

## Background

In the most recent elementary boundary process from Fall 2018, see <https://www.apsva.us/engage/elementary-school-boundary-change/> for background information, various boundary scenarios were developed which relied on projections of elementary students by planning units. In that 2018 process, the planning unit-level projections and the boundary scenarios were shared with the community at the same time. This concurrent approach, sharing data and scenarios, led to simultaneous questions about the planning unit data and boundary scenarios. In order to make the communication and review of data and boundary scenarios more manageable for the community and decision makers, the current 2020 elementary boundary process separates these two tasks: the sharing and review of planning unit information occurs first, in Spring 2020, and the boundary scenarios are a later process, scheduled to occur in Fall 2020.

In the Fall 2018 elementary school boundary process, the questions that were raised regarding the planning unit information ranged from specific assumptions--for example questions about the forecast of residential building, their units, or construction year--to methodology. The one recurring question that was raised throughout the Fall 2018 process was regarding the methodology to estimate future kindergarten students likely to attend their neighborhood school. In Fall 2018, APS staff used the approach of projecting the total kindergarten population living in each planning unit and then subtracting from each planning unit the estimated number of kindergarten students likely to attend an option school. The students likely to attend an option school by planning unit was based on each planning unit's relative total kindergarten population size. For example, the larger the kindergarten population for a planning unit, the higher the percentage of students assumed to attend an option school. In this approach, the remaining kindergarten students in each planning unit were those assumed to attend their neighborhood school.

In the Fall 2018 elementary school boundary process, the community and decision makers questioned the approach of estimating the number of kindergarten students who would attend an option school (and not attend their planning unit's neighborhood school) based on the planning unit's relative population size. The rationale for questioning this approach is that it did not account for the influence an option school's location is likely to have on a parent's decision to enroll their child in an option school. For example, it was asserted that a parent is more likely to enroll their kindergarten student in an option school if they live close to that option school. By extension, the percentage of kindergarten student's likely to attend their neighborhood school should be lower for planning units that are in proximity to an option school, since a high percentage of kindergarten students are enrolled in an option school.

In order to address these concerns expressed in 2018 regarding the estimation of future kindergarten students by planning units likely to attend their neighborhood school, the 2020 elementary school boundary process is asking the community to weigh in on which approach (described in the next sentence) is more reasonable. The accompanying planning unit data

table has elementary projections in which Kindergarten students likely to attend their neighborhood school were calculated according to a planning unit's relative kindergarten population size (Approach 1), similar to the 2018 approach; or based on a planning unit's half-mile proximity to an option school (Approach 2). Note that Approach 2 takes into consideration the fact that two option/school programs will relocate, thus planning units close to the relocated Immersion and Arlington Traditional elementary schools will have higher percentages of kindergarten students attending an option school.

## Data Sources

A special elementary enrollment (Grades K to 5) projections by Planning unit (planning unit) was produced in early 2020. These planning unit enrollment projections were calculated separately from, and use a different methodology than, the Fall 2019 ten-year projections. The planning unit enrollment projections are for Fall 2020 through Fall 2023. The planning unit projections used the following data sources:

- September 30, 2019 official enrollment counts by address from the Student Information System which are matched to planning units
- Historical Student Information System address-level data, also matched to current planning units, from September 30 of 2018, 2017, 2016, and 2015
- Planning Unit boundaries in a [GIS format](#), last updated in Fall 2018
- Housing Unit Forecast from Arlington County Government (ACG) from September 2019 and updated with ACG residential construction status information from March 2020, see Table 2. This data includes a timeline of when residential construction projects are forecasted by ACG to be completed and habitable, each project's residential type, number of net new units, and affordability levels. This information helps APS estimate the number of new students and the year that a given housing development will add students to neighborhood schools.
- Student Generation Rates used in the Fall 2019 ten-year projections and produced by APS staff are applied to the Housing Unit Forecast; see Attachment C at <https://www.apsva.us/wp-content/uploads/2019/12/2019-Report-Final.pdf>
- Actual Resident Live Births from 2015 through 2018 is sourced from ACG, who receive that information from the Virginia Department of Health. This historical information is for live births to mothers who reside in Arlington County.
- Birth to Kindergarten Ratio is updated on a yearly basis by APS staff. This ratio represents the percentage of children entering kindergarten in a particular year as compared to the total number of children born five years earlier to Arlington County parents. The birth to kindergarten used in the PLANNING UNIT enrollment projections used kindergarten enrollment counts from 2017 to 2019 and birth information from 2012 to 2014; it averaged 0.708 in this 3-year period.
- Spring Update to the 2020-21 School Year, available at <https://www.apsva.us/statistics/enrollment-projections/>, was used for the assumption of how many future Kindergarten students were likely to attend an option school, or not attend their neighborhood school. The 506 option school kindergarten students

estimate from the Spring Update to the 2020-21 School Year was assumed for each incoming Kindergarten cohort from Fall 2020 through Fall 2023.

