Demographic School Analysis
Update 5 Years Out with
Attention to the Student
Projections for 2023
Gettysburg Area School District

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Demographic School Analysis Update 5 Years Out for the Gettysburg Area School District

PART 1: Comparison of Projected and Actual Student enrollment in 2023 (5 years out)

The present analysis provides an update of the student enrollment projections for the Gettysburg Area School District. We begin by reviewing the predictive accuracy of the 2023 projections—5 years out. The initial 5-year projections and observed values are shown in the upper quadrant of Table1, Scenario I, and include a major surprise. The predictive accuracy of our projections is generally in the upper 5%, that is 95% or higher. For instance, at the elementary and middle school levels, we find the accuracy in student enrollment in 2023 of 94% and 96%, respectively. In contrast, at the high school level, the predictive accuracy is 79%, which is totally unacceptable. The 1st task, given this unexpected finding, is to find out what is the source of the error or errors, to find out "why" and to "fix it". None of the prior analysis in 2019, up to the actual projections, are affected, namely births, net-migration and housing, though how the projections incorporate births, net-migration, and housing may be pertinent.

The 1st probes into what happened focused on high school and the number of students in the Tech Prep program. Currently, GASD students enrolled in the Adams County Tech Prep are also enrolled in the GASD, but there was a brief time during the evolution of Tech Prep that other school districts with students in the Tech Prep were also counted in the GASD enrollment. A brief coverage regarding Tech Prep is given in

the initial Demographic Study in 2019, pages 58-62. As will be shown, the distortion in the student enrollment counts resulting from Tech Prep counts is the main source of the predictive error and its manifestation is fairly clear in the retention ratio for G10-to→G11 (1.276), a VERY HIGH retention ratio largely responsible for the large over prediction of the number of students to expect in the high school in 2023. What was assumed in the 2019 study to be a large retention ratio, but one that would not be so consequential, was incorrect, especially now that the Tech Prep is an independent unit managed by Adams County. The source of the high school predictive error was an enrollment data set that goes back to 1990, with a brief period around 2012-2018 that included Tech Prep students from non-GASD districts. Regardless, the responsibility for the usage of this biased data set rests solely with the analyst. Consequently, we have utilized a different data set (October 1 enrollment per year), as well as a revised set of parameters (retention ratios) and made another set of projections that, it turns out, meet our standards. The results, shown in Scenario II in the lower quadrant of Table 1, can be compared with the actual observed changes in student enrollment. More detailed projections per year for the revised parameters are provided in Table 2 and for the biased parameters, the more detailed projections are shown in Table 2a. The revised parameters are provided in Table 3. Note: When making comparisons between actual or observed student enrollment and projected or predicted student enrollment in 2023, Tables 2 and 7 provide the data for cross-checking the numbers.

Using the October 1 data, the enrollment accuracy 5 years out from 2019 is now 97% at the elementary level, 99% at the middle school and 97% (vs 79%) at the high school. Total student enrollment was projected to be 2,816; actual enrollment was 2,813

(99.9%). These results show a projected decrease in elementary enrollment of 89 students; that is, from the 2019 enrollment of 1,212 students to the 2023 enrollment of 1,123 students. The actual enrollment In 2023 was 1,093, a decrease of 119 students (1,212 – 1,093), a difference of 30 students (119 – 89). The accuracy is computed with the following metric: 1.0 – (P – O/ O), where P represents predicted and O is the actual observed value. [When P – O is negative, we use the absolute value]. Also, we use O as the denominator, rather than P since we are making predictions that are not tied to an underlying statistical distribution, where statistics would normally use P as the denominator. (P – O)/ O is the percentage error and 1.0 - (P – O)/ O is the degree of accuracy. In the case of elementary enrollment, we have (P – O)/ O = (1,123 – 1,093)/ 1,093 or 30/1,093 = .027 and 1.0 - .027 =.97.3, an accuracy of 97%.

For the middle school, the predictive error is 5 students and .007 a predictive error of less than 1% and a predictive accuracy of 99%. Middle School enrollment changed very little over the last 5 years. It was 694 in 2019 and 682 in 2023, a drop of 12 students. The prediction in 2023 was 687 students, a drop of 7 students; the miss is 5 students, less than 1% from the number of students attending the middle school in 2023 (and a predictive accuracy of 99%).

What about the high school where the 2023 enrollment projections in Scenario I were quite inaccurate (79%)? As noted earlier, the essence of the problem was the counting of 1) non-GASD students in the Tech Prep program as well as 2) GASD students in Tech Prep, and 3) GASD students not in Tech Prep. This created a bump in GASD enrollment at the high school level and specifically at the G10→G11 transition where the ratio is 1.276, whereas in the revised retention ratio (see Table 3) G10→G11

is less than 1.0 (.989). As shown in Scenario II, the predicted 2023 high school enrollment was 1,006 students and the observed enrollment was 1,038—this time yielding a projected student undercount. Actual enrollment at the high school increased from 930 students to 1,038 or an additional 108 students; the predicted growth was 76 additional students, 32 below the observed number of additional students. The percentage error is 32/1,038 = .031 and the predictive accuracy is now 96.9 or 97%. Overall, student enrollment changed from 2,836 students to 2,813 students, a small decrease of 23 students. The predicted total student enrollment in 2023 is 2,816 students, a difference of only 3 students from that observed. This is a remarkable outcome, with a percentage error of .001 (3/2,813) and a predictive accuracy of 99.9%!

PART 2: Projected Student Enrollment in 2028, 10 Years Out

What about 10 years out, in 2028? Scenario II has both 2023 and 2028 projections, as shown in Table 2. These results are based on the Revised Retention Ratios in Table 3 and provide a follow up to the rather accurate results found in the 1st 5 years in Scenario II (Table 2) where we could observe the outcomes. The elementary enrollment is once again expected to decrease, but at a much lower rate with 35 fewer students in 2028 than in 2023. We know that the actual decrease in elementary student enrollment of 119 students between 2018 and 2023 [(1,212 -1,093) = 119], is 20 more than expected for 2023 (89) and only 5 students short of the projection for 2028, five years earlier and 10 years out (-124).

