2017

Pollard Middle School

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
7	424	413	421	467	404	439	445	408	448	467	497	411	467	441	474	471	465	462	460	457	460	452	449
8	405	419	410	404	457	400	431	446	402	441	460	490	407	462	437	469	466	463	460	458	452	455	447
Total: 7-8	829	832	831	871	861	839	876	854	850	908	957	901	874	903	911	940	931	925	920	915	912	907	896

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
Total: 7-8	829	832	831	871	861	839	876	854	850	908	957	901	874	903	911	940	931	925	920	915	912	907	896
Change		3	-1	40	-10	-22	37	-22	-4	58	49	-56	-27	29	8	29	-9	-6	-5	-5	-3	-5	-11
% Change		0.4%	-0.1%	4.8%	-1.1%	-2.6%	4.4%	-2.5%	-0.5%	6.8%	5.4%	-5.9%	-3.0%	3.3%	0.9%	3.2%	-1.0%	-0.6%	-0.5%	-0.5%	-0.3%	-0.5%	-1.2%

Forecasts developed November 2017

Green Cells (2017-18 and earlier) are historical data

Blue Cells (2018-19 and later) are forecasted years

Needham High School

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
9	380	400	420	414	400	449	416	435	455	410	450	469	497	413	469	444	474	471	468	465	463	457	460
10	373	371	398	417	418	396	446	414	433	453	408	448	467	495	411	467	442	472	469	466	463	461	455
11	367	378	369	382	416	407	396	441	410	429	448	404	444	462	490	407	462	438	467	464	461	458	456
12	329	373	366	363	389	412	401	395	439	408	427	446	402	442	460	488	405	460	436	465	462	459	456
Total: 9-12	1,449	1,522	1,553	1,576	1,623	1,664	1,659	1,685	1,737	1,700	1,733	1,767	1,810	1,812	1,830	1,806	1,783	1,841	1,840	1,860	1,849	1,835	1,827

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
Total: 9-12	1,449	1,522	1,553	1,576	1,623	1,664	1,659	1,685	1,737	1,700	1,733	1,767	1,810	1,812	1,830	1,806	1,783	1,841	1,840	1,860	1,849	1,835	1,827
Change		73	31	23	47	41	-5	26	52	-37	33	34	43	2	18	-24	-23	58	-1	20	-11	-14	-8
% Change		5.0%	2.0%	1.5%	3.0%	2.5%	-0.3%	1.6%	3.1%	-2.1%	1.9%	2.0%	2.4%	0.1%	1.0%	-1.3%	-1.3%	3.3%	-0.1%	1.1%	-0.6%	-0.8%	-0.4%

Forecasts developed November 2017

Green Cells (2017-18 and earlier) are historical data

Blue Cells (2018-19 and later) are forecasted years

Revised: 11/26/2017