## Planning Unit Projections Assumptions and Methodology

Below are notable assumptions and methodological steps used in the planning unit elementary enrollment projections. Note that the planning unit projections were produced in consultation with Dr. Richard Grip and they differ from the methods used to project the ten-year enrollment projections by schools from Fall 2019, which is available at this link: <https://www.apsva.us/wp-content/uploads/2019/12/2019-Report-Final.pdf>. Dr. Richard Grip, Executive Director of Statistical Forecasting LLC, has been advising APS staff on enrollment projections methodology since 2015 when he consulted on improvements to APS enrollment projections and County population forecasts as part of the Community Facilities Study, see <https://commissions.arlingtonva.us/community-facilities-study/documents/> for more information.

### **Projections Years**

An initial run of the planning unit projections was for the years 2020 to 2023. The reason for projecting out four years was because in this approach, the projections rely mostly on information from students that already attend APS as of September 30, 2019. For example, by projecting out four years a current Grade 4 student will be in Grade 5 in 2020, a current Grade 3 student will be in Grade 4 in 2020, a current Grade 2 student will be in Grade 3 in 2020, a current Grade 1 student will be in Grade 2 in 2020, and a current kindergarten student will be in Grade 1 in 2020.

In addition, in each projection year, assumptions must be made about future incoming kindergarten students for 2020 through 2023; they are students not in the APS system yet. A benefit of projecting out four years is that APS does have live birth records, courtesy of ACG, for the years 2015 to 2018. A certain percentage of 2015 births will enroll as APS kindergarten students in 2020, a percentage of 2016 births will be future kindergarteners in 2021, a percentage of 2017 births will be future kindergarteners in 2022, and a percentage of 2018 births will be future kindergarteners in 2023. As of May 7, 2020, neither ACG or The Virginia Department of Health's Division of Health Statistics have the number of actual births for Arlington County parents that occurred in 2019.

Upon request from Advisory Council on School Facilities and Capital Programs (FAC) and other members of the community, the planning unit elementary projections will project out one extra year to 2024. The 2019 births that will inform the 2024 kindergarten students was forecasted by ACG and RLS Demographics, a consultant who has worked with ACG on its Cohort Component Model to forecast births, and provided to APS on September 30, 2019.

### **Projecting Kindergarten Students by Planning Unit**

### Distributing future kindergarten students among 347 planning units

The planning unit projection estimate countywide kindergarten enrollment for 2020 to 2023 based on applying a Birth to Kindergarten Ratio (see prior section) to the known births from 2015 to 2018. This process will also be applied to the 2019 birth forecast from the county to estimate 2024 kindergarten enrollment. These births are then distributed among all 347 planning units based on each planning unit's unique three-year average kindergarten share of total kindergarten enrollment from 2017 to 2019.

### Estimating future kindergarten students from future residential construction

To each projected incoming kindergarten cohort, from 2020 to 2023, is added the additional kindergarten student estimated from ACG's housing units forecast by the relevant planning unit. The estimated student yield is calculated using the relevant student generation factor by the housing unit type (i.e., high-rise apartment, garden apartment, town house, etc.) and current school attendance zone. In incorporating the student yield from new development, it is assumed that the yield from newly-developed housing units will produce the same number of students every year once the development is constructed. Note that the kindergarten students estimated from forecasted [Committed Affordable Units \(CAFs\)](#) and single-family detached homes are incorporated into the enrollment projections in the year that these units are assumed to be built and in the relevant planning unit. Meanwhile, the estimated kindergarten students from forecasted market-rate or mixed-income residential developments were phased into the enrollment projections over a two-year period from the date that a residential development is estimated to be completed by ACG, at the planning unit-level. For all housing types and affordability designation the estimated kindergarten student yields are added cumulatively from 2020 to 2023.

### Estimating the number of kindergarten students by planning unit that are likely to attend their neighborhood school

When new kindergarten cohorts are allocated to a planning unit using (a) birth information and each planning unit's unique 3-year average kindergarten share and (b) the estimate of additional kindergarten students from the housing unit forecast, not all those projected kindergarten students are likely to attend their neighborhood school. Rather, a certain number of projected kindergarten students by planning unit will choose to attend an elementary option school. In the Fall 2020 elementary boundary process, all boundary scenarios will be based on projected elementary students likely to attend their neighborhood school by planning units. In the planning unit enrollment projections, two different approaches (Approaches 1 and 2 described below) were used to calculate the number of incoming kindergarten students likely to attend their neighborhood school by planning unit.