In contrast to the elementary case, in the first 5 years, the actual middle school enrollment was very stable with 694 students in 2019 and 682 students in 2023, a difference of 12 fewer students. The 5-year projection was extremely close—687

students, a difference of only 7 students. The 2nd 5 years is different, with an expected decrease of 33 middle school students—comparable to the expected decrease at the elementary level (-35 students).

Contrary to decreases at the elementary level and the middle school, the high school enrollment had a gain of 108 additional students in the 1st 5 years, 32 above the predicted number of 76 students. In the 2nd 5 years, this short-term gain is totally gone, reversing course, and is predicted to result in a reduction of 90 students by 2028. Should these projections hold, rather than a small student gain in enrollment, a loss of 14 high school students is expected, 10 years out. [76-90]

Overall, total student enrollment in the GASD was predicted to decrease by 20 students in the 1st 5 years. It actually decreased by 23 students, 5 years out. The prediction for enrollment 10 years out is a decrease of 178 students, from 2,836 in 2019 to 2,658 in 2028, with the bulk of the decrease in the next 5 years.

PART 3: Projected Student Enrollment in Each of the Three Elementary Schools in 2023 and 2028--5 and 10 years out.

We now briefly take a look at the projected student enrollment at each of the 3 elementary schools. Before doing so, we must overcome a serious challenge—how to link different, disaggregated enrollment data sets for 3 elementary schools and 7 municipalities, while also incorporating the number of births per year. We must allocate the births in each municipality to their entry at K in one of the elementary schools. We will use the following steps to specify the expected Kindergarten enrollment by year for each school: ***Step 1***. Estimate the weighted births per year per municipality $(.75 \times B_{t-5}) + (.25 \times B_{T-6})$; the annual births by municipality for 1990-2023 are given in Table 4. ***Step***

2. For the 2 municipalities that have 2 school districts—Mt. Joy Township and Straban Township, estimate the % share that pertains to the Gettysburg Area SD; ***Step 3***. Estimate the % distribution of allocated births in each municipality per school—based on the 2018 number of students in K + G1; then multiply the total number of births per year in that municipality by these %'s to obtain the number of births allocated to each elementary school; this is key, allocating total births to births per elementary school; ***Step 4***. Multiply the number of students estimated in Step 3 by .731, the B→K ratio, to obtain the expected number of K entries per year from each municipality to each school; and ***Step 5***. Sum the expected K entries per school across the municipalities to obtain the total expected K entries by year per school. We use the observed number of births per year for each municipality for the 2018 to 2028 projections. The share of Mt. Joy and Straban Townships' K + G1 GSAD students in 2018 was .79 and .88, respectively. The K+G1 distribution of students by school and municipality is given below:

	Elementary School		x
Municipality	Franklin Township	James Gettys	Lincoln
Mt. Joy Twp	0	0	1.0
Straban Twp	.017	.750	.233
Cumberland Twp	.254	.410	.336
Franklin Twp	.952	.032	.016
Freedom Twp	0	0	1.0
Gettysburg Boro	.017	.383	.600
Highland Twp	.933	0	.067

The share of Straban Townships' K + G1 students in 2018 was .84, which was used in this update.

The results are shown in Tables 5a, 5b and 5c for Franklin. James Gettys and Lincoln Elementary Schools, respectively. The Franklin Township Elementary school projection for 2023 was 321 students; for the James Gettys school, 346 students and

for the Lincoln Elementary school 425 students. The changes in expected student enrollment include 384→321(-63), 416→346 (-70) and 412→425 (+13) for Franklin Township, James Gettys and Lincoln Elementries, respectively. The degree of accuracy in student enrollment 5 years out at Franklin Elementary was 88%, at James Gettys Elementary it was 97% and at Lincoln Elementary it was 92%. See Table 6. What perhaps is an important element of this analysis is the development of a new way to specify the distribution of Kindergarten entries to specific elementary schools beyond a one-to-one linkage with births, municipalities and the elementary school.

PART 4: Student Enrollment Over the Past Decade with Attention to 5 and 10 Years Out—2023 and 2028

Actual (vs predicted) total student enrollment, including LIU enrollment and enrollment by educational level, is shown in Table 7 for years 2010 to 2023. As noted earlier, when making comparisons between actual or observed student enrollment and projected or predicted student enrollment in 2023, Tables 2 and 7 provide the data for cross-checking the numbers.

We make 2 other initial observations. First, with 1 exception, 2010 at the elementary level, all of the other 95 cells in Table 7 have enrollments with a difference across years less than 100 students per column. There are no major outliers. For instance, take the Grand Total column, the change in Grand Total enrollment in the last 5 years (+32 students), the prior 5 years (-43 students) or the last 10 years (-11 students). The fact that there are no large differences in the Grand Total is, in part, a reflection that there are complementary increases and decreases, as -32 + 43, together yielding a change of only 11 students. In fact, the change in the number of Grand Total

students in the last 5 years, (-32 students) is due to a decrease of 119 students at the elementary level and an increase of 108 students at the high school; (see Table 7, high school column), as well as a decrease of 12 students in the middle school. Secondly. the primary factors were the relatively large complementary shifts in enrollment at the elementary level and the high school—with students at the high school increasing at the same time that elementary student enrollment was decreasing. Elementary enrollment has decreased by over 100 students, while high school enrollment has increased by over 100 students and Grand Total enrollment has been stable with only a decrease pf 32 students.

