HCPSS Projection Methodology

Office of School Planning
Joel Gallihue, Manager
April 18, 2013

Table of Contents

This document contains a number of examples of the Excel spreadsheets that comprise the Howard County Public School System's enrollment projection tool. The entries on these sheets are color-coded, to make it easier for School Planning Office staff to maintain and use the tool. The colors you will see in use, and their significance, are explained in the table below:

black	headers, labels, explanatory text, values linked verbatim from another worksheet
red	calculated values
blue	values that are manually entered, or copied and pasted by manually clicking one of the macro buttons
green	values that must be saved from one year to the next because they can't be recalculated
orange	"best fit" indications of how options performed in previous projection efforts

Occasionally within some of the summary worksheets, these colors are used for purposes different than those listed above – we apologize for the confusion, but there are only so many colors that show up well on black and white printers. The actual worksheets also contain several light green buttons which execute Excel macros to copy the numbers shown below each button and paste them into the "Use for Future Yrs" column. In this document these buttons are shown in the worksheet examples, but the text refers to the copy and paste steps as if they are done manually, to avoid confusion about the process that is being described.

The Howard County Public School System (HCPSS) enrollment projection tool is a set of Microsoft Excel workbooks that are linked together to allow efficiency in data entry and formatted to provide clarity in presenting the entered data, the decision points during the projection process, and the results of the forecasting effort. While the tool is capable of generating projected school enrollments into the distant future, for all practical purposes its most important output is the projected enrollments for the next five school years. These enrollment numbers (defined as the September 30th student headcount for each school year) are used as a basis for decision-making about staffing, budgeting, capital project planning, and housing growth control in Howard County.

The HCPSS projection model belongs to the generic class of projection methodologies that are collectively known as "cohort survival" methods. The term "cohort survival" refers to a method of analysis that seeks to account for gains and losses in the population of a group (for example, students of a given grade level) as they progress through a process, such as matriculation through elementary, middle, and high school. Simply put, our survival ratio is the percentage of a grade level cohort that shows up the next school year at the same school, one grade level above last year's. If the student cohort expands between the two September 30th counts, this ratio will be greater than 1.0; if the size of the group shrinks, the ratio will be less than 1.

We try to isolate the effects of several types of housing transactions (apartment turnover, re-sales of existing homes, and first-time sales of newly-constructed homes) on student cohort expansion and contraction and exclude them before we calculate survival ratios. This is done so that we can project the effects of these housing phenomena separately from the survival ratio analysis. Once we have removed the students who come and go due to housing effects, the remaining cohort of students is often referred to as the "non-housing cohort" in our projection tool, and elsewhere in this document.

The projection process we use is a "bottom-up" approach to building the total student enrollment estimate for the HCPSS. That is, we project first for each grade level within single schools, and add those grade level projections together to get the individual schools' projections. Then the projected school enrollments are summed to determine the School System's projected enrollment. This approach allows us to tailor the methodology to be sensitive to the historic and future trends that are relevant at each school, rather than implement a "one size fits all" set of planning assumptions that may not be truly descriptive of any school's reality. It is our belief that if we are successful at projecting the individual school enrollments within a reasonable tolerance, and our projection tool is well centered (i.e. it over-projects as often as it under-projects), then the accuracy of the system-wide enrollment projections will remain high. Our experience with this tool over the past five years has justified our belief in this approach.

The projection tool is comprised of ten spreadsheet workbooks (each containing multiple worksheets) that can be divided into the major categories of data collection, projection, and reporting as shown in the chart on the next page. The workbooks listed under the "Data Workbooks" heading are repositories for raw data that is used in various ways within the three workbooks listed under the "Projection Workbooks" heading. The contents of four of the five data collection workbooks will be discussed in greater detail in the "OOD Workbooks" and "Data Workbooks" sections that follow.

The three projection workbooks are where all of the school-by-school planning assumptions are documented, along with the historical performance of the various projection options, and the net effects of the interplay between the data and the selected planning assumptions - the projections themselves. Human judgment is applied to the projection process via these workbooks, thus the primary purpose of this document is to explain how to interact with them for this purpose. In the "Projection Workbooks" section of this document, the contents of these workbooks are presented in detail.

The two workbooks listed under the "Reporting Workbooks" heading are used to summarize the results of the projection process. The "Countywide" workbook pulls the individual projections together in various formats required by other HCPSS offices, or other agencies with which we share data. The "Reformats" workbook presents the same projection data that is contained in the three projection workbooks, only formatted differently to facilitate its use in other work products of the School Planning Office, such as the Capital Budget or redistricting feasibility studies. Only selected worksheets within the "Countywide" workbook will be discussed in detail in this document. (In the chart below, the worksheets that are covered in this document are shown in bold typeface.)

Data Workbooks	Projection Workbooks	Reporting Workbooks
OOD-HS	High Schools	Countywide
ADMIN	4yr Acc Geo	4yr Acc Geo
SPED	3yr Acc Geo	3yr Acc Geo
ESOL	2yr Acc Geo	2yr Acc Geo
TM	1yr Acc Geo	1yr Acc Geo
Open Enr	1yr Acc	1yr Acc
One worksheet for each school	**One worksheet for each school**	**Open-Closed**
Net	**Reconcile**	10yr by School
	Totals	8yr by School Gr 1-5
OOD-MS		10yr Comparison
ADMIN	Middle Schools	State Rept
SPED	4yr Acc Geo	15yr by Grade
One worksheet for each school	3yr Acc Geo	**To Infinity and Beyond**
Net	2yr Acc Geo	New 15yr ES
	1yr Acc Geo	New 15yr MS
OOD-ES	1yr Acc	New 15yr HS
ADMIN	**One worksheet for each school**	1yr Staff CE
SPED	Reconcile	1yr Staff CW
One worksheet for each school	Totals	1yr Staff NE
Net		1yr Staff N
	Elem Schools	1yr Staff SE
DATA	4yr Acc Geo	1yr Staff W
Cap	3yr Acc Geo	**1yr Staff Cnty**
Bth	2yr Acc Geo	Peggy's Staffing
Hsg	1yr Acc Geo	Budget Office
Dem	1yr Acc	Sept Adj
Fdr	**One worksheet for each school**	Redist Adj
Yld	Totals	
Whiffer Output		Reformats
		Tot-CE, ES-CE, MS-CE
ENR_CNTS		Tot-CW, ES-CW, MS-CW
ES_att1, MS_att1, HS_att1		Tot-N, ES-N, MS-N
es_msde1, ms_msde1, hs_msde1		Tot-NE, ES-NE, MS-NE
ES_geo1, MS_geo1, HS_geo1		Tot-SE, ES-SE, MS-SE
ES_geo2, MS_geo2, HS_geo2		Tot-W, ES-W, MS-W
ES_geo3, MS_geo3, HS_geo3		ES
ES_geo4, MS_geo4, HS_geo4		MS
		HS

Out of District Enrollments: the **OOD** Workbooks

The three workbooks that begin with the letters "OOD" contain data related to out-of-district enrollments within HCPSS schools. An out-of-district enrollment occurs when a student is enrolled at a school that is different from the school whose geographic service area (or district) contains the student's home, in other words the student is enrolled in a school other than his or her "home school". Students are enrolled out-of-district for a variety of reasons, including the availability of special instructional programs, administrative considerations, and open enrollment policies. Since all of our analysis of historical data and all but the very last step of our enrollment projection process are done on the basis of geographic home school districts, tracking the magnitude of out-of-district placements is the essential element for deriving a school's attending enrollment from its geographic enrollment (officially, the School Planning Office is responsible for projecting attending enrollment at each school, not geographic enrollment).

ADMIN	Gr 11						Attending School							
2007		AHS	CHS	GHS	HaHS	HoHS	LRHS	MRHS	MHHS	OMHS	RHS	RHHS	WLHS	
	AHS	0	0	0	1	1	1	0	0	0	1	0	2	6
	CHS	1	0	0	0	2	0	0	6	0	0	3	0	12
	GHS	0	0	0	0	1	0	0	0	0	0	0	0	1
	HaHS	6	0	0	0	0	0	0	1	3	2	0	0	12
	HoHS	0	1	0	0	0	7	0	0	2	0	0	0	10
Home	LRHS	2	0	0	1	14	0	0	0	2	0	0	0	19
	MRHS	0	1	0	0	1	0	0	1	0	0	1	0	4
School	MHHS	0	2	0	0	0	0	1	0	0	0	0	0	3
	OMHS	0	0	0	1	0	3	0	1	0	1	1	1	8
	RHS	8	0	1	0	0	0	0	0	0	0	2	0	11
	RHHS	1	1	1	0	0	0	0	0	0	0	0	0	3
	WLHS	5	1	0	0	1	0	0	0	4	0	3	0	14
		23	6	2	3	20	11	1	9	11	4	10	3	103

The three OOD workbooks all work the same way, and are organized and formatted internally in very similar fashion. Each contains a worksheet for each type of program or reason that causes out-of-district enrollment. These sheets display a matrix of home school versus attending school enrollment counts for each grade level for the current school year (the illustration above is an example of this matrix for out-of-district enrollments in grade 11 for administrative reasons.) The totals in the far right column indicate how many students are living in each high school district and attending a school that is outside of the district in which they live. For example, on the Atholton High School (AHS) line, a total of six students live in Atholton's district but attend a different high school. The "attending school" columns show the breakdown of the six by which school they actually attend (1 each at Hammond, Howard, Long Reach, and Reservoir; 2 at Wilde lake). Conversely, the totals at the bottom of the chart indicate how many students are attending a different school than their home school, broken down by the home school subtotals on each row. The OOD workbooks contain similar charts for every out-of-district enrollment program, for every grade level from K to 12.

Also included in the OOD workbooks are worksheets for each school, where the future effects of the out-of-district enrollments are projected. These worksheets look similar to the one on the next page, which again shows data for Atholton High School. On the left side of this chart, there are six years of historical data indicating each program's impact on the school in past school years. On the right are the projected values for these impacts and the projection rules currently in use to obtain these values.

Atholton HS						2008															

ROTC/ADM — Actual — 100.0% of last two years' average level

2002	2003	2004	2005	2006	2007		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
2	1	20	14	26	10	9	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
13	23	7	24	22	20	10	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
0	8	19	24	21	17	11	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
4	4	1	8	-1	28	12	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
19	36	47	70	68	75	Tot	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5	71.5

SPED — Actual — 66.7% of last two years' average level

2002	2003	2004	2005	2006	2007		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
4	1	4	2	0	6	9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
7	4	1	0	5	0	10	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
17	8	22	1	12	5	11	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
27	14	4	0	7	14	12	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
55	27	31	3	24	25	Tot	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3

ESOL — Actual — 66.7% of last two years' average level

2002	2003	2004	2005	2006	2007		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	-2	-2	0	0	0	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	-5	-2	0	0	0	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	-3	-5	-2	0	0	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0	-4	-5	0	0	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	-10	-13	-7	0	0	Tot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TM — Actual — (TM phase out - last year is 2006)

2002	2003	2004	2005	2006	2007		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
-33	-32	0	0	0	0	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-26	-33	-28	0	0	0	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-21	-25	-27	-24	0	0	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-20	-9	-25	-26	-22	0	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-100	-99	-80	-50	-22	0	Tot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

OTHR — Actual — 66.7% of last two years' average level

2002	2003	2004	2005	2006	2007		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
0	0	0	0	0	0	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0	0	0	0	0	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0	0	0	0	0	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0	0	0	0	0	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	0	0	0	0	0	Tot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

The projection rules, as currently adopted, were derived from a "best fit" analysis conducted in 2006 and verified in 2007, which attempted to determine which mathematical technique would produce a future value which was most accurate for each program. The School System has been trying to reduce its reliance on out-of-district enrollments for delivering specialized educational programs, so the rule that fit best for programs like special education (SPED) and ESOL were formulas containing a percentage reduction from the previous years' levels (ESOL placements became indistinguishable from other administrative placements in 2007, so they are no longer projected separately). Administrative placements (ADMIN) were also being reduced in some areas, but at the same time, programs such as JROTC were on the increase, thus leading us to project administrative placements at 100% of their historical average. The Technology Magnet (TM) program was phased out entirely over the past three years, and other programs (OTHR) are currently two open enrollment programs that only affect three high schools.