Each approach shares the assumption that each incoming kindergarten cohort in 2020 through 2023 will have 506 Grade K students who attend an option school (thus, they will not attend their planning unit's assigned neighborhood school). The assumption of the 506 option school student capacity comes from the Spring Update to the 2020-21 School Year (see *Data Sources* section). The 2020-21 Spring Update, which is used for staffing and budgeting purposes for each school and program, estimates the following number of Kindergarten students at following

schools: Arlington Traditional with 96 K students, Campbell with 72 K students, Claremont with 144 K students, Key with 144 K students, and the Montessori Public School of Arlington with 50 K students. A PDF copy of the Spring Update to the 2020-21 School Year can be accessed at [https://www.apsva.us/wp-content/uploads/2020/03/2020-03-19-Spring-Update-2020-21\\_for\\_website.pdf](https://www.apsva.us/wp-content/uploads/2020/03/2020-03-19-Spring-Update-2020-21_for_website.pdf).

From each incoming kindergarten cohort, these 506 kindergarten option school students were subtracted by planning unit to arrive at an estimate of kindergarten students likely to attend their neighborhood elementary school in the future by planning unit according to the two below approaches:

- **Approach 1:** In one approach, the 506 option school students were subtracted proportionally based on each planning unit's expected total kindergarten population, including new kindergarten students from new residential constructions.
- **Approach 2:** In the second approach, September 30, 2019 patterns for how many option school kindergarten students resided in planning units within 0.5-mile of an option school (41.6%) and how many resided in planning units beyond the 0.5-mile threshold (58.4%) were determined. These shares were then applied to the assumed 506 future option school students. With these shares applied, the number of assumed option school students in planning units within 0.5-mile of such schools—this reflects the school moves to take effect in 2021-22 for an Immersion program and Arlington Traditional—were subtracted from each relevant planning unit based on its proportional kindergarten population size (including the estimated kindergarten students from new construction). Likewise, the number of assumed kindergarten students residing beyond the 0.5-mile threshold were subtracted proportionally based on each planning unit's proportional kindergarten population (including the estimated kindergarten students from new construction).

In Approach 2, described above, the Superintendent's adopted recommendation to move three schools as part of the Elementary School Planning Process for the 2021-22 school year was assumed at the planning unit level. To learn more about the school moves, see <https://www.apsva.us/engage/planning-for-2020-elementary-school-boundary-process/>.

In either approach, when the kindergarten students estimated to attend an option school are subtracted from each planning unit's total kindergarten population, the remaining kindergarten students are those that are likely to attend their planning unit's assigned neighborhood school.

### **Assumption About Grade 1 to 5 Students Likely to Attend Their Planning Unit's Assigned Neighborhood School**

Previously, we outlined the assumptions and approach to project kindergarten students likely to attend their planning unit's assigned neighborhood school. For kindergarten to Grade 5 students attending APS as of September 30, 2019, it is known which students chose to attend their neighborhood school and which students chose to attend an option school. For purposes of the planning unit projections, student records were retrieved for September 30, 2019, Grade

K to 5 students attending neighborhood schools (not attending an option school). It was only these students who were aged into subsequent grades, in subsequent years, using a three-year average county-wide cohort transition rate.

#### **Cohort Transition, Kindergarten to Grade 5**

To “age” students from one grade to another—from one year to the next year—a three-year average county-wide cohort transition rate was calculated for Grades K to 1, 1 to 2, 2 to 3, 3 to 4, and 4 to 5. The three-year average used historical Sept. 30 enrollment from 2017, 2018, and 2019. These rates were applied to elementary cohorts at the planning unit level as they “age” to the next grade in the next school year.

#### **Estimating Future Grade 1 to 5 Students from Future Residential Construction**

To model projected enrollment for Grades 1 through 5, the student estimate from forecasted [Committed Affordable Units \(CAFs\)](#) and single-family detached homes are incorporated into the enrollment projections in the year that these units are assumed to be built and in the relevant planning unit. Meanwhile, the student yield from forecasted market-rate or mixed-income residential developments were phased into the enrollment projections over a two-year period from the date that a residential development is estimated to be completed by ACG, at the planning unit-level. The same assumptions were made for projected Kindergarten cohorts, but for this cohort the students estimates were added on a cumulative basis for each subsequent projection year.