Alternative Schooling We now turn to students opting for alternative schooling -- private/parochial (P/P), cyber/charter (C/C) and home schooling (HS). The number of students in each is provided in Table 8. The number of students being “home schooled” is unavailable for most years, but in the last 5 years, it has averaged 137 students/yr. The P/P average per year was 153 students, while C/C averaged 187/yr. Many of these students enter GASD at Grade 6 as reflected in the G5→G6 retention ratio, shown in Table 3. We also note that P/P has somewhat stabilized; prior to 2013 it was never below 200 students. The combined P/P and C/C enrollments averaged over 300 students/yr. and it appears that this combination may be leveling off or declining.

PART 5: New Housing in the GASD, with Attention to the Last 5-10 Years

Table 9, Part 1 provides data on new housing construction (via building permits) per year and municipality within GASD for the 5-year period 2014-2018. We need this data to establish a floor or baseline for new construction from 2019 forward. Table 9, Part 2

pertains to the 2nd 5+ years (2019-2024) for the construction up to 2024, 5 years out from 2019. Cumberland Township, by far, had the most new-housing construction in the 1st of these 2 periods (52/yr.). followed by a distant 2nd in Mt Joy Township (12/yr.) and then by Straban Township (8/yr.) and Franklin Township (8/yr.)

In the 2nd period, 2019-2024, Straban Township has an extremely large development for residents 55+, Amblebrook, with 2,018 new homes (all SFDs). An estimate of 750 homes have been built, starting in 2019, for an annual average of 125/yr. Amblebrook, due to restrictions to 55+ residents, is not pertinent for estimating school age students. Recall that enrollment was very stable in this 2nd period without adding direct impacts from new-housing construction. Moreover, the "embedded" impacts from housing are definitely occurring for districts, such as the case of GASD, where substantial housing construction is underway. Thus, the total average per 5-year period for all municipalities combined is one possible baseline. In period 1, the overall average was 75/yr. which in the 2nd period decreased a bit to 65/yr.

Table 10 shows the student/housing ratios for the 5 developments in Cumberland Township and the one in Mt.Joy. These plans had almost 600 new homes (598), of which 459 new homes were built. The number of students residing in those homes (151) provides the numerator for the S/H ratio. It is generally quite low, consistent with the findings of the 2019 study. The average S/H ratio for the GASD is .329 or .33, meaning that per 100 new homes, we can expect 33 new students. If, on the other hand, the new developments have a S/H ratio of .70, then the direct impact from new housing would be doubled, with an expectation of 70 new students. But much of the future growth will be tied to the S/H ratio in the new homes expected to begin

construction in 2025. See Table 11a for the expected number of homes per development, including current developments in Cumberland and Mt.Joy Townships. Table 11b lays out the future housing developments, including one “moving dirt” in January 2025. The full set of developments include 419 SFRs, 281 Townhomes and 1,000 Apartment Units, all in Straban Township, and all approved. This is not necessarily unique to the GASD, as indicated by the SRFs and THs in Cumberland Township, the Links and Lake Heritage, shown In Table 11a and excepting the 1,000 Apartments. In terms of predicting the future, there are too many unknown factors, such as the starting dates, the rate of construction, the new S/H ratios and the scheduling of construction for the different types of homes—much of which requires waiting until more data comes in to fill in some of these unknowns. Will this be a “new game”? Are these projects going to have a relatively fast rollout individually or collectively. Is the time frame for the set of developments in Table 11b a decade or longer? Will all of the developments be on-going at the same rate of construction? What are the S/H ratios per development? Are they different from those in Table 10 or from each other? What is the baseline that must be surpassed for additional direct impacts to become operative? Will construction top 65-70 new homes per year and be over 100/yr? Is this a new inflection point for housing in the Gettysburg Area School District? These are some of the questions that come to mind.

PART 6: Reset

Presently, we will extend this update to 2033; that is, from the original 2018 to 2023 (5 years out) and 2028 (10 years out), as in Table 2, for another 5 years—to 2033. We initialize the projections at 2023, holding the forecast once again to 10 years. We

also re-estimate the 4-year retention ratios (2020-2023) for all grades (see Table 12), and use 5-year weighted births for a 1,152/5 =230 births/year once beyond the known or observed births. The results for the forecasts are given in Table 13.

In the first 5 years, 2023→2028, the elementary schools are expected to have a loss of 43 students, followed in the 2nd 5 years, 2028→2033, by a gain of 15 students, so that by 2033 enrollment is expected to have a relatively small decrease of 28 students. Similarly, the middle school enrollment is also expected to have a decrease of 24 students by 2028, followed by an increase of 13 students by 2033, so that by the end of the decade, (2023-2033), the change is only few students (-11).

High school enrollment is expected to have a much larger change by 2028, and subsequently also by 2033, both expected to be decreases, first by -54 students, then by -60 students. Overall, high school enrollment is projected to decrease by 114 students by 2033 with the total enrollment for all three educational levels decreasing by 153 students,10 years out.

Results at the three elementary schools for the decade 2023-2033 is given in Tables 14a, 14b and 14c, pertaining to Franklin, James Gettys and Lincoln, respectively. Enrollment at Franklin Township Elementary School is expected to decrease by 46 students by 2028, followed by only 9 fewer students by 2033 [337→316→307]. The James Gettys Elementary School enrollment is also expected decrease in both 5-year frames, but by rather small amounts in each 5-year period (-!8 and -9); that is 337→319→310. Finally, the Lincoln Elementary School is expected to have an increase oof 33 students in the 1st 5 years, followed by a comparable decrease in students (-36) in the 2nd 5 years; specifically 392→425→389.