The final worksheet in each of the three OOD workbooks is the place where the cumulative effects of all of the out-of-district programs are summarized, by school and for the HCPSS as a whole. These "Net" worksheets look like the sample on the next page, which is the top portion of the high school summary worksheet. On this sheet, the net increase or decrease in attending enrollment due to out-of-district programs is forecast by school and grade level, for each future year. This net value is calculated by

accumulating the effects of each program listed in the schools' individual worksheets. The resulting net out-of-district impact will be carried over to the projection worksheet for each school and used to derive the attending enrollment projection from the geographic enrollment projection.

Totals		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	9	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	11	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	12	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Atholton HS		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	9	-32	22	16	26	16	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
	10	-11	-22	24	27	20	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7
	11	-12	9	-1	33	22	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7
	12	9	-24	-23	-16	42	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
		-46	-15	16	70	100	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8

Centennial HS		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	9	-15	-5	-4	-12	-2	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3
	10	-11	-13	-4	-7	-3	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8
	11	-13	-13	-16	-13	-7	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8	-9.8
	12	-8	-11	-7	-4	1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
		-47	-42	-31	-36	-11	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5

Glenelg HS		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	9	21	21	17	23	15	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
	10	14	22	19	18	20	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
	11	7	11	16	12	17	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
	12	10	3	10	15	10	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6
		52	57	62	68	62	71.7	71.7	71.7	71.7	71.7	71.7	71.7	71.7	71.7	71.7	71.7	71.7	71.7	71.7	71.7

It is worth noting that the top few rows of the "Net" worksheet contain the cumulative sums of corresponding cells across all of the schools at a given level, i.e. elementary, middle, or high. Because out-of-district enrollments are basically moving students between schools, when all is said and done on these OOD workbooks, the net result system-wide should be zero change in the total enrollment projection. This top section allows us to quickly check for errors anywhere within the set of OOD worksheets by verifying that the net effect of all out-of-district projections within the workbook is still zero.

Geographic Enrollment Projections: Using the **Data** Workbook

All of the raw data upon which the geographic enrollment projections are built reside in the "Data" workbook. This workbook has six data input worksheets (and one output worksheet used to set up an automated redistricting tool, which will not be discussed here). The first data worksheet is called "**Cap**", and it contains the future enrollment capacities for each existing school, as well as schools that are currently planned for the future. While this data is not used in creating the enrollment projections, it is very important in terms of assessing the impact of the projected enrollments on the future utilization

Level	ID	Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	603	Atholton ES	387	387	387	387	387	387	387	387	387	387	387	387	387
1	218	Bellows Spring ES	596	662	662	662	662	662	662	662	662	662	662	662	662
1	620	Bollman Bridge ES	566	566	566	566	566	566	566	566	566	566	566	566	566
1	510	Bryant Woods ES	355	355	355	355	355	355	355	355	355	355	355	355	355

of the School System's school facilities. An example of the data contained in this worksheet is shown above. The numbers under the year headings on each school's row are the future student capacities of the school. In the projection workbooks that will be discussed later, capacity data is used to color-code the background of the projected attending enrollments to indicate when a school will be over-utilized or under-utilized.

The second data worksheet is called "**Bth**", and it contains both historical and projected birth data, subtotaled by school district. In the segment of this workbook reproduced below, the historical number of births recorded in each school's geographic district is shown for the past 15 years. Farther to the right, the fraction of the whole county's births that each school district's births represent is calculated, using several optional ways to summarize the historical data. The rightmost column, titled "USE" is where we record our chosen set of fractions, created by copying and pasting the values from one of the five red columns that precede it. We change the text style to bold in the selected column, to highlight the option that has been chosen: in this case, the 2-year average value.

1st yr of projd enrollmt	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Dec	Sep-Aug
2008	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Atholton ES	98	102	108	103	106	84	72	80	73	86	65	57
Bellows Spring ES	109	159	163	208	209	201	222	205	227	193	214	202
Bollman Bridge ES	138	123	80	115	107	106	101	107	114	98	114	112
Bryant Woods ES	71	62	81	70	74	74	66	52	72	74	56	61
Bushy Park ES	32	45	28	46	50	39	55	48	71	73	72	73

Sep-Aug	Sep-Aug	Sep-Aug		Prv Yr		2yr Avg		3yr Avg		5yr Avg		10yr Avg		USE
2004	2005	2006												
79	73	62		0.019		0.020		0.021		0.020		0.021		0.020
209	189	184		0.055		0.056		0.057		0.058		0.060		0.056
115	121	97		0.029		0.032		0.033		0.032		0.032		0.032
85	52	77		0.023		0.019		0.021		0.019		0.020		0.019
77	60	65		0.019		0.019		0.020		0.020		0.019		0.019

Above the historical data in the Bth workbook are the projected births for Howard County as a whole, and the portion of those births that we project as occurring in each school district. The projected births for each school are calculated by multiplying the total projected births by the school district's fraction, as selected above. (Projected births begin in the current year because birth data by school district is not generally available for the current year at the time this process is completed.) Projected births for

Projected births-->	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Atholton ES	62.0	62.1	62.1	62.1	63.7	64.1	65.3	66.2	66.4	66.4	66.4	66.4	66.4	66.4
Bellows Spring ES	186.0	185.5	185.3	189.1	210.8	230.0	252.1	275.4	298.3	305.7	313.1	324.1	334.5	345.6
Bollman Bridge ES	97.2	97.2	97.9	98.8	102.8	106.6	106.6	107.9	108.8	109.4	110.3	112.0	113.7	115.6
Bryant Woods ES	77.1	77.1	77.1	77.1	77.1	77.1	77.1	77.1	77.1	77.1	77.1	77.1	77.1	77.1

Howard County as a whole are prepared annually by the Maryland Department of Planning, in five-year increments. These are the boxed numbers in the worksheet segment reproduced below. The worksheet is set up to smoothly interpolate the annual number of births for all years spanned by the MDP projections, using the five-year totals entered in the boxed cells.

interpolated totals->	3377	3408	3440	3472	3504	3638	3771	3905	4039	4171	4218	4264	4311	4358	4403
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
MDP projections ->					17201					19524					21554

The school-by-school birth projections are adjusted for the impact of projected future housing projects within specific school districts. This adjustment is done in years when the number of births County-wide is projected to be an increase from the previous year's total. The increment of additional births is added to each school district's total from the previous year, in proportion to the district's projected share of the County's total occupied housing units in the year of the increase. The underlying assumption of this approach is that the bulk of the increase in births is attributable to housing growth and should therefore be added to those districts that are expected to experience housing growth that year. If there is a decrease in births projected from one year to another, the decrease is spread across all school districts,

in proportion to their share of the previous year's births. The birth projections by school district that result from this process are linked from this worksheet to the individual school worksheets in the projection workbooks.

The third worksheet in the data workbook is called "**Hsg**". This workbook contains counts of the number of existing and projected housing units in Howard County, by type of unit and school district, as shown in the worksheet segment below. Unit types are single-family, detached (SFD); single-family, attached (SFA); apartment (APT); mobile home (MH), and unknown (UNK). The column headed "Existing" is the count of all currently-existing units (as of approximately September 30th of the current year); all columns to the right of the "Existing" column contain the additional number of units expected to be completed during each future year. Negative numbers, such as those shown above on the MH row for Bellows Spring Elementary School, indicate a net loss of units due to redevelopment projects (in the case of the example, the redevelopment of the Aladdin Village mobile home park).

	Existing	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Totals	96669	1238	1455	1729	1851	1729	1587	1491	1430	1405	1418	1417	1408	1392
Atholton ES														
SFD	1237	2	0	0	22	5	13	10	2	0	0	0	0	0
SFA	708	0	0	0	0	0	1	0	0	0	0	0	0	0
APT	710	0	0	0	0	0	0	0	0	0	0	0	0	0
MH	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UNK	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bellows Spring ES	0													
SFD	1349	6	18	0	0	0	16	14	38	29	31	30	11	44
SFA	1224	25	50	120	130	120	116	119	80	63	67	108	70	104
APT	1078	0	0	186	170	130	130	126	130	130	130	195	230	195
MH	225	-50	-75	-100	0	0	0	0	0	0	0	0	0	0
UNK	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bollman Bridge ES	0													
SFD	1573	1	0	0	5	0	0	15	10	17	29	0	1	9
SFA	730	0	0	0	0	0	0	0	0	0	0	50	50	50
APT	701	0	30	50	50	50	0	0	0	0	0	0	0	0
MH	4	0	0	0	0	0	0	0	0	0	0	0	0	0
UNK	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bryant Woods ES	0													
SFD	624	0	0	0	0	0	0	0	0	0	0	0	0	0
SFA	710	0	0	0	0	0	0	0	0	0	0	0	0	0
APT	1316	0	0	0	0	0	0	0	0	0	0	0	0	0
MH	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UNK	0	0	0	0	0	0	0	0	0	0	0	0	0	0

The housing unit data are created by the Howard County Department of Planning and Zoning, using a software tool that simulates the residential build-out of the County's remaining undeveloped residentially-zoned properties under real world conditions, such as the constraints imposed by current zoning of properties, the logistics of residential construction, and the growth limits of the County's General Plan. The simulation tool outputs a file of data that is copied directly into the Hsg workbook. In addition to providing the basis for apportioning future births among school districts on the Bth worksheet discussed above, the housing unit data contained on this sheet are used extensively in the school projection worksheets. Future housing data provide the basis for projected future student yields from newly-constructed homes, and are used to adjust the student impacts from re-sales of existing homes and apartment turnover in future years in a fashion similar to that used to adjust future births.

The next worksheet in the Data workbook is named "**Dem**". This worksheet stores data such as survival ratios, yields from newly constructed homes, yields from re-sales of existing homes, beginning and ending grade level cohort sizes, etc. for ten year's worth of this-school-year-to-next-school-year comparisons, for each grade level within each of the 71 schools. It is a very large worksheet, and it performs no function other than serving up the data to the projection workbooks, to which it is linked repeatedly (see example of the Dem worksheet's layout below). The real workhorse that conducts the cohort analysis and generates the data that is presented in the "Dem" worksheet is a set of computer programs that scan the student records of two or more September 30th files simultaneously and link them by address, student ID, and property tax account ID to electronic files of property sale transactions,