Table 1

Comparison of Projected and Actual Student Populations in 2023 (5 Years Out): Predictive Accuracy Overall and By Level

Scenario I: 5 year projections (Biased data/retention ratios)					
	A 2018 School Population	P 2023 Projected Population	O 2023 Actual (Observed) Population	(P-O)	Percentage Accuracy[1]
Elementary	1,243	1,158	1,093	+65	94.1
Middle School	738	713	682	+31	95.5
High School	1,109	1,259	1,038	+221	78.7
Total	3,090	3,130	2,813	+317	88.7
Scenario Ii: 5 Year Projections (Revised retention ratios)					
	A 2018 School Population	P 2023 Projected Population	O 2023 Actual (Observed) Population	(P-O)	Percentage Accuracy[1]
Elementary	1,212	1,123	1,093	+30	97.3
Middle School	694	687	682	+5	99.3
High School	930	1,006	1,038	-32	96.9
Total	2,836	2,816	2,813	+3	99.9

[1] [1 - (P-O)/O]; when the (P-O) is negative, we use the absolute value in computing the accuracy %.

Table 2

Gettysburg Area School District Forecasts per Grade: 2018-2028 Fertility/Aging/Embedded Growth Scenario with *Revised Current Retention and Birth to Kindergarten Ratios and Current Fertility Level* [Scenario II][1]

	K	G1	G2	G3	G4	G5	Total K→G5	G6	G7	G8	Total G6→G8	G9	G10	G11	G12	Total G9 → G12	K →G12	LIU/
2018	184	179	177	221	199	252	1,212	234	229	231	694	255	252	201	222	930	2,836	69/2,905
2019	171	192	184	184	223	205	1,159	271	240	234	745	234	257	249	197	937	2,841	85/2,926
2020	181	178	198	192	186	230	1,165	221	278	246	745	238	235	254	244	971	2,881	64/2,945
2021	162	189	183	206	194	192	1,126	248	227	285	760	250	239	232	248	969	2,855	87/2,942
2022	165	169	194	191	208	200	1,127	207	254	232	693	289	252	236	227	1,004	2,824	62/2,886
2023	168	172	174	202	193	214	1,123	215	212	260	687	235	291	249	231	1,006	2,816	60/2,876
2024	168	175	177	181	204	199	1,104	230	221	217	668	264	236	288	244	1,032	2,804	71/2,875
2025	168	175	180	184	183	210	1,100	214	236	226	676	220	266	233	282	1,001	2,777	71/2,848
2026	168	175	180	185	186	189	1,083	226	220	242	688	229	221	263	228	941	2,712	71/2,783
2027	168	175	180	185	187	192	1,087	204	232	225	661	246	230	219	257	952	2,700	71/2,788
2028	168	175	180	185	187	193	1,088	207	209	238	654	228	247	227	214	916	2,658	71/2,729

	2018	2023	2028	Δ2023-2018	Δ2028-2023	Δ2028-2018
K→G5	1,212	***1,123***	1,088	-89 (-7%)	-35 (-3%)	-124 (-10%)
G6→G8	694	***687***	654	-7 (-1%)	-33 (-5%)	-40 (-6%)
G9→G12	930	***1,006***	916	+76 (+8%)	-90 (9%)	-14 (-2%)
Total	2,836	***2,816***	2,658	-20 (-1%)	-158 (-6%)	-178 (-6%)

[1] * This scenario uses the following parameters: (1) Baseline four-year retention ratios (2014-2017), as shown in Table 3; (2) Birth at t-5 to K enrollment ratio of .731; this is derived as follows: (a) a baseline .75 (t-5 Births) + .25 (t-6 Births) for births in years 2009-2013 and 2015-2018 K enrollments. For years 2019-2022, observed births in 2013-2017 in the Gettysburg Area School District were used. For years 2023-2028, the number of births was assumed to remain at the current 5 yr. level (230/yr.)

Table 2a

Gettysburg Area School District Forecasts per Grade: 2019-2028 Fertility/Aging/Embedded Growth Scenario with Biased Retention Ratios and Current Birth to Kindergarten Ratios and Current Fertility Levels [Scenario I][1]

	K	G1	G2	G3	G4	G5	Total K→G5	G6	G7	G8	Total G6→G8	G9	G10	G11	G12	Total G9 → G12	Total K → G12
2018	185	179	180	223	206	270	1,243	246	244	248	738	264	264	292	289	1,109	3,090
2019	171	193	186	190	230	216	1,186	287	256	249	792	257	271	337	284	1,149	3,127
2020	181	179	201	197	196	241	1,195	230	298	261	789	258	263	346	328	1,195	3,179
2021	162	189	186	213	203	205	1,158	256	239	304	799	271	264	336	337	1,208	3,165
2022	165	169	197	197	220	213	1,161	218	266	244	728	315	278	337	327	1,257	3,146
2023	168	172	176	208	203	231	1,158	226	215	272	713	253	323	355	328	1,259	3,130
2024	168	176	179	186	215	213	1,137	246	224	220	690	282	259	412	346	1,299	3,126
2025	168	176	183	189	192	225	1,133	226	256	229	711	228	289	330	401	1,248	3,092
2026	168	176	183	194	185	201	1,107	239	235	261	735	237	233	369	321	1,160	3,002
2027	168	176	183	194	200	194	1,115	214	248	240	702	271	243	297	359	1,170	2,987
2028	168	176	183	194	200	210	1,131	206	222	253	681	249	278	310	289	1,126	2,938

	2018	2023	2028	Δ2023-2018	Δ2028-2023	Δ2028-2018
K→G5	1,243	1,158	1,131	-85 (-7%)	-27 (-2%)	-112 (-9%)
G6→G8	738	713	681	-25 (-3%)	-32 (-4%)	-57 (-8%)
G9→G12	1,109	1,259	1,126	+150 (+14%)	-133 (-11%)	+17 (+2%)
Total	3,090	3,130	2,938	+40 (+1%)	-192 (-6%)	-152 (-5%)

[1] * This scenario uses the following parameters: (1) Baseline four-year retention ratios (2014-2017), as shown in Table 3; (2) Birth at t-5 to K enrollment ratio of .731; this is derived as follows: (a) a baseline .75 (t-5 Births)+ .25 (t-6 Births) for births in years 2009-2013 and 2015-2018 K enrollments. For years 2019-2022, observed births in 2013-2017 in the Gettysburg Area School District were used. For years 2023-2028, the number of births was assumed to remain at the current level (230/yr.)