Atholton ES																			
Athol	59	60	62	38	42	78	90	97	98	64	92	85	91	106	100	89	95	81	104
Athol	0	43	0.5784	0.5556	0.6019	0.3585	0.5	0.049	0.0648	0.0388	0.0189	0.0476	14	9	14	9	6	-0.1132	-6
Athol	1	50	0.963	1.1538	1.2597	1.225	1.28	0.037	0.0769	0.0779	0.075	0.16	0	-6	0	-3	-1	-0.0282	-2
Athol	2	101	1.011	1.0494	1.0111	1.0291	0.9901	0.022	-0.0617	0.0333	-0.0291	0.0693	-4	-4	2	-3	-6	0.0198	2
Athol	3	100	1	1.0556	1.0658	1.0833	1.01	-0.0112	0	-0.0395	-0.0104	0	0	-1	-2	-3	-1	-0.04	-4
Athol	4	100	0.9655	0.9886	0.9574	1.0789	1.1	0.0115	0	-0.0426	-0.0263	-0.01	0	3	0	-3	-5	-0.0673	-7
Athol	5	77	1.0114	0.9765	1.0444	1.0581	0.961	-0.0114	-0.0118	0.0222	-0.0233	0.039	0	-1	0	0	-3	0.027	2
Bellows Spring ES																			
Bello	55	60	62	103	77	107	103	124	109	141	128	110	103	117	101	98	118	116	100
Bello	0	95	0.3459	0.3681	0.2981	0.4928	0.3831	0.0314	0.0368	0.024	0.0239	0.0299	10	16	6	9	5	-1	-107
Bello	1	135	1.1263	1.1196	1.1589	1.2386	1.0444	-0.0105	0.0109	-0.0561	-0.0455	-0.0296	-4	0	-5	0	-4	-1	-136
Bello	2	106	1.0847	1.0377	0.9717	1.0263	0.9528	-0.0339	-0.0189	-0.0377	-0.0263	-0.066	-5	4	-6	-1	-1	-1	-95
Bello	3	115	0.9515	0.9752	1.0175	1.0638	1.0174	-0.0097	-0.0496	0.0088	-0.0957	-0.0261	-2	1	-2	-2	0	-1	-115
Bello	4	90	1.0103	1.01	0.9828	1.0171	1	0.0103	-0.03	-0.069	-0.0427	0.0222	-2	1	-3	0	-2	-1	-91
Bello	5	116	1	0.9804	1.0588	0.981	1.0086	0.0244	-0.0196	-0.0196	-0.019	-0.0345	-5	-3	-4	0	-2	-1	-112
Bollman Bridge ES																			
Bollm	63	63	52	62	48	106	117	98	100	110	115	118	116	102	100	131	114	120	108
Bollm	0	50	0.5122	0.7875	0.4522	0.5794	0.4528	0.0163	0.0875	0.0609	0.0561	0.0755	34	21	28	25	21	-0.0253	-2
Bollm	1	95	1.0192	1.125	1.0652	1.087	1.1579	0.0577	0	0.0326	0.0435	0.0211	-2	0	-3	0	-2	-0.1091	-12
Bollm	2	104	0.9746	1.0631	0.9831	1.0408	0.9615	-0.0085	0.018	0.0169	0	0.0192	-3	-1	-3	1	4	-0.1321	-14
Bollm	3	103	0.9632	1	1	0.9391	1.0097	0	-0.0088	0.0167	0.0087	0.0097	-3	2	-6	-2	2	-0.0935	-10
Bollm	4	107	1	1.0076	0.9304	1.0172	0.9907	0.0152	0.0229	0.0087	0.0259	0.028	-3	-4	-1	-1	0	0	0
Bollm	5	120	0.937	0.9924	1.0229	0.9907	0.9417	-0.0079	0.0076	-0.0229	0.0561	-0.0583	-2	1	-1	0	1	-0.0748	-8
Bryant Woods ES																			
Bryar	24	25	16	22	28	65	51	53	47	50	70	74	49	51	51	75	71	81	54
Bryar	0	28	0.3871	0.3086	0.2286	0.2973	0.3784	0.0484	0.0617	0.0286	0.0405	0.027	15	20	15	19	13	-0.0465	-2
Bryar	1	44	1.0833	1.2143	1.06	1.4242	1.1364	0.0833	-0.0476	-0.02	0.1212	0.0455	0	-1	-2	0	-2	-0.16	-8
Bryar	2	51	1.0448	1.0571	1.0208	1.02	1	0.0597	0.0571	0.0417	0	-0.0588	-5	1	-1	0	-1	-0.0426	-2
Bryar	3	51	1.1364	1.029	1.0253	1.08	0.9608	0.0455	0.029	0	0.08	0.0196	1	0	0	-1	-1	0.0204	1
Bryar	4	57	0.9375	0.8987	1.0685	0.9383	1	0.0313	0	0.0137	0.0247	-0.0175	3	2	-2	-4	-1	-0.2182	-12
Bryar	5	74	1.0789	0.9692	0.9863	1.0649	1.0405	0.0132	0.0154	0	-0.026	-0.0405	-4	0	-3	3	-1	-0.2055	-15

building permits and enrollment transactions. These programs identify the reason behind each student who entered or left the grade level cohort in which he or she started out, tag and count student records according to these reasons, and output a file of data that can be inserted into this workbook "as is". The uses of all of the data contained in the "Dem" worksheet will be described in more detail during the discussion of the projection workbooks in a subsequent section of this document.

The fifth worksheet in the Data workbook is called "**Fdr**". It holds data that are referred to as "feed rates". A feed rate is the percentage of a lower level school's graduating class (e.g. the 5th grade of each elementary school and the 8th grade of each middle school) that lives in the geographic district of a given school at the next level (i.e. middle school or high school). The worksheet segment included on the next page shows feed rates for several Howard County elementary schools. Some school systems maintain what are called "strict feeder systems", where every lower level school feeds its graduates into only one upper level school. Howard County, due to its small geographic size and the locations and sizes of its

school buildings, cannot maintain strict feeds for all of its schools. As shown in the segment below, Atholton Elementary School, for example, sends its graduates to three middle schools: Hammond, Oakland Mills, and Patuxent Valley. This fact means that parts of the Atholton Elementary district overlap a portion of each of these three middle school districts. Bellows Spring feeds two middle schools. On the other hand, both Bollman Bridge and Bryant Woods have strict feeds, meaning that their districts are completely within the districts of the middle schools that they feed. Feed rates are also calculated and stored in the Fdr worksheet for the feeds between middle and high schools, in the same fashion as the elementary-to-middle feeds shown.

Sending School	Receiving School	Portion of sending school's rising graduates living in each receiving school's geography									
		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Atholton ES	Hammond MS	0.398	0.383	0.385	0.416	0.419	0.396	0.388	0.377	0.451	0.417
	Oakland Mills MS	0.284	0.247	0.229	0.315	0.203	0.219	0.212	0.255	0.211	0.236
	Patuxent Valley MS	0.318	0.370	0.385	0.270	0.378	0.385	0.400	0.368	0.338	0.347
Bellows Spring ES	Bonnie Branch MS	0.241	0.242	0.269	0.225	0.277	0.208	0.183	0.273	0.225	0.219
	Mayfield Woods MS	0.759	0.758	0.731	0.775	0.723	0.792	0.817	0.727	0.775	0.781
Bollman Bridge ES	Patuxent Valley MS	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bryant Woods ES	Wilde Lake MS	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Feed rates are important to the projection process because they tell us how to apportion the graduates of the lower level schools to the incoming classes of the schools at the next higher level. Knowing the relationship between sending and receiving schools allows the projection methodology to properly estimate incoming cohorts for upper level schools. The approach we use for estimating feeds between school levels also makes the estimates of the receiving schools' future enrollments sensitive to trends that have already developed, or are predicted to develop, for the individual feeder schools. The feed rate data contained in the Fdr worksheet are linked to the projection workbooks, where they are used to determine the size of the incoming grade level cohorts for each middle and high school.

The final data worksheet to be discussed is the "**Yld**" worksheet. The Yld worksheet contains student yield rates, by type of unit, for new housing units constructed over the past ten years. These data include both the number of units completed each year for the past decade and the student yield per unit for each year's

	# of units completed											student yield rate									
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Atholton ES																					
SFD	2	0	1	0	2	1	0	0	0	0		0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
SFA	0	0	0	0	0	0	0	0	0	0		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
APT	0	0	0	0	0	0	0	0	0	0		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MH	0	0	0	0	0	0	0	0	0	0		0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
UNK	0	0	0	0	0	0	0	0	0	0		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bellows Spring ES																					
SFD	60	84	49	68	58	45	4	3	4	16		0.350	0.107	0.245	0.162	0.190	0.067	0.000	0.000	0.250	0.125
SFA	18	1	7	1	0	0	0	0	0	0		0.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
APT	0	0	0	0	0	0	0	0	0	0		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MH	13	4	7	8	3	1	5	4	0	0		0.350	0.107	0.245	0.162	0.190	0.067	0.000	0.000	0.250	0.125
UNK	0	0	0	0	0	0	0	0	0	0		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bollman Bridge ES																					
SFD	31	7	7	5	8	4	3	5	3	2		0.258	0.286	0.143	0.000	0.000	1.250	0.000	0.000	0.667	0.000
SFA	0	0	0	0	0	0	0	18	8	0		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.167	0.250	0.000
APT	0	0	0	0	0	0	0	0	0	0		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MH	0	0	0	0	0	0	0	0	0	0		0.258	0.286	0.143	0.000	0.000	1.250	0.000	0.000	0.667	0.000
UNK	0	0	0	0	0	0	0	0	0	0		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

completed units, in all 71 school districts. Student yield rates are calculated by a computer program which matches occupied residential building permit records with student addresses, using appropriate time intervals, to determine whether or not each occupied housing unit contributed students to the School System's enrollment (only students who are new to the school district in which the housing unit is located are counted, so that the resulting yield rates can be utilized to calculate the move-in impact of new residential housing units in the future). As with the other data worksheets, the data contained on the Yld worksheet are linked to the projection workbooks.

Making Choices: The Projection Workbooks

The next section of this document will present the projection workbooks ("Elem Schools", "Middle Schools", and "High Schools"), where the actual school-by-school projections are developed, using the contents of the data workbooks as their foundation. The three projection workbooks are very similar in content: each contains a worksheet for each school of the specified level, plus one or more worksheets that summarize or reconcile the combined projected enrollment of the individual schools, and five worksheets for assessing the accuracy of the projection, by comparing the projected values on the individual school worksheets to future actual enrollments. While the summary worksheets and the projection accuracy worksheets are important in their own right, they do not play a part in the initial development of the projection, and they will not be discussed in detail in this document.

In the section that follows, the elementary school projection worksheet will be discussed first, then the middle school worksheet, and finally the high school worksheet. Since the middle and high school projection worksheets share many components with the elementary version, only the elements of the middle and high school worksheets that differ from the elementary version will be presented.

Using the **Elem Schools** Projection Workbook

This is the workbook where the elementary school projections are created, one school at a time. There is a worksheet for every school, and each worksheet has links to the data specific to its school that is located in the OOD-ES workbook and the six worksheets of the Data workbook, as discussed above. The purpose of the school projection worksheets is fourfold:

- to present multiple years of historical data side by side so that historical trends are apparent
- to calculate various historical averages and present them as planning assumption alternatives

10

      - to apply the chosen alternatives to existing data and thereby forecast future data

      - to combine all forecast data values in a logical fashion to produce projected enrollments

These purposes are achieved by starting at the bottom of any school's worksheet and selecting options as you work your way to the top. The text below will walk you through an elementary school's worksheet in this manner, with segments from several actual schools' worksheets embedded in the text to serve as examples.

The first order of business when projecting elementary school enrollment is to determine the future size of the incoming cohorts of kindergarten students. The School Planning Office currently considers two broad classes of projection techniques for kindergarten cohorts: one method that bases the cohort size on the number of births in the school's district five years earlier (the "survival ratio" method), and one that bases the estimate on the historical size of the kindergarten cohort at the school in question (the "historical cohort" method). It should be noted that we are actually determining the size of the <u>non-housing cohort</u>, i.e. before any housing-induced enrollment growth is added in, at this point in the projection process.

The broad group of approaches that is based on births (the first four rows under the heading "Method Used" in the worksheet segment reproduced below) assumes that there exists a predictable (and relatively constant) mathematical ratio between births in a given year and the number of students enrolled in kindergarten five years later, within this school's district. On the projection worksheet, the ratio is referred to as the "B->K surv. ratio". One should note that the assumption is <u>not</u> that the same children who were born five years ago will show up in kindergarten, but rather that a more or less constant mathematical ratio exists between these two quantities, regardless of how many actual children the two groups have in common.

Kindergarten		Historical Accuracy (actual minus proj. - neg. # is over-projected)								Projections->					
		2003	2004	2005	2006	2007	Avg Miss		Method Used	2008	2009	2010	2011	2012	2013
Projection	1	13	-10	-8	14	17	12.2	Use	last yr's B->K surv. ratio	46.0					
Alternatives	2	17	-2	-12	10	23	12.8	Use	2 yr B->K surv. ratio	38.9					
	3	12	3	-9	5	22	10.3	Use	3 yr B->K surv. ratio	33.7					
	4	6	-1	-7	9	21	8.8	Use	5 yr B->K surv. ratio	33.2					
	5							Use							
	6	8	-6	-13	12	19	11.6	Use	school's 2 yr avg K NHC	52.5					
	7	1	-3	-13	8	19	8.7	Use	school's 3 yr avg K NHC	45.2					
	8	-8	-11	-15	7	17	11.6	Use	school's 5 yr avg K NHC	44.5					
	9							Use							
	10							Use							
	11							Use							
	12							Use							
	13							Use							
	14							Use							
	15							Use							
	16							Use							
Full-time K: 2006					*	*			Use for K non-housing cohort:						

Within the "survival ratio" group, there are planning assumption options to base the future size of the kindergarten non-housing cohort on last school year's actual B->K survival ratio, or ratios calculated by combining data from the last two, three, or five years of historical data. The projected value for the school's kindergarten cohort that each option would produce is displayed to the right of each option, under the "2008" heading. The historical accuracy of each option in predicting the next year's kindergarten cohort (defined as the actual enrollment minus the option's predicted value) is displayed to the left of each option, along with a calculation of the mean of the absolute values of the five historical errors in the column "Avg Miss". The "historical cohort" group of projection options has three alternatives (those that include the words "avg K NHC"), based upon the average size of the cohort over

the past two, three, or five years. The same future value and past performance indicators are shown for this group as for the survival ratio options.