Table 3

Gettysburg Area School District
Retention Ratios 2014-2017[§]
(Four-Year Averages)

	Biased Est	***Revised Est***
	2014-2017	***2014-2017***
K→G1	1.045	***1.043***
G1→G2	1.040	***1.029***
G2→G3	1.058	***1.042***
G3→G4	1.032	***1.009***
G4→G5	1.048	***1.031***
G5→G6	1.063	***1.077***
G6→G7	1.039	***1.026***
G7→G8	1.021	***1.024***
G8→G9	1.037	***1.015***
G9→G10	1.025	***1.006***
G10→G11	**1.276**	***.989***
G11→G12	.974	***.978***
$B_{t-5} \rightarrow K_t$*	***.731***	***.731***

[§] Data for the retention ratios for 2014-2017 included student populations for 2014-2018—the beginning school year enrollment; For the Birth to Kindergarten ratio, we use four-year averages for (.75 x Birth at t-5) + (.25 x Birth at t-6 and Kindergarten enrollment at t; eg., the header for 2014-2017 refers to the most recent K enrollments in 2015-2018 and births from 2009-2013.

Table 4

Annual Number of Births to Gettysburg Area School District Residents by Municipality and Year: 1990-2023[1]

Year//5-Yr. Period	Gettysburg Borough	Cumberland Twp	Franklin Twp	Freedom Twp	Highland Twp	Mt.Joy Twp	Straban Twp	Total
1990	82	87	49	4	9	42	59	332
1991	91	56	51	7	9	35	46	295
1992	83	59	56	6	6	23	54	287
1993	98	39	45	12	7	28	53	282
1994	80	52	36	7	4	25	57	261
1995	79	44	46	7	10	32	40	258
1996	100	31	49	10	7	23	35	255
1997	93	46	39	6	5	28	41	258
1998	98	33	37	5	10	27	49	259
1999	79	32	46	4	8	26	40	235
2000	86	35	44	6	11	35	44	261
2001	89	38	48	4	9	29	35	252
2002	78	38	41	3	3	19	47	229
2003	86	25	52	4	12	28	48	255
2004	105	40	44	7	6	29	36	267
2005	111	42	48	6	12	21	47	287
2006	92	40	44	2	10	22	43	253
2007	120	41	52	4	14	28	54	313
2008+	108	31	48	9	9	31	42	278
2009	73	42	42	0	14	28	40	239
2010	109	50	43	3	7	26	26	264
2011	90	51	38	3	9	26	40	257
2012	71	43	50	8	10	22	25	229
2013	74	39	47	3	5	22	33	223
2014	85	48	44	3	5	18	34	237
2015	75	40	51	8	5	28	43	250
2016	65	39	39	6	7	21	34	211
2017	70	46	49	7	3	16	39	230
2018	69	46	38	10	7	26	25	221
2019	63	44	45	2	8	17	28	207
2020	62	39	49	6	9	30	33	228
2021	53	57	46	5	9	25	43	238
2022	46	61	40	12	6	26	28	219
2023	52	50	40	8	7	23	29	209
5-yr sums								
∑ 1990-1994	434	293	237	36	35	153	269	1,457
∑ 1995-1999	449	186	217	32	40	136	205	1,265
∑ 2000-2004	444	176	229	24	41	140	210	1,264
∑ 2005-2009	504	196	234	21	59	130	226	1,370
∑ 2010-2014	429	231	222	20	36	114	158	1,210
∑ 2015-2019	342	215	222	33	30	108	169	1,119
∑ 2020-2023	215	207	175	31	31	104	133	894

[1] Source: Pennsylvania Department of Health; note that the bottom row in the next to the last quadrant pertains to 4 years with an average/yr. divisor of 4 vs 5.

Average/ yr.							Cont…	
1990-1994	86.8	58.6	47.4	7.2	7.0	30.6	53.8	291.4
1995-1999	89.8	37.2	43.4	6.4	8.0	27.2	41.0	253.0
2000-2004	88.8	35.2	45.8	4.8	8.2	28.0	42.0	252.8
2005-2009	100.8	39.2	46.8	4.2	11.8	26.0	45.2	274.0
2010-2014	85.8	46.2	44.4	4.0	7.2	22.8	31.6	242.0
2015-2019	68.4	43.0	35.0	6.6	6.0	27.0	26.6	**223.8**
2020-2023	53.8	51.8	43.8	7.8	7.8	26.0	33.3	**223.5**

Table 5a-E1

Franklin Township Elementary School
Forecasts per Grade: 2018-2028
Fertility/Aging/ Embedded Growth Scenario[1]
[Scenario E1]

	K	G1	G2	G3	G4	G5	*Total K→G5*
2018	69	52	54	67	62	80	***384***
2019	40	72	54	56	68	64	***354***
2020	42	42	75	56	57	70	***342***
2021	50	44	44	78	57	54	***332***
2022	46	52	46	46	79	59	***328***
2023	44	48	54	48	46	81	***321***
2024	45	46	50	56	48	47	***292***
2025	47	47	47	52	57	49	***294***
2026	56	49	48	49	52	59	***308***
2027	47	58	50	50	49	54	***302***
2028	46	49	60	50	50	51	***303***

	∆2023-2018	**∆2028-2023**	**∆2028-2018**	**∆Peak**	**Peak Size**
K→G5	-63	-18	-81	-81	384