So the first task in producing an elementary school projection is to settle on a method for projecting the kindergarten non-housing cohort. Generally speaking, the starting point for this decision is the option that has shown the best accuracy over the past five years, as evidenced by having the lowest value in the Avg Miss column. Next, it is wise to check next year's value for your chosen alternative against the

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Birth cohort	101	106	105	105	91	76	77	75	82	72	57	79	73	62	62
Actual K NHC						59	60	62	38	42	48	39	31	47	58
Birth->K surv ratio						0.586	0.566	0.592	0.362	0.460	0.632	0.508	0.406	0.574	0.806

historical values for the school, by comparing it to the row of values to the right of the "Actual K NHC" heading (segment reproduced above), which is below the kindergarten projection options area in the worksheet. (The 38.9 students yielded by the 2yr B->K ratio selected in the segment on the previous page looks a little low when viewed in this perspective, given the trend toward increased values for the last three years at this school. On the other hand, it may be wise to hedge a little, given the ups and downs of this school's kindergarten NHC over the years.) This area of the worksheet also displays birth cohort sizes, which are linked from the Bth worksheet in the Data workbook, and calculates historical B->K survival ratios, which may also help you judge the appropriateness of your selected option's projection. For example, if you have selected one of the survival ratio options, and your option's projected 2008 cohort looks unusually large compared to the school's history as shown on the K NHC row, a look at the number of births in 2003 (highlighted with an orange background in the worksheet) may reveal an unusually large number, which may make you more comfortable with your projected 2008 kindergarten cohort.

Two historical developments make kindergarten projections problematic. The School System has been gradually phasing in the full day kindergarten program over the past four school years, and this program change has generally had the effect of increasing the size of kindergarten classes as it is implemented at each school. This increase is due to the fact that, as a free full day program, public school kindergarten competes more successfully against private full day programs and draws in students who in the past would not have been enrolled in the public schools until first grade. (This phenomenon, in turn, makes predicting the size of a school's first grade cohort the year after full day kindergarten commences

Full-day K adjustment	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
expand K	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
contract Gr 1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

somewhat more difficult, as well.) We attempt to adjust for this full day K conversion by artificially changing the sizes of both the kindergarten cohort, in the year of the change, and the grade 1 cohort the year after. The worksheet segment shown above accomplishes this adjustment by entering a decimal fraction larger than 1.0 on the "expand K" row and a fraction lower than 1.0 on the "contract Gr 1" row. Current thinking is that the expansion of kindergarten should be the same value as the school's historical kindergarten to grade 1 survival ratio, and the contraction of grade 1 should be about 0.9, based on our experience with the first three years of the full day program. However, our experience from year to year with this program has been very inconsistent, and we are still developing our methodology in this area.

Because this program change has occurred during the five-year period reflected in the historical accuracy columns, the data presented there and the kindergarten projection options, in general, must be used with caution if you are working on a school that made the switch to full day kindergarten two or three years ago. The bottom row of the kindergarten projection options area (see the segment

reproduced on a previous page) contains an asterisk in one or more of the five historical accuracy columns to indicate the duration of the full day kindergarten program at the school in question. In addition, the cell at the far left of this row shows the school year in which the program was begun. In general, the School Planning Office uses three-year average projection options for schools that have been in the full day kindergarten program for three years, and two-year averages for those in the program for two years. Any of the projection options are deemed appropriate for schools in the full day program for four years or that are only now in their first year of the program (none have five years in the program yet).

A second issue affecting the kindergarten projection methodology was the decision of the Maryland State Department of Education (MSDE) to change the cut-off date for kindergarten eligibility from January 1st to September 1st, by shortening the eligibility period to 11 months for four consecutive school years, from 2002 to 2006. The school year beginning in August 2007 was the first one since 2001 that had a full 12-month eligibility period. Consequently, the actual data for the years 2002 to 2006 must be normalized to twelve-month values before it can be used in our projection formulas. The green background on four cells of the K NHC row (see worksheet segment at the top of the previous page) indicates that these cells contain actual data for an 11-month period, increased proportionally to simulate twelve months of eligibility and be comparable to the other years.

Once you have mastered the intricacies of the kindergarten projection, the next step in the elementary school projection process is to select the survival ratios to be used to project the remaining five grade level cohorts for future years. The Survival Ratios segment of the projection worksheet (reproduced below) is intended to assist in this process. On the left are five years' actual values of each grade level's survival ratios, as contained in the Dem worksheet of the Data workbook. To the right of the column headed "2007" are the two-, three-, and five-year average values for this school's survival ratios. The values from one of these three columns, or the actual values for 2007, are selected and copied to the

Survival Ratios					Use	Use	Use	Use		Centering Multipliers				Use for
	2003	2004	2005	2006	2007	2yr Avg	3yr Avg	5yr Avg		K	1		2008	Future Yrs
K->1	1.151	1.294	1.111	1.119	1.164	1.141	1.131	1.168		1	1		Geographic	1.141
1->2	1.000	0.952	1.039	1.000	1.056	1.028	1.032	1.009		2	1		Total	1.028
2->3	1.020	1.041	1.000	1.025	1.107	1.066	1.044	1.039		3	1		408.1	1.066
3->4	0.990	1.037	1.014	1.000	0.950	0.975	0.988	0.998		4	1			0.975
4->5	0.942	0.989	0.982	0.934	1.045	0.990	0.987	0.978		5	1			0.990

boxed "Use for Future Yrs" area. To provide some feedback about the effect of each option on the school's final enrollment, the value in the "2008 Geographic Total" cell will update itself as different options are pasted into the "Use" box. Generally speaking, we try to select a survival ratio option with a timeframe that is consistent with the option previously selected for the kindergarten projection. (The Centering Multipliers are used to make gross adjustments to the projection tool after the individual school projection decisions have been made, if it is felt that the tool has a built-in bias toward over- or under-projecting a given grade level when the County-wide grade level cohorts are reviewed. This technique is rarely necessary, and even less often a good idea.)

Next, it is time to project the various housing effects that will impact this school's enrollment. The first housing effect to be determined is net apartment turnover. It is called "net" because students may both leave and arrive in the school's district by way of apartment turnover. The Net Apartment Yield segment of the worksheet (reproduced on the next page) displays in its lower left quadrant the net number of students yielded by apartment transactions in this school's district over the past five years (negative numbers indicate a net loss of students). The five columns to the right of the student yield columns show the student yields as a percentage of the number of existing apartment units in the district each year (i.e. an apartment turnover yield rate), by grade level. Continuing to the left in the bottom half

of the segment, the next three columns calculate the two-, three-, and five-year average historical apartment turnover yield rates, and the column headed "2007 Cnty" displays the County-wide average apartment turnover yield rates for all schools of this level.

Net Apartment Yield		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	K	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	2	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
	3	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
	4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Projected Total		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

		Previous Years' Net Apartment Yields					Yields (as portion of existing APTs)				Use	Use	Use	Use	2007	Use for	Tot Fut
		2003	2004	2005	2006	2007	2003	2004	2005	2006	2007	2yr Avg	3yr Avg	5yr Avg	Cnty	Future Yrs	Apt
	K	5	6	9	10	9	0.007	0.008	0.013	0.014	0.013	0.013	0.013	0.011	0.019	0.013	0
	1	1	0	0	2	1	0.001	0.000	0.000	0.003	0.001	0.002	0.001	0.001	-0.001	0.002	
	2	0	-1	0	-3	-1	0.000	-0.001	0.000	-0.004	-0.001	-0.003	-0.002	-0.001	-0.001	-0.003	
	3	4	-1	-2	-1	0	0.006	-0.001	-0.003	-0.001	0.000	-0.001	-0.001	0.000	0.000	-0.001	
	4	-6	-2	-1	3	0	-0.008	-0.003	-0.001	0.004	0.000	0.002	0.001	-0.002	-0.001	0.002	
	5	-1	-4	-1	0	0	-0.001	-0.006	-0.001	0.000	0.000	0.000	0.000	-0.002	0.000	0.000	
Tot		3	-2	5	11	9	1st year impacts ->				9.0	10.0	8.3	5.2	11.4		

To project apartment turnover yields, you must determine which set of the historical average rates (or the previous year's actual values) seems appropriate for the future. To provide feedback on their impacts, the net student increase or decrease that each option would forecast for next school year is shown at the bottom, to the right of the heading "1st year impacts->". If there are no apartment units currently in existence within the school's district, all of the yield columns will be filled with zeros. In this case, the County-wide average values should be selected and pasted into the "Use" box at the far right. (Farther to the right is a heading "Tot Fut Apt", that indicates how many apartment units are projected to be built within this school district in all future years combined, just for those curious to know.) Once a projection option is selected, its future impact is displayed in the rows above the historical data.

The next housing effect to be determined is net yield from re-sales of existing homes. Like apartment turnover, students may also leave from and arrive in the school's district by way of sales of existing homes. The Net Resale Yield segment of the worksheet (reproduced below) displays in its lower left quadrant the net number of students yielded by real estate sales transactions in this school's district over the past five years (negative numbers indicate a net loss of students), by grade level. The five columns to the right of the student yield columns show the student yields as a percentage of the number of existing non-apartment housing units in the district each year (i.e. a re-sale yield rate). We exempt re-sales of apartment units because we don't really care who owns apartments, only who lives in them. Continuing to the left, the next three columns calculate the two-, three-, and five-year average historical re-sale yield rates, and the column headed "2007 Cnty" displays the County-wide average re-sale yield rates for all schools of this level.

Net Resale Yield		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	K	5.0	5.0	5.0	5.0	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
	1	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
	2	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Projected Total		11.5	11.5	11.5	11.5	11.6	11.7	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8

		Previous Years' Net Resale Yields					Yields (as portion of existing SFDs, SFAs, MHs)				Use	Use	Use	Use	2007	Use for	Tot Fut
		2003	2004	2005	2006	2007	2003	2004	2005	2006	2007	2yr Avg	3yr Avg	5yr Avg	Cnty	Future Yrs	Non-apt
	K	2	3	5	8	2	0.001	0.002	0.003	0.004	0.001	0.003	0.003	0.002	0.001	0.003	55
	1	1	11	3	5	0	0.001	0.006	0.002	0.003	0.000	0.001	0.001	0.002	0.001	0.001	
	2	3	4	-1	6	-1	0.002	0.002	-0.001	0.003	-0.001	0.001	0.001	0.001	0.000	0.001	
	3	2	-3	2	0	0	0.001	-0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	4	-3	0	3	1	0	-0.002	0.000	0.002	0.001	0.000	0.000	0.001	0.000	0.000	0.000	
	5	-1	-1	-2	0	2	-0.001	-0.001	-0.001	0.000	0.001	0.001	0.000	0.000	0.000	0.001	
Tot		4	14	10	20	3	1st year impacts ->				3.0	11.5	11.0	10.2	4.5		

To project re-sale yields, you must determine which set of the historical average rates (or the previous year's actual values) seems appropriate for the future. To provide feedback on their impacts, the net student increase or decrease that each option would forecast for next school year is shown at the bottom, to the right of the heading "1st year impacts->". In the unlikely event that there have been no re-sales of existing homes for the past five years within the school's district, all of the yield columns will be filled with zeros. In this case, the County-wide average values should be selected and pasted into the "Use" box at the far right. (Farther to the right is a heading "Tot Fut Non-apt", that indicates how many housing units are projected to be built within this school district in all future years combined.) Once a projection option is selected, its future impact is displayed in the rows above the historical data.

Next we turn our attention to the impact of newly constructed homes in the school's district. These impacts occur in three ways: future births to families that move in; children younger than five years old at the time of move-in, who will enroll in public schools in future years; and school-aged children who are immediately enrolled in the school at the time of move-in. The first of these impacts is measured by tracking births in the school district, as covered above in the discussion of the Bth worksheet.