[1] This scenario uses the following parameters: (1) Baseline four-year retention ratios (2014-2017), as shown in Table 3; (2) Birth at t-5 to K enrollment ratio of .731. For years 2019-2022, the observed births from 2014-2

Table 5b-E2

James Gettys Elementary School
Forecasts per Grade: 2018-2028

[Scenario E2]

	K	G1	G2	G3	G4	G5	*Total K→G5*
2018	58	57	67	78	69	87	***416***
2019	57	60	54	70	79	71	***391***
2020	48	59	62	56	71	81	***377***
2021	57	50	71	65	57	73	***363***
2022	50	59	51	64	66	59	***349***
2023	47	52	61	53	65	68	***346***
2024	48	49	54	64	53	67	***335***
2025	42	50	50	56	65	55	***318***
2026	57	44	51	52	57	67	***328***
2027	49	59	45	53	52	59	***317***
2028	47	51	61	47	53	54	***313***

	∆2023-2018	**∆2028-2023**	**∆2028-2018**	**∆Peak**	**Peak Size**
K→G5	-70	-33	-103	-87	416

Table 5c-E3

Lincoln Elementary School
Forecasts per Grade: 2018-2028
Fertility/Aging/ Embedded Growth Scenario[1]
[Scenario E3]

	K	G1	G2	G3	G4	G5	*Total K→G5*
2018	57	70	56	76	68	85	***412***
2019	73	59	73	58	77	70	***410***
2020	64	76	61	76	59	79	***415***
2021	68	67	78	65	77	61	***416***
2022	65	71	69	81	66	79	***431***
2023	62	68	73	72	82	68	***425***
2024	70	65	70	76	73	85	***439***
2025	69	73	67	73	77	75	***434***
2026	70	72	75	70	74	79	***440***
2027	55	73	74	78	71	76	***427***
2028	62	57	75	77	79	73	***423***

	∆2023-2018	**∆2028-2023**	**∆2028-2018**	**∆Peak**	**P8ak Size**
K→G5	+13	-2	+11	-17	440

[1] This scenario uses the following parameters: (1) Baseline four-year retention ratios (2014-2017), as shown in Table 3; (2) Birth at t-5 to K enrollment ratio of .731. For years 2019-2022, the observed births from 2014-2017 were used.

Table 6

Comparison of Projected and Actual Elementary Student Populations in 2023 (5 Years Out): Predictive Accuracy Overall and By School

Scenario IIi: 5 Year Projections (Revised retention ratios)					
Elementary School	A 2018 School Population	P 2023 Projected Population	O 2023 Actual (Observed) Population	(P-O)	Percentage Accuracy[1]
Franklin Twp	384	321	364	-43	88.2
James Gettys	416	346	337	+9	97.3
Lincoln	412	425	392	+33	91.6
Total	1,212	1,092	1,093	+1	99.9

Table 7

Total Student Enrollment in the Gettysburg Area School District by Year and Level: 2009-2023

School Yr.	Elementary School	Middle School	High School	Grand Total	LIU/Total
2009-10					
2010-11	1,291	655	1,015	2,961	NA/2,961
2011-12	1,211	683	948	2,876	34/2,842
2012-13	1,217	689	923	2,862	46/2,820
2013-14	**1,252**	**683**	**907**	**2,862**	**33/2,829**
2014-15	1,230	666	906	2827	34/2793
2015-16	1,214	678	927	2,840	38/,2,802
2016-17	1,224	743	893	2891	58/2,833
2017-18	1,232	751	933	2964	79/2,885
2018-19	**1,212**	**694**	**930**	**2,905**	**69/2,836**
2019-20	1,160	745	947	2,937	85/2,852
2920-21	1,081	745	991	2,881	64/2,817
2021-22	1,064	729	995	2,875	87/2,788
2022-23	1,070	682	1018	2,832	62/2,770
2023-24	**1,093**	**682**	**1,038**	**2,873**	**60/2,813**
Δ last 5 years	-119	-12	+108	-32	-23
Δ prior 5 years	-40	+9	-135	+43	+7
Δ last 10 years	-159	+64	-63	-94	-16

Table 8

Overall Alternative Schooling by Type of Alternative[1]

Yr.	Home Schooled	Charter CyberCharter	Private/Parochial	Σ1	Σ2	Panel
1997	74	0	242	316	242	A
1998	69	0	260	329	260	
1999	80	0	262	342	262	
2000	57	3	247	307	250	
2001	62	19	290	371	309	
2002	74	16	321	411	337	B
2003	55	34	338	427	372	
2004	58	42	365	465	407	
2005	71	36	328	435	364	
2006	NA	32	250[2]	--	282	C
2007	NA	47	234	--	281	
2008	NA	66	245	--	311	
2009	NA	77	234	--	311	
2010	NA	120	222	--	342	D
2011	NA	170	228	--	398	
2012	NA	176	217	--	393	
2013	NA	209	211	--	420	E
2014	NA	235	198	--	433	
2015	NA	199	213	--	412	
2016	NA	216	208	-	424	
2017	NA	247	189	-	436	
2018	NA	330	169	-	499	
2019	85	149	155	389	304	
2020	129	157	154	440	311	
2021	118	173	155	446	328	
2022	136	214	146	496	360	
2023	148	200	161	509	361	
2024	156	190	150	496	340	
Avg Last 5-yrs	137	187	153	477	340	

[1] Σ1: sum of all 3 types of alternative schooling, 1997-2005; Σ2: Sum of Cyber Charter & Private/Parochial schools only since data for home schooled students is not available from 2006-2018.

[2] Transported students; therefore, likely an undercount from 2006-2024.