The second impact, that of children who are too young to immediately enroll in a school at the time of move-in, must be measured indirectly. We analyze the makeup of each school's kindergarten class for the past ten school years to determine how many of the students lived in houses that were built one to four years before the students entered kindergarten, meaning that these students were born prior to move-in, but were too young to start school immediately. The worksheet segment reproduced below is used to estimate each future year's potential for kindergarten cohort growth due to children of ages 1

Pre-school Move-ins in Previously-constructed Units

					2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Proj./actual units, prev 4 yr					36	8	-6	196	480	749	1018	1071	1019	991	957	1031	1094	1215	1202
Projected additional K					0.8	0.2	-0.1	4.1	10.1	15.7	21.3	22.4	21.3	20.8	20.0	21.6	22.9	25.4	25.2
									2003	2004	2005	2006	2007						
			Units, prev 4 years						290	247	193	123	66		Use	Use	Use		Use for
			Contribution to K						8	10	5	2	1		2yr Avg	3yr Avg	5yr Avg		Future Yrs
			Yield rate						0.028	0.040	0.026	0.016	0.015		0.016	0.021	0.028		0.021

through 4 who have moved into newly constructed homes in a school's district during the previous four years. The bottom four rows of the segment present the historical data for the school district in question. To the left of the "Units, prev 4 years" heading is the number of housing units constructed in the district during the previous four year period. Below those figures is the number of students the housing units built in the last four years contributed to each school year's kindergarten class, and below that, the yield rate of what we refer to as "Pre-school Move-ins". To the right of the historical data are the now-familiar planning assumption options for you to choose from, and the "Use" box for pasting in your choice. Once a choice is put in the "Use" box, the lines at the top of the segment show the four-year unit totals and the estimated kindergarten student yield from pre-school move-ins for each future year of the projection period.

The third impact of new housing, immediate enrollees, is unlike the pre-school move-in impact in that immediate enrollees can enter any and all grade levels of the school. So the first task in projecting the immediate impact of new housing on school enrollment is to determine each grade level's share of the impact. Like everything else, this task is accomplished by looking at historical values for the district. The left portion of the projection worksheet shown on the next page displays the number of students, by grade level, who have been added to the school's enrollment via newly constructed housing in each of the last five years. Proceeding to the right, the next set of columns calculates the proportion of the total student yield that each grade level subtotal represents. Farther still to the right are several options for

selecting future values for the grade level distribution, based on historical averages for the school and, if little or no new housing has taken place in the district in the past five years, the County-wide average distribution. The selected option's values are pasted in the "Use" box, as usual.

	Previous Years' New Construction Yields						Distribution by Grade Level						Use School 3yr Avg	Use School 5yr Avg	Use Cntywide 5yr Avg	Use for Future Yrs
	2003	2004	2005	2006	2007		2003	2004	2005	2006	2007				
K	0	0	0	0	0		0.000	0.000	0.000	0.000	0.000		#DIV/0!	0.000	0.171	0.171
1	0	0	0	0	0		0.000	0.000	0.000	0.000	0.000		#DIV/0!	0.000	0.247	0.247
2	0	0	0	0	0		0.000	0.000	0.000	0.000	0.000		#DIV/0!	0.000	0.184	0.184
3	0	0	0	0	0		0.000	0.000	0.000	0.000	0.000		#DIV/0!	0.000	0.101	0.101
4	1	0	0	0	0		1.000	0.000	0.000	0.000	0.000		#DIV/0!	1.000	0.171	0.171
5	0	0	0	0	0		0.000	0.000	0.000	0.000	0.000		#DIV/0!	0.000	0.127	0.127
Tot	1	0	0	0	0		1.000	0.000	0.000	0.000	0.000		#DIV/0!	1.000	1.000	1.000

The next task is to select a student yield rate for each new construction unit type and paste the selected values in the "Use for Future Yrs" box on the right. In the worksheet segment below, the number of occupied building permits and their student yield rates for each of the past five years are displayed by linking to this data in the Ylds worksheet of the Data workbook. To the right of the linked data are columns that calculate the school district's two-, three-, and five-year average student yield per housing unit built during the period. Note that these yields are students of all grade levels, by unit type. Also shown are the County-wide values, in case there has been an inadequate volume of units of one or more types constructed over the past five years in the school's district. At the far right is a column (headed "Tot Fut Units") indicating how many future units of each type are projected for this school. It is very important that each non-zero total in this column have a non-zero yield rate entered in the column to its left.

	Occupied Permits					Existing Units	Yield Rates					Use School 2yr Avg	Use School 3yr Avg	Use School 5yr Avg	Use Cntywide 5yr Avg	Use for Future Yrs	Tot Fut Units
	2003	2004	2005	2006	2007	2007	2003	2004	2005	2006	2007						
SFD	45	4	3	4	16	1349	0.067	0.000	0.000	0.250	0.125	0.150	0.130	0.084	0.331	0.150	278
SFA	0	0	0	0	0	1224	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.182	0.182	1211
APT	0	0	0	0	0	1078	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.119	0.119	2358
MH	1	5	4	0	0	225	0.067	0.000	0.000	0.250	0.125	0.000	0.000	0.007	0.331	0.150	-225

It is not unusual to combine values in the "Use" box from two or more of the columns to its left, depending upon the mix of units that has been built in the past. Generally speaking, we require at least 20 occupied units to have a reliable yield rate for that unit type. In the example above, the two-year average rate was chosen for SFD units, and the County-wide average yield rates were chosen for SFA and APT units, since none of the latter two types has been built and occupied in the past five years in this school's district.

New Construction Yield	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
K	-1.9	-2.2	1.9	7.5	6.4	6.7	6.6	6.1	5.4	5.5	8.1	7.2	8.3	4.5	10.2
1	-2.7	-3.2	2.7	10.8	9.2	9.6	9.6	8.8	7.7	8.0	11.7	10.3	12.0	6.5	4.4
2	-2.0	-2.4	2.0	8.1	6.9	7.2	7.1	6.6	5.7	5.9	8.7	7.7	9.0	4.9	3.3
3	-1.1	-1.3	1.1	4.4	3.8	4.0	3.9	3.6	3.2	3.3	4.8	4.2	4.9	2.7	0.0
4	-1.9	-2.2	1.9	7.5	6.4	6.7	6.6	6.1	5.4	5.5	8.1	7.2	8.3	4.5	0.0
5	-1.4	-1.7	1.4	5.6	4.7	4.9	4.9	4.5	4.0	4.1	6.0	5.3	6.2	3.4	0.0
Projected Total	-11.1	-13.0	10.9	43.9	37.3	39.0	38.8	35.8	31.3	32.4	47.4	41.8	48.8	26.5	17.9
Future Housing Units	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
SFD	6	18	0	0	0	16	14	38	29	31	30	11	44	23	8
SFA	25	50	120	130	120	116	119	80	63	67	108	70	104	2	0
APT	0	0	186	170	130	130	126	130	130	130	195	230	195	190	140
MH	-50	-75	-100	0	0	0	0	0	0	0	0	0	0	0	0
Tot	-19	-7	206	300	250	262	259	248	222	228	333	311	343	215	148

Once the distribution by grade level and yield rate have been decided, the only remaining quantity needed to complete the calculation of projected student yields from new construction is the number of housing units expected to be built in the future. Fortunately, this data has already been calculated by the

Department of Planning and Zoning, and stored by us in the Hsg worksheet of the Data workbook, as discussed above. The projection workbooks link to this projected housing data and display it above the grade level distribution and historical student yield sections of the workbook, as shown above. The bottom five rows are the projected housing unit totals by year for this school, and the top seven rows display, by grade level, the projected numbers of students added to the school's enrollment due to new housing construction. These student totals are the mathematical products of the projected number of units, the unit type yield rates as selected in the yields' "Use" box, and the grade level's percentage of the total yield as selected in the grade level distribution "Use" box.

At this point in the process, all of the elements are in place to complete the projection of the geographic enrollment. It all comes together in the segment of the worksheet that is reproduced below, showing the school's future geographic enrollment levels. Each section of the projection worksheet that has been discussed so far contributes its results to a calculation that produces these numbers, using the formula shown here:

kindergarten cohort OR last year's cohort multiplied by the selected survival ratio

+

apartment turnover yield

+

re-sale of existing home yield

+

pre-school move-in yield

+

new construction yield

=

geographic enrollment

Geographic Population		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
K	69	53.5	73.9	67.3	61.5	60.1	60.9	60.6	60.3	61.3	61.6	62.5	63.1	63.3	63.3	63.3
1	72	82.9	65.1	88.3	82.6	74.6	73.7	74.4	73.4	72.8	74.0	74.4	75.4	76.1	76.3	76.3
2	55	74.6	85.7	67.4	92.6	85.7	78.1	76.9	77.2	76.0	75.4	76.7	77.0	78.0	78.8	79.0
3	62	58.2	79.1	90.9	72.1	98.4	91.3	83.1	81.6	81.8	80.6	79.9	81.2	81.6	82.7	83.5
4	76	62.6	58.8	79.1	91.9	72.6	98.8	91.6	83.1	81.6	81.7	80.6	80.0	81.2	81.6	82.7
5	72	76.3	62.9	59.1	80.2	92.1	73.4	99.2	91.8	83.3	81.8	81.9	80.8	80.1	81.4	81.8
Tot	406	408.1	425.5	452.2	480.9	483.6	476.2	485.8	467.4	456.8	455.1	455.9	457.5	460.4	464.1	466.5

Once the school's geographic enrollment is determined, it is used as the basis for two additional calculations. First, the feeder rates (introduced in the discussion of the Fdr worksheet above) are linked to the projection worksheet to give an indication of what share of this school's graduating class has historically fed into each middle school (see worksheet segment on the next page). This data is displayed under the "Historical Feed Ratios to MS" heading. To the right of these columns are the familiar options for projecting the future values of these feed rates. Farther to the right, under the "Best Fit" heading, are indications of which options produced projected feed rates that came closest to the actual feed rates for each school in years past (a "10" indicates that the ten-year average was best, a "5" indicates the five-year average was closest, etc.) These best fit indicators sometimes strongly suggest which option should be chosen; at other times, such as in the example, they provide little useful guidance.

Projected Feed Ratios to MS

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Hammond MS	0.403	0.403	0.403	0.403	0.403	0.403	0.403	0.403	0.403	0.403
Oakland Mills MS	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241
Patuxent Valley MS	0.356	0.356	0.356	0.356	0.356	0.356	0.356	0.356	0.356	0.356
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Historical Feed Ratios to MS

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Hammond MS	0.398	0.383	0.385	0.416	0.419	0.396	0.388	0.377	0.451	0.417
Oakland Mills MS	0.284	0.247	0.229	0.315	0.203	0.219	0.212	0.255	0.211	0.236
Patuxent Valley MS	0.318	0.370	0.385	0.270	0.378	0.385	0.400	0.368	0.338	0.347
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total %	1.000	1.000	0.999	1.001	1.000	1.000	1.000	1.000	1.000	1.000

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	0.403	0.403	0.403	0.403	0.403	0.403	0.403	0.403	0.403	0.403
	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241
	0.356	0.356	0.356	0.356	0.356	0.356	0.356	0.356	0.356	0.356
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Use	Use	Use	Use		Best fit				
2yr Avg	3yr Avg	5yr Avg	10yr Avg		2003	2004	2005	2006	2007
0.434	0.415	0.406	0.403		5	5	2	10	2
0.224	0.234	0.227	0.241		10	2	10	3	2
0.343	0.351	0.368	0.356		3	2	5	10	10
0.000	0.000	0.000	0.000						
0.000	0.000	0.000	0.000						
1.000	1.000	1.000	1.000						

Once a selection for feed rates has been decided upon, its values are pasted in the "2008" column under the heading "Projected Feed Ratios to MS", and filled to the right for all of the remaining columns inside the boxed area of the worksheet. It is possible that you will want to override this approach of a constant set of feed ratios for all future years. An override may be particularly appropriate when there is a large future housing development that will be located exclusively in the geography that is shared by the sending school and one of the receiving schools. In this case, you should manually change the feed rates as you think appropriate, and fill your new rates to the right inside the boxed area. Once the future

Contribution to Each Middle School's Grade 5 Cohort

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Bonnie Branch MS														
Burleigh Manor MS														
Clarksville MS														
Cradlerock MS														
Dunloggin MS														
Elkridge Landing MS														
Ellicott Mills MS														
Folly Quarter MS														
Glenwood MS														
Hammond MS	30.0	30.7	25.4	23.8	32.3	37.1	29.6	40.0	37.0	33.6	32.9	33.0	32.5	32.3
Harpers Choice MS														
Lime Kiln MS														
Mayfield Woods MS														
Mount View MS														
Murray Hill MS														
Oakland Mills MS	17.0	18.4	15.2	14.3	19.3	22.2	17.7	23.9	22.1	20.1	19.7	19.7	19.5	19.3
Patapsco MS														
Patuxent Valley MS	25.0	27.2	22.4	21.0	28.5	32.8	26.1	35.3	32.7	29.6	29.1	29.1	28.7	28.5
Wilde Lake MS														
Total	72.0	76.3	62.9	59.1	80.2	92.1	73.4	99.2	91.8	83.3	81.8	81.9	80.8	80.1

feed rates are in place, the worksheet applies them to the projected geographic enrollment for grade 5, to determine each receiving school's portion of the graduating class, as shown in the worksheet segment on the previous page. These values will be linked to the bottom of each middle school's projection worksheet and, together with similar data from all of the sending schools, will form the basis for projecting the middle schools' sixth grade cohorts in much the same way as the birth data was used to project kindergarten cohorts for the elementary schools.