Table 9 Part 1

New Housing Permits by Municipality and Year Part 1: 2014-2018[1]

Year	Cumberland Twp	Franklin Twp	Freedom Twp	Gettysburg Borough	Highland Twp	Mt.Joy Twp	Straban Twp	Total
2014	94	3	3	2	2	14	6	124
2015	64	5	2	1	3	5	6	86
2016	38	5	0	1	1	22	8	75
2017	34	10	0	1	3	8	15	71
2018	31	12	1	2	3	13	4	66
Σ 2014-2018	261	35	6	7	12	62	39	422
Σ 2015-2018	167	32	3	5	10	48	33	298
Average/Year Last 5 Years	52/yr.	7/Yr.	1/Yr.	1/Yr.	2/Yr.	12/yr.	8/yr.	84/yr.
Average/Year Last 4 Years	42/yr.	8/yr.	1/Yr.	1/Yr.	3/yr.	12/yr.	8/yr.	75/yr.

[1] Source: Adams County Tax Services and Planning; Cumberland Township

Table 9 Part 2

New Housing Permits by Municipality and Year Part 2: 2019-2024[1]

Year	Cumberland Twp	Franklin Twp	Freedom Twp	Gettysburg Borough	Highland Twp	Mt.Joy Twp	Straban Twp	Total
2019		6	4			17		
2020		4	4			14		
2021		6	3			32		
2022		3	3			17		
2023		3	0			7		
Σ 2019-2024	240	31	15	(est): 7	0	94	750[2]	387/50
Average/Year Last 6 Years	40/yr.	5 /Yr.	3/Yr.	1/Yr.	0/Yr.	16/yr.	125/yr.	65/yr/125/yr.

[1] Source: Each of the Townships.Adams County quit tracking permits by municipality sometime before the pandemic.
[2] Age 55+ Housing; all SFDs

Table 10

Student/Housing Ratios

Development	Type of Housing	Number of Units	Number of Homes Built	Number of Students	S/H Ratio
Cambridge Crossing	TH	126	42	8	.190
Cannon Ridge	TH	86	86	37	.430
Cumberland Village Phase 1	SFR	93	93	26	.176
Cumberland Village Phase 1A,2	SFR	104	55		
Fairview Farms	SFR	10	4	NA	
Misty Ridge	TH	136	136	85	.625
Cumberland Crossing at the Links	SFR	43	43	4	.093
TOTAL		**598**	**459**	**151**	**.329**

Table 11a

On-Going and Future Major Housing Developments

On-Going Major Developments				
Development	Type of Housing	Number of Units	Number Units Built	Number of Units Left
The Links at Gettysburg				
The Courtyard	SFRs	200	200	0
The Retreat	SFRs	41	34	7
Cumberland Crossing	TH	43	12	31
Garrison Falls	SFRs	77	53	24
Wade Run	SFRs	99	0	99
Σ				
		460	**299**	**161**
Other Long Term Developments in MtJoy Twp				
Lake Heritage	SFRs	NA	16/11	NA
Links of Gettysburg	SFRs	NA	46/13	NA
Σ			**62/24**	
Major Developments in Cumberland Township				
Cambridge Crossing	TH	126	42	84
Cannon Ridge	TH	86	86	0
Cumberland Village 1A & III	SFRs	93-104	93+55	0+49
Fairview Farms	SFRs	10	4	6
Misty Ridge	TH	136	136	0
Σ		**555**	**416**	**139**
Major Developments In Straban Township				
Amblebrook (55+)	SFRs	2,018	750	1,268
Σ		**2,018**	**750**	**1,268**

Table 11b

Major Housing Developments continued

On-going and Future Major Developments in Straban Township	Type of Housing	Number of Units	Number of Homes Built	Number of Lots Left
Kortney Meadow	SFR	154	0	154
Granite Lake Estates (1)	SFR	165	0	165
Mark Town Center (1)	SFR	99	0	99
Σ		**419**	**0**	**419**
Granite Lake Estates (2)	TH	100	0	100
Mark Town Center (2)	TH	181	0	181
Σ		**281**	**0**	**281**
			0	
Inch & Company	APTs	456	0	456
JVI Group “Union Square”	APTs	300	0	300
Metropolitan “1115 York LLC	APTs	244	0	244
Mark Town Center (3)	APTs	6 lots	0	6 lots
Σ		**1,000+**		**1,000+**

Table 12

Gettysburg Area School District
Retention Ratios 2020-2023[§]
(Four-Year Averages)

	Reset Est
	2020-2023
K→G1	1.037
G1→G2	1.030
G2→G3	1.012
G3→G4	1.027
G4→G5	1.024
G5→G6	1.161
G6→G7	1.039
G7→G8	1.024
G8→G9	1.046
G9→G10	1.005
G10→G11	1.018
G11→G12	.967
$B_{t-5}→K_t$*	***.731***

[§] Data for the retention ratios for 2014-2017 included student populations for 2014-2018—the beginning school year enrollment; For the Birth to Kindergarten ratio, we use four-year averages for (.75 x Birth at t-5) + (.25 x Birth at t-6 and Kindergarten enrollment at t; eg., the header for 2014-2017 refers to the most recent K enrollments in 2015-2018 and births from 2009-2013.