The other use for the geographic enrollment is to project the attending enrollment for the current school. As discussed in the previous section about the out-of-district enrollments, the difference between geographic enrollment and attending enrollment is the net out-of-district enrollment. Since these have

Net Out-of-District Population

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
K	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	0	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
2	-1	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
3	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Tot	0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

been conveniently stored for us in the Net worksheet of the OOD-ES workbook, we link to them now in the projection worksheet. By adding these values to the geographic enrollment projections, we obtain our goal of producing the school's attending enrollment projections, as shown below.

1st Projected Year: 2008   School: **Atholton ES**

Attending Population   Projected ----->

By Sept. 30, ->	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
K	69	54	74	67	61	60	61	61	60	61	62	62	63
1	72	83	65	88	82	74	73	74	73	73	74	74	75
2	54	74	85	67	92	85	78	77	77	76	75	76	77
3	63	58	79	91	72	98	91	83	82	82	81	80	81
4	74	63	59	79	92	73	99	92	83	82	82	81	80
5	74	77	64	60	81	93	74	100	93	84	83	83	82
Tot	406	409	426	452	480	483	476	487	468	458	457	456	458
Utilization %		106	110	117	124	125	123	126	121	118	118	118	118

Previous Years' Projections

2007	392	390	379	389	407	390	399	406	404	403	402	408	414
2006	370	373	363	378	395	399	404	403	404	407	408	414	418
2005	394	402	393	402	405	408	412	416	417	424	429	435	443
2004	398	409	411	413	415	417	420	421	418	417	417	407	
2003	409	414	424	428	437	437	438	439	439	439	438		

11/27/2007

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	B/O 2031	2032
	63	63	63	63	63	63	63	63	62	62	61	61	60
	76	76	76	76	76	76	76	76	75	75	74	74	73
	78	78	79	79	79	79	79	79	78	78	77	77	77
	82	83	84	84	84	84	84	84	84	83	83	82	82
	81	82	83	83	84	84	84	84	84	84	83	83	82
	81	82	83	84	85	85	85	85	85	85	85	84	84
	461	464	468	469	471	471	471	471	468	467	463	461	458
	119	120	121	121	122	122	122	122	121	121	120	119	118

1st Yr Accuracy

	425	436	446	14									
	423			9	Indicates a year in which redistricting took effect
				1	
				7	
				-10	

Several features of the attending enrollment region at the top of the projection worksheet are worthy of further discussion. Immediately below the attending enrollment projection are five rows (under the "Previous Years' Projections" heading) in which previous attending enrollment projections for the same

set of school years are shown. At the far right of each previous projection is an indication of its short term accuracy, as expressed by how close it came to the actual school enrollment in the first projected year (negative numbers are over-projections, positive numbers are under-projections). These rows can be used to provide an historical perspective in which to assess the reasonableness of the current projection. Because changing a school district's boundary lines (a process termed "redistricting") makes meaningful year-to-year comparisons of attending enrollment projections impossible, years in which redistricting occurred are indicated by an orange horizontal double line between the years when redistricting went into effect.

On the total enrollment row (to the right of the heading "Tot") of the attending enrollment projection, the peak enrollment is highlighted with a yellow background in its cell. Immediately below the total enrollment line is the utilization rate row, where the school's projected enrollment is compared to the school's capacity (via link to the Cap worksheet in the Data workbook). Utilization rate is defined as enrollment divided by capacity, thus utilization rates over 100% result when enrollment exceeds capacity. The School System has set a goal of keeping school utilization rates between 90% and 110%. In addition, the Howard County Adequate Public Facilities Ordinance shuts off allocations for building new housing units in school districts where the projected utilization of elementary or middle schools exceeds 115% three years into the future. To graphically illustrate these thresholds, the background colors of the utilization rate cells change to blue when the utilization rate dips to below 90%, green from 90% to 110%, orange from over 110% to 115%, and red when the rate is over 115%.

Finally, in the cell above one of the future school year headings (in the example above, year 2031) is an indicator (B/O) of when the Department of Planning and Zoning predicts residential build out will occur for Howard County. Although the science underlying the relationship between residential build out and peak school enrollment is still poorly understood, the build out indicator is provided for those who might be curious about pursuing more knowledge regarding this relationship.

This concludes the walkthrough of the elementary school projection workbook. The sections that follow will talk about the middle school and high school versions of this workbook, and specifically, how their school projection worksheets differ from the elementary school version. There are only a few differences; the calculation of survival ratios, apartment turnover yields, existing home re-sale yields, and the application of out-of-district enrollment statistics to derive attending enrollment from geographic enrollment are done identically on all schools' worksheets. In the same vein, the middle school worksheet contains a segment that allocates its graduating class among the high schools that it feeds, just as the elementary school worksheet allocates its graduates to middle schools.

Middle school and high school worksheets also start the projection process at the bottom of the worksheet, but what you see there is a different calculation than the elementary worksheets have. The kindergarten projection options are absent from the middle and high school worksheets, as is the calculation of pre-school move-in yields. Unique in both middle and high schools is the derivation of the incoming class by applying feeder rates to the graduating classes of the lower level schools. High schools have an additional unique requirement to adjust the attending enrollment for the phase-out of old boundary lines, when district boundaries have been changed. These unique features are discussed in more detail in the sections that follow.

Using the Unique Features of the **Middle Schools** Projection Workbook

The first noticeable difference on the middle school worksheet is the derivation of its incoming class. Where the elementary worksheet provided options for estimating kindergarten class sizes from births or

historical kindergarten class sizes, the middle school worksheet provides an accounting of the contribution each feeding elementary school makes to the fifth grade cohort that resides within the middle school's geographic district (see shaded rows below). This fifth grade geographic cohort will

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Geog. Gr 5 Cohort	182.0	182.5	182.9	162.2	182.2	205.8	179.4	193.7	194.3	191.0	205.9	213.3	218.1	232.0	243.0	252.9
Atholton ES	30.0	30.7	25.4	23.8	32.3	37.1	29.6	40.0	37.0	33.6	32.9	33.0	32.5	32.3	32.8	33.0
Bellows Spring ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bollman Bridge ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bryant Woods ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bushy Park ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Centennial Lane ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clarksville ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clemens Crossing ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cradlerock ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dayton Oaks ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deep Run ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elkridge ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forest Ridge ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fulton ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gorman Crossing ES	25.0	35.2	29.9	29.1	34.3	29.9	34.9	36.1	38.5	44.4	46.2	47.6	48.3	48.4	50.5	50.5
Guilford ES	26.0	24.7	26.9	24.1	28.2	29.0	31.2	29.9	30.8	30.5	30.6	30.0	29.8	30.1	30.3	30.2
Hammond ES	101.0	91.8	100.7	85.2	87.3	109.7	83.8	87.8	88.0	82.7	96.1	102.7	107.5	121.2	129.5	139.2
Hollifield Station ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ilchester ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jeffers Hill ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Laurel Woods ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lisbon ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Longfellow ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manor Woods ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Northfield ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phelps Luck ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pointers Run ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rockburn ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Running Brook ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
St Johns Lane ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stevens Forest ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Swansfield ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Talbott Springs ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Thunder Hill ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Triadelphia Ridge ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Veterans ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waterloo ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waverly ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
West Friendship ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worthington ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

become the basis of the middle school's sixth grade the following year, via the application of an appropriate survival ratio. The values shown in the worksheet segment above are linked from each elementary school's projection worksheet, so that the elementary school projections directly influence the future enrollment projections of the middle schools that they feed. This relationship requires that you complete a projection worksheet for all of a middle school's feeding elementary schools, before you start work on the middle school's projection worksheet.

The middle school worksheet contains the same processes as the elementary worksheet for estimating future survival ratios, apartment turnover yields, re-sale yields, and new construction yields. The middle school's geographic enrollment is arrived at in a fashion similar to the elementary school's, by applying survival ratios to the previous year's cohort sizes to get the new non-housing cohort for each grade level, and then adding in each grade level's share of the yields from the three housing effects to generate the final geographic enrollment.

Geographic grade 8 enrollments are allocated to the one or more high schools that each middle school feeds in much the same way that grade 5 enrollments were allocated to middle schools in the elementary school worksheet. Finally, the middle school's out-of-district enrollment projection is used to derive the its attending enrollment from its geographic enrollment (see completed middle school attending enrollment projection in the worksheet segment reproduced on the next page). Information concerning previous projections and their accuracy, peak enrollment, utilization rates, and residential built out of the County are included on the middle school worksheet, as discussed above for the elementary version.

Attending Population		Projected ----->											
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
6	187	191	190	190	171	190	216	190	205	204	201	220	225
7	219	193	195	193	196	175	197	224	199	212	211	212	228
8	214	225	195	198	197	198	179	201	228	202	216	216	217
Tot	620	609	580	581	564	563	592	615	632	618	628	648	670
Utilization %		104	99	99	97	96	101	105	108	106	108	111	115
Previous Years' Projections													
2007	635	634	604	608	582	590	588	612	615	625	630	632	633
2006	619	588	543	522	508	505	529	569	599	611	625	635	644
2005	624	588	545	523	518	508	531	547	553	541	525	518	520
2004	630	595	541	538	545	554	556	561	577	577	574	567	
2003	676	632	619	639	654	626	606	590	572	568	586		

11/27/2007

												B/O	
2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	
229	241	253	267	278	284	290	288	282	275	273	271	263	
231	234	248	264	279	287	293	297	292	286	279	277	275	
231	234	237	253	270	283	292	297	299	294	288	282	280	
691	709	738	784	827	854	875	882	873	855	840	830	818	
118	121	126	134	142	146	150	151	149	146	144	142	140	
			1st Yr Accuracy										
642	661	693	-15										
655			2										
			-3	Indicates a year in which redistricting took effect									
			15										
			6										

Using the Unique Features of the **High Schools** Projection Workbook

Like the middle school worksheet, the high school worksheet provides an accounting of the contribution each feeding middle school makes to the eighth grade cohort that resides within the high school's geographic district (see shaded rows below). This eighth grade geographic cohort will be the basis for projecting the following year's ninth grade, or incoming, class for each high school. In all other regards, the high school projection proceeds through the same steps as the middle school projection, applying survival ratios and adding the impacts of the three housing effects to arrive at the geographic enrollment. Since there are no higher-level schools to be fed by the high schools, there is no need to allocate the graduating class to other destinations. So the attending enrollment is the next order of business, and the usual addition of out-of-district enrollments yields a preliminary attending enrollment for each high school.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Geog. Gr 8 Cohort	358.1	310.9	339.3	304.8	324.8	313.6	313.7	307.6	330.9	345.2	305.4	367.9	351.7	355.9	359.1	360.1
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Bonnie Branch MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Burleigh Manor MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clarksville MS	101.1	98.0	107.4	94.3	95.3	80.1	86.1	79.7	94.3	91.9	75.4	94.7	87.8	87.8	87.5	87.8
Cradlerock MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunloggin MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elkridge Landing MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ellicott Mills MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Folly Quarter MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Glenwood MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hammond MS	50.0	48.2	52.5	45.3	47.4	45.9	45.9	42.5	47.4	48.8	46.2	53.1	50.4	51.6	53.1	53.1
Harpers Choice MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lime Kiln MS	82.9	72.8	82.4	76.3	85.8	79.8	78.5	82.4	91.1	96.4	91.0	109.1	106.8	108.1	109.1	108.6
Mayfield Woods MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mount View MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray Hill MS	20.1	13.9	15.9	11.8	12.9	15.1	12.9	13.1	13.8	13.9	11.2	12.9	12.0	12.0	12.2	12.6
Oakland Mills MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Patapsco MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Patuxent Valley MS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wilde Lake MS	104.0	78.1	81.1	77.1	83.5	92.8	90.2	89.9	84.3	94.2	81.5	98.1	94.7	96.4	97.2	98.0

However, there is one new twist to the process of finalizing the attending enrollment at the high school level. When high school district boundaries are changed, the HCPSS typically allows rising 11th and 12th grade students living in the changed areas to continue to attend the high school at which they

originally enrolled until they graduate. Thus, for the next two years, there will be what is referred to as a "phase-in" effect, until all students within the new geographic boundaries attend the same schools. The School Planning Office has computer programs which calculate the percentage of students at each grade level that are subject to the phase-in rules, and this data is plugged into the worksheet segment shown below to estimate the effects of the phase-in of new boundaries on each involved high school.

Redistricting Phase-In	Phase-In in effect?	Should attend: 2007	2008	2009	2010		Staying at previous school: (-) 2007	2008	2009	2010		Staying at this school: (+) 2007	2008	2009	2010
9		366.0	354.0	402.0	365.0										
10		372.9	365.6	353.0	400.0										
11		356.2	366.8	359.1	347.0										
12	x	353.6	356.0	366.2	358.7		6.2								
		1448.7	1442.4	1480.3	1470.7		6.2	0.0	0.0	0.0		0.0	0.0	0.0	0.0

Every phase-in involves two schools: one that should be receiving the students who are allowed to stay at their present school, and one that keeps them on its rolls instead. The estimated number of students who will be staying at their present school is entered on the present school's projection worksheet in the area at the far right of the segment shown above, under the heading "Staying at this school". Typically, only the columns marked "2008" (for grades 11 and 12) and "2009" (for grade 12) would be in use, under the terms of the phase-in rules used in the past. The same numbers are entered in the corresponding cells under the heading "Staying at previous school" on the worksheet for the school that would be enrolling these students, were it not for the phase-in. On both school's worksheets, the appropriate grade levels (normally, grades 11 and 12 during the first phase-in year, and only grade 12 during the last phase-in year) are X'ed in the blue cells under the heading "Phase-in in effect?".

This process is repeated for every pair of schools that is subject to a phase-in period due to redistricting. Like the out-of-district enrollments, the phase-in process should result in the transfer of students between schools, with no net gain or loss of students involved. To check that the phase-in data have been correctly entered, the High Schools workbook contains a worksheet called "Reconcile", where the net system-wide effects of both the out-of-district enrollments and the phase-in adjustments are shown (see segment copied below). All is well if all of the cells on this worksheet contain zeros.

Phase-in adjustment reconciliation: should all be zeroes

	2007	2008	2009	2010
9	0.0			
10	0.0	0.0		
11	0.0	0.0	0.0	
12	0.0	0.0	0.0	0.0

Out-of-district reconciliation (other than redistricting phase-in): should all be zeroes

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Once all phase-in adjustments are entered and their cumulative effects are checked on the Reconcile worksheet, the high school attending enrollment projection is done (see completed high school attending enrollment projection in the worksheet segment reproduced on the next page). Information concerning previous projections and their accuracy, peak enrollment, utilization rates, and residential build-out of

the County are included on the high school worksheet, in the same manner as the elementary and middle school versions.

1st Projected Year:	2007							School:	Centennial HS				
Attending Population		Projected ----->											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
9	368	366	354	402	365	375	365	352	392	415	438	434	524
10	358	373	366	353	400	364	375	367	353	391	416	438	435
11	350	356	367	359	347	394	358	371	362	348	386	410	433
12	395	347	356	366	359	347	393	358	371	362	348	385	409
Tot	1471	1442	1443	1480	1471	1480	1491	1448	1478	1516	1588	1667	1801
Utilization %		108	108	111	110	111	112	109	111	114	119	125	135
Previous Years' Projections													
2006	1462	1402	1421	1462	1465	1452	1423	1330	1321	1305	1340	1401	1448
2005	1410	1371	1392	1410	1387	1378	1375	1312	1314	1307	1331	1380	1398
2004	1657	1696	1677	1693	1672	1652	1650	1628	1633	1649	1675	1698	1717
2003	1544	1529	1509	1513	1517	1502	1494	1475	1468	1443	1458	1460	
2002													

11/27/2007													B/O	
2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
507	510	504	500	496	492	496	496	495	499	494	489	483	478
526	509	508	502	498	494	490	493	493	493	496	492	487	481
431	521	502	501	495	491	487	482	486	486	486	489	485	480
431	429	517	498	497	491	487	483	479	483	483	482	485	481
1895	1969	2031	2001	1986	1968	1960	1954	1953	1961	1959	1952	1940	1920
142	148	152	150	149	148	147	147	147	147	147	147	146	144
			1st Yr Accuracy										
1515	1526		4										
1414			23	Indicates a year in which redistricting took effect									
			-6										
			18										

Selected Worksheets of the Countywide Workbook

The Countywide workbook exists primarily to summarize the individual school projections in terms of their School System-wide impact. Over the years, many different needs for data have been met through the worksheets included in this workbook, so many of these worksheets are associated with singular purposes or users of data. In this document, we will present only those worksheets of general interest; typically they are used after the last school's projection worksheet is completed, to check on the reasonableness of the total projection effort. Because our projection process is done from the bottom up, the County-wide worksheets are our first glimpse of the total cumulative impact of the hundreds of separate decisions we have made during many hours, if not days, of work on the school worksheets.

The **To Infinity and Beyond** Worksheet

This worksheet gets its name from the fact that it shows projected enrollments far into the future, well beyond the time frame in which they can be relied upon to be accurate. Nonetheless, it is interesting to see how the projection tool behaves over longer time periods, if only to seek reassurance that it doesn't break down completely. The contents of this worksheet are reproduced on the next page.

Each row in this worksheet presents the total actual (in row 1) or projected enrollment of the School System, by linking to the 71 individual school projection worksheets and summing their values by grade level. Each grade level's System-wide total for the year in question is shown in a separate column; totals by level and System-wide are shown to the right. Notable events or characteristics of the projection are tagged in the far right column: the year of reckoning for the Howard County Adequate Public Facilities Ordinance, the peak School System total enrollment, and the residential build-out of the County. At the bottom, and highlighted in red type within each column, are the projected peak

enrollments for each grade level (note how they tend to move along the diagonals, or "cohort-wise" as dyed-in-the-wool projecters might say).

Source	By 30-Sep	K	1	2	3	4	5	6	7	8	9	10	11	12	Elem Tot.	Mid Tot.	High Tot.	Grand Total	Yearly Increm		Notes
Actual	2006	2969	3284	3269	3525	3644	3711	4008	3875	4013	4398	4042	3861	3557	20402	11896	15858	48156		2006	Actual enrollment
Projected	2007	3190	3394	3472	3347	3621	3703	3822	4079	3964	4409	4182	3900	3763	20727	11865	16254	48846	690	2007	
Projected	2008	2624	3578	3582	3550	3437	3681	3812	3885	4163	4355	4188	4033	3794	20452	11860	16370	48682	-164	2008	
Projected	2009	3286	2980	3774	3661	3640	3500	3794	3876	3967	4570	4134	4044	3921	20841	11637	16669	49147	465	2009	
Projected	2010	3139	3700	3164	3855	3746	3696	3615	3864	3956	4356	4340	3989	3938	21300	11435	16623	49358	211	2010	First year of Open/Closed chart
Projected	2011	3176	3546	3911	3258	3948	3815	3816	3687	3951	4351	4140	4192	3883	21654	11454	16566	49674	316	2011	
Projected	2012	3216	3585	3751	4000	3354	4014	3934	3895	3773	4345	4140	3996	4084	21920	11602	16565	50087	413	2012	
Projected	2013	3243	3622	3795	3844	4098	3423	4133	4006	3979	4155	4136	4000	3886	22025	12118	16177	50320	233	2013	
Projected	2014	3253	3658	3831	3882	3946	4164	3536	4200	4094	4379	3956	4000	3895	22734	11830	16230	50794	474	2014	
Projected	2015	3247	3662	3855	3910	3973	4002	4274	3597	4284	4495	4160	3820	3892	22649	12155	16367	51171	377	2015	
Projected	2016	3281	3659	3865	3933	4009	4036	4117	4345	3678	4702	4276	4017	3720	22783	12140	16715	51638	467	2016	
Projected	2017	3290	3700	3870	3951	4043	4078	4149	4185	4432	4045	4471	4129	3910	22932	12766	16555	52253	615	2017	
Projected	2018	3327	3716	3909	3956	4053	4104	4196	4219	4270	4857	3870	4320	4018	23065	12685	17065	52815	562	2018	
Projected	2019	3356	3752	3935	4000	4062	4122	4225	4265	4304	4680	4640	3757	4203	23227	12794	17280	53301	486	2019	
Projected	2020	3369	3795	3974	4019	4112	4134	4245	4294	4347	4720	4473	4496	3667	23403	12886	17356	53645	344	2020	
Projected	2021	3358	3782	3996	4038	4108	4161	4238	4296	4363	4745	4493	4325	4379	23443	12897	17942	54282	637	2021	
Projected	2022	3333	3771	3981	4053	4128	4160	4262	4287	4368	4763	4515	4344	4211	23426	12917	17833	54176	-106	2022	
Projected	2023	3313	3738	3964	4040	4175	4263	4312	4357	4768	4532	4364	4227	23372	12932	17891	54195	19	2023	
Projected	2024	3285	3717	3931	4029	4130	4197	4278	4315	4384	4763	4540	4383	4247	23289	12977	17933	54199	4	2024	
Projected	2025	3263	3683	3907	3982	4109	4175	4289	4325	4381	4784	4529	4386	4262	23119	12995	17961	54075	-124	2025	
Projected	2026	3238	3648	3856	3949	4063	4147	4258	4327	4387	4774	4541	4371	4263	22901	12972	17949	53822	-253	2026	
Projected	2027	3208	3608	3809	3893	4018	4087	4226	4293	4384	4774	4527	4383	4249	22623	12903	17933	53459	-363	2027	Peak K-12 Enrollment
Projected	2028	3180	3573	3771	3846	3957	4038	4162	4254	4348	4773	4528	4368	4258	22365	12764	17927	53056	-403	2028	
Projected	2029	3152	3540	3730	3798	3907	3976	4114	4190	4309	4729	4526	4368	4247	22103	12613	17870	52586	-470	2029	
Projected	2030	3120	3506	3698	3760	3868	3927	4048	4137	4241	4686	4484	4365	4244	21879	12426	17779	52084	-502	2030	Residential build-out of county
Projected	2031	3072	3467	3662	3725	3822	3881	3989	4069	4186	4611	4438	4323	4239	21629	12244	17611	51484	-600	2031	
Projected	2032	3023	3416	3624	3690	3786	3839	3946	4014	4116	4554	4368	4279	4198	21378	12076	17399	50853	-631	2032	
Projected	2033	2980	3364	3568	3653	3751	3802	3901	3967	4060	4479	4311	4213	4154	21118	11928	17157	50203	-650	2033	
Projected	2034	2938	3318	3513	3594	3711	3763	3866	3926	4017	4423	4246	4159	4091	20837	11809	16919	49565	-638	2034	
Projected	2035	2895	3270	3467	3544	3655	3728	3829	3887	3972	4375	4190	4092	4039	20559	11688	16696	48943	-622	2035	
Projected	2036	2915	3230	3413	3490	3600	3672	3790	3853	3932	4326	4143	4038	3975	20320	11575	16482	48377	-566	2036	
Projected	2037	2937	3253	3377	3444	3554	3620	3737	3811	3899	4287	4099	3998	3923	20185	11447	16307	47939	-438	2037	
Projected	2038	2961	3277	3400	3403	3503	3573	3682	3755	3861	4247	4063	3954	3881	20117	11298	16145	47560	-379	2038	
Projected	2039	2983	3297	3425	3427	3463	3520	3633	3703	3803	4208	4024	3917	3838	20115	11139	15987	47241	-319	2039	
Projected	2040	3000	3321	3447	3452	3487	3479	3581	3652	3750	4148	3987	3881	3806	20186	10983	15822	46991	-250	2040	
Projected	2041	2987	3346	3471	3476	3509	3503	3539	3606	3699	4091	3928	3846	3770	20292	10844	15635	46771	-220	2041	
Projected	2042	2969	3327	3495	3500	3535	3528	3566	3561	3650	4034	3873	3791	3735	20354	10777	15433	46564	-207	2042	
Projected	2043	2957	3311	3478	3523	3554	3552	3589	3584	3607	3982	3819	3738	3680	20375	10780	15219	46374	-190	2043	
Projected	2044	2940	3292	3458	3502	3584	3574	3610	3609	3629	3937	3772	3688	3629	20350	10848	15026	46224	-150	2044	
Maximums		3369	3795	3996	4053	4142	4197	4289	4345	4432	4857	4640	4496	4379	23443	12995	17961	54282			

We look at this worksheet first, after finishing with the individual schools, to see if the increment of growth each year looks reasonable (conveniently calculated in the column headed "Yearly Increm"), and to see if the timing and size of the peak System-wide enrollment seem believable. We often compare this table with the same table from last year's projection, to get a sense of how things have changed from our previous projection. What follows then is a long and sometimes embarrassing attempt to rationalize the changes; however, the conversation is usually valuable in that it focuses us on the questions we are going to be asked by frustrated School System personnel who will be obliged to change their budgets or operational plans when the new projection is published, if significant changes from the previous numbers have been forecast.