Table 13

Gettysburg Area School District Forecasts per Grade: 2023-2033 Fertility/Aging/Embedded Growth Scenario with *Current Retention and Birth to Kindergarten Ratios and Current Fertility Level* [Scenario iil][1]

	K	G1	G2	G3	G4	G5	Total K→G5	G6	G7	G8	Total G6→G8	G9	G10	G11	12	Total G9 → G12	Total K → G12	LIU/
2023	174	150	188	174	214	193	1,093	192	221	269	682	254	261	278	245	1,038	2,813	60/2,873
2024	161	180	155	190	179	219	1,084	224	199	226	649	281	255	266	269	1,071	2,804	85/2,889
2025	156	167	185	157	195	183	1,043	254	233	204	691	236	282	260	257	1,035	2,769	64/2,833
2026	172	162	172	187	161	200	1,054	212	264	239	715	213	237	287	251	988	2,757	87/2,844
2027	164	178	167	174	192	165	1,040	232	220	270	722	250	214	241	278	983	2,745	62/2,807
2028	155	170	183	169	176	197	1,050	192	241	225	658	282	251	218	233	984	2,692	60/2,752
2029	168	161	175	185	174	180	1,043	229	199	247	675	235	283	256	211	985	2,703	71/2,774
2030	168	174	166	177	190	178	1.053	209	238	204	651	258	236	288	248	1,030	2,734	71/2,805
2031	168	174	179	168	182	195	1,066	207	217	244	668	213	259	240	278	990	2,724	71/2,795
2032	168	174	179	181	173	186	1,061	226	215	222	663	255	214	264	232	965	2,689	71/2,760
2033	168	174	179	181	186	177	1,065	216	235	220	671	232	256	218	218	924	2,660	71/2,731

	2023	2028	2033	Δ2028-2023	Δ2033-2028	Δ2033-2028
K→G5	1,093	***1.050***	1,065	-43 (-4%)	+15 (+1%)	-28 (-3%)
G6→G8	682	***658***	671	-24 (-1%)	+13 (+2%)	-11 (-2%)
G9→G12	1,038	***984***	924	-54 (-5%)	-60 (-6%)	-114 (-11%)
Total	2,813	***2,692***	2,660	-121(-4%)	-32 (-1%)	-153 (-5%)

[1] * This scenario uses the following parameters: (1) Baseline four-year retention ratios (2020-2023), as shown in Table (2) Birth at t-5 to K enrollment ratio of .730; this is derived as follows: (a) a baseline .75 (t-5 Births) + .25 (t-6 Births) for births in years 2009-2013 and 2015-2018 K enrollments. For years 2019-2022, observed births in 2013-2017 in the Gettysburg Area School District were used. For years 2023-2028, the number of births was assumed to remain at the current level (230/yr.)

Table 14a

Franklin Township Elementary School
Forecasts per Grade: 2023-2033
Fertility/Aging/ Embedded Growth Scenario[1]
[Scenario E4]

	K	G1	G2	G3	G4	G5	*Total K→G5*
2023	53	52	62	55	70	72	***364***
2024	45	55	54	63	56	72	***345***
2025	46	47	57	55	65	57	***327***
2026	56	48	48	58	56	67	***333***
2027	47	58	49	49	60	57	***320***
2028	46	49	60	50	50	61	***316***
2029	48	48	50	61	51	51	***306***
2030	48	50	49	51	63	52	***311***
2031	48	50	52	50	52	65	***315***
2032	48	50	52	53	51	53	***305***
2033	48]	50	52	53	54	52	***307***

	∆2028-2023	**∆2033-2028**	**∆2033-2023**	**∆Peak**	**Peak Size**
K→G5	-48	-9	-57	-57	364

[1] This scenario uses the following parameters: (1) Baseline four-year retention ratios (2020-2023), as shown in Table ; (2) Birth at t-5 to K enrollment ratio of .731. For years 2024-2028, the observed weighted births from 2020-2023 were used; for years 2029 to 2033, the 4-yr average of weighted births was used. All expected K enrollments were based on a sum of the weighted distribution of each municipality's share of combined K and G1 enrollments per year.

Table 14b-E5

James Gettys Elementary School
Forecasts per Grade: 2023-2033
Fertility/Aging/ Embedded Growth Scenario[1]
[Scenario E5]

	K	G1	G2	G3	G4	G5	*Total K→G5*
2023	53	50	57	50	71	56	***337***
2024	48	55	52	58	51	73	***337***
2025	42	50	57	53	60	52	***313***
2026	57	44	52	58	54	61	***325***
2027	49	59	45	53	60	55	***320***
2028	47	51	61	46	54	61	***319***
2029	48	49	53	62	46	55	***313***
2030	48	50	50	54	64	47	***313***
2031	48	50	52	51	55	66	***322***
2032	48	50	52	53	52	56	***311***
2033	48	50	52	53	54	53	***310***

	∆2028-2023	**∆2033-2028**	**∆2033-2023**	**∆Peak**	**Peak Size**
K→G5	-18	-9	-27	-27	337

[1] This scenario uses the following parameters: (1) Baseline four-year retention ratios (2020-2023), as shown in Table 13; (2) Birth at t-5 to K enrollment ratio of .731. For years 2020-2027, the observed births from 2014-2017 were used; for years 2028 to 27=[033, the 4-yr average of weighted births were used.

Table 14c

Lincoln Elementary School
Forecasts per Grade: 2023-2033
Fertility/Aging/ Embedded Growth Scenario[1]
[Scenario E6]

	K	G1	G2	G3	G4	G5	*Total K→G5*
2023	68	48	69	69	73	65	***392***
2024	70	71	49	70	71	75	***406***
2025	69	73	73	50	72	73	***410***
2026	70	72	75	74	51	74	***416***
2027	55	73	74	76	76	52	***381***
2028	62	57	75	75	78	78	***425***
2029	60	64	59	76	77	80	***416***
2030	60	62	66	60	78	78	***404***
2031	60	62	64	67	62	80	***395***
2032	60	62	64	65	69	63	***383***
2033	60	62	64	65	67	71	***389***

	∆2028-2023	**∆2033-2028**	**∆2033-2023**	**∆Peak**	**Peak Size**
K→G5	+6	-9	-3	+17	409

[1] This scenario uses the following parameters: (1) Baseline four-year retention ratios (2020-2023), as shown in Table ; (2) Birth at t-5 to K enrollment ratio of .731. For years 2024-2028, the observed weighted births from 2020-2023 were used; for years 2029 to 2033, the 4-yr average of weighted births was used. All expected K enrollments were based on a sum of the weighted distribution of each municipality's share of combined K and G1 enrollments per year.