The **1yr Staff Cnty** Worksheet

Despite its cryptic name (its original purpose has morphed into a broader one, but its title was never updated), this worksheet is one of the most interesting ones for true numbers-crunchers. This worksheet calculates and displays System-wide gross survival ratios for each grade level, going back to the time when projecters first roamed the earth in Howard County. We use the term "gross Survival ratios" here to set them apart from the survival ratios that are used on the individual school worksheets. On the school worksheets, the survival ratios are applied to (and the historical values were calculated from) the non-housing cohorts, which means that the contributions to cohort sizes that housing effects made were removed from the analysis before the ratios were calculated. On this worksheet, we calculate the ratios on the true sizes of the System-wide grade level cohorts with nothing removed, i.e. their gross size.

The purpose of this worksheet is to allow the current projection (as represented by its projected grade level enrollments for the next school year) to be compared to all previous school year's enrollments in terms of its projected gross survival ratios (calculated by comparing its projected grade level enrollments to last September's enrollments at the previous grade level, except that the survival ratio for kindergarten is based on births five years earlier). As the segment copied below shows, the actual year-to-year grade level survival ratios vary over time, but usually within a narrow range. In fact, the worksheet calculates a common statistical measure of this variance called the standard deviation. (Standard deviations properly apply only to normal distributions of observations, and some may object to their use in this setting, but we are using them here only for guidance, not to prove statistical significance.) Near the bottom of the chart, the worksheet calculates the arithmetic mean value of each grade's survival ratio over all years in the chart, and over the most recent five-year period. The standard deviation of the survival ratios is calculated for both time periods for each grade and, by adding and subtracting the standard deviation from the mean, the 68% confidence interval is obtained (i.e. loosely speaking, the range within which one would expect the survival ratio's value to fall in 68 out of 100 years). Above the area where the means and confidence intervals are calculated are three rows that indicate the maximum, minimum, and median historical values for each grade's survival ratio.

	B->K	K->1	1->2	2->3	3->4	4->5	5->6	6->7	7->8	8->9	9->10	10->11	11->12
Projected 2007	73.1	112.1	103.9	102.2	101.8	101.5	102.2	101.7	101.7	108.5	95.0	96.3	97.6
GIS Actual 2006	82.9	115.0	105.7	102.7	102.9	101.6	102.7	101.5	101.5	112.2	93.4	97.6	95.9
GIS Actual 2005	81.5	116.4	104.1	102.1	102.0	102.9	102.5	101.6	101.8	108.7	93.8	95.5	96.7
GIS Actual 2004	80.1	118.8	104.1	101.9	102.4	101.5	101.4	100.8	101.2	108.2	96.9	96.9	95.5
GIS Actual 2003	84.8	115.8	102.8	102.0	100.8	101.6	103.5	101.3	100.5	109.2	94.6	96.2	97.5
DJA Actual 2002	87.7	118.4	102.8	103.1	103.2	101.4	101.8	102.0	101.2	110.7	92.0	93.2	97.3
DJA Actual 2001	86.7	121.7	102.6	104.1	101.8	102.4	102.7	101.7	102.1	112.6	94.7	93.9	95.6
DJA Actual 2000	86.4	119.7	102.9	103.0	103.0	102.8	102.7	107.1	107.2	116.9	98.3	99.4	98.4
DJA Actual 1999	93.7	119.5	107.3	105.2	106.1	105.5	100.0	102.2	100.7	110.3	94.6	93.7	97.0
DJA Actual 1998	88.1	114.0	105.3	103.3	103.0	102.5	100.8	102.4	102.6	109.8	95.7	95.2	98.2
DJA Actual 1997	92.5	114.3	102.4	101.3	102.3	101.3	100.5	102.0	99.9	112.5	94.3	93.3	97.7
DJA Actual 1996	n/a	116.0	100.5	102.2	101.5	100.7	100.6	100.9	101.1	111.7	96.3	94.8	96.1
DJA Actual 1995	n/a	113.3	102.4	100.6	101.6	101.7	100.8	100.1	99.5	108.1	96.1	95.3	99.0
DJA Actual 1994	n/a	113.8	104.8	103.1	101.0	102.5	99.8	102.2	102.5	107.5	98.0	96.3	98.2
DJA Actual 1993	n/a	111.6	102.5	102.2	101.0	103.2	102.7	102.5	101.2	107.1	99.2	96.4	99.3
Actual Minimum	80.1	111.6	100.5	100.6	100.8	100.7	99.8	100.1	99.5	107.1	92.0	93.2	95.5
Actual Median	86.5	115.9	102.9	102.5	102.2	102.1	101.6	101.9	101.2	110.1	95.2	95.4	97.4
Actual Maximum	93.7	121.7	107.3	105.2	106.1	105.5	103.5	107.1	107.2	116.9	99.2	99.4	99.3
Avg (mean) - all yrs	86.4	116.3	103.6	102.6	102.3	102.3	101.6	102.0	101.6	110.4	95.6	95.6	97.3
Std Dev - all yrs	4.2	2.8	1.7	1.1	1.3	1.1	1.2	1.6	1.8	2.5	2.0	1.7	1.2
68% Conf. Interval - all yrs:	82.3	113.5	101.9	101.5	101.0	101.1	100.5	100.5	99.9	107.8	93.6	93.9	96.1
	90.6	119.1	105.3	103.7	103.6	103.4	102.8	103.6	103.4	112.9	97.5	97.2	98.5
Avg (mean) - last 5 yrs	83.4	116.9	103.9	102.4	102.3	101.8	102.4	101.4	101.2	109.8	94.1	95.9	96.6
Std Dev - last 5 yrs	2.7	1.5	1.1	0.5	0.8	0.6	0.7	0.4	0.4	1.5	1.6	1.5	0.8
68% Conf. Interval - last 5 yrs:	80.7	115.4	102.8	101.9	101.4	101.2	101.6	101.0	100.8	108.3	92.5	94.4	95.8
	86.1	118.4	105.0	102.8	103.1	102.4	103.1	101.8	101.7	111.3	95.8	97.4	97.4

Update each "1 yr Staff XX" sheet first, by clicking the "Refresh Data" button on each

11-month K eligibility window, final year is 2006

reduced K->1 survival ratio due to full-day K phase-in, fully in place by 2008

All of these statistical calculations are done to allow the worksheet to color-code the survival ratios postulated by the new projection for next year according to whether or not each represents a new minimum historical value or a new maximum historical value (red), a value outside of the 68% confidence interval for the last five years (purple), or a value outside the 68% confidence interval for all recorded years (orange). The historical minimum and maximum for each grade level are indicated by the same red and blue color-coding within the columns of historical values.

We would like our new projection to have none of its survival ratios colored other than black, but such is rarely the case. Obviously, some years the actual values of one or more grade levels are going to lie outside of the 68% confidence intervals, or even establish a new maximum or minimum value, but we'd rather have our projection sticking closer to the mean values than the extremes. The two exceptions to this rule are the birth-to-K survival ratio and the K-to-grade-1 survival ratio; in both cases we expect the changes to the kindergarten program over the past four years to yield unpredictable results. The chart has the "unpredictable" years highlighted by blue and green backgrounds.

When viewed for the first time after the school projections are complete, this chart generates even more lively discussion than the "To Infinity and Beyond" chart. Every projected survival ratio that displays in colors is reviewed, and possible reasons for an unusual value are explored. The first possibility that is always examined is an error somewhere in the data or the methodology that is causing an erroneous survival ratio. In extreme cases, lacking other corrections to make, we have played with the centering multipliers to "fix" the projection tool (and thereby change one or more survival ratios) but we do so less and less frequently as our overall confidence in the projection tool has grown.

The "**Open-Closed**" Worksheet

The Open-Closed worksheet is intended to provide a preview of the official Open/Closed Chart that the School System is responsible for preparing to assist the County Council in implementing the County's Adequate Public Facilities Ordinance. The official chart indicates which elementary and middle school districts are projected to be above 115% utilization in school years three years or more in the future. Once the County Council votes the chart into law, residential development in the overcrowded districts is put on hold (i.e. the school's geographic district is "Closed" to new development projects) for a time period of up to three years, to give County officials time to respond with redistricting or capital projects that relieve the overcrowding. This worksheet (a portion of which is reproduced on the next page) presents the same data, organized by planning region, and within each region by school, for all of the years covered by the current projection. The cells under the "Projected Pop" headings are linked directly from the individual school projection worksheets. The utilization rates are color-coded on this sheet, using basically the same rules used at the top of the individual schools' projection worksheets.

The chart contained in the Open-Closed worksheet is different from the official chart in several important ways. Most importantly, because of the sequence and timing of the School System's planning cycle and its resulting documents, it is produced approximately 18 months before the official version is voted into law by the County Council. During that interim period, both redistricting plans and capital projects that change school capacities (and the school district's open or closed status) can be implemented. These developments are usually reflected in the official chart's utilization rate calculations, but they are unknown at the time the projection is completed. So the Open-Closed worksheet is at best an indication of what the official chart might look like in 18 months, if no further actions that change utilization rates are taken.

Further differences between the official open/closed chart and the Open-Closed worksheet involve the format of the chart. The worksheet version includes all future years; the official version starts three years in the future. The worksheet version includes a regional calculation at the middle school level, as well as individual school and regional calculations for the high school level, all of which do not appear in the official chart. The official chart covers a ten-year time period, the worksheet version extends to "infinity and beyond", as we say. The area of the Open-Closed worksheet that has the shaded background corresponds to the data that will eventually be presented in the official chart, barring any changes in capacities or boundaries during the interim.

Columbia - East

	2007 Projected Pop.	Capacity	Projected Utilization	2008 Projected Pop.	Capacity	Projected Utilization	2009 Projected Pop.	Capacity	Projected Utilization	2010 Projected Pop.	Capacity	Projected Utilization	2011 Projected Pop.	Capacity	Projected Utilization	2012 Projected Pop.	Capacity	Projected Utilization
Cradlerock ES	483	487	99.2	489	487	100.4	490	487	100.6	494	487	101.4	481	487	98.8	472	487	96.9
Jeffers Hill ES	396	421	94.1	367	421	87.2	351	443	79.2	321	443	72.5	303	443	68.4	291	443	65.7
Phelps Luck ES	566	540	104.8	553	540	102.4	549	540	101.7	548	540	101.5	530	540	98.1	516	540	95.6
Stevens Forest ES	285	333	85.6	287	355	80.8	301	355	84.8	320	355	90.1	340	355	95.8	351	355	98.9
Talbott Springs ES	392	421	93.1	343	443	77.4	323	443	72.9	316	443	71.3	300	443	67.7	289	443	65.2
Thunder Hill ES	326	368	88.6	347	368	94.3	373	368	101.4	405	368	110.1	416	368	113.0	436	368	118.5
Region Totals	**2448**	**2570**	**95.3**	**2386**	**2614**	**91.3**	**2387**	**2636**	**90.6**	**2404**	**2636**	**91.2**	**2370**	**2636**	**89.9**	**2355**	**2636**	**89.3**
Cradlerock MS	463	584	79.3	449	584	76.9	476	584	81.5	483	584	82.7	503	584	86.1	510	584	87.3
Oakland Mills MS	468	506	92.5	455	506	89.9	415	506	82.0	369	506	72.9	359	506	70.9	354	506	70.0
(Region MS Totals)	931	1090	85.4	904	1090	82.9	891	1090	81.7	852	1090	78.2	862	1090	79.1	864	1090	79.3
Oakland Mills HS	1208	1332	90.7	1188	1332	89.2	1194	1332	89.6	1173	1332	88.1	1140	1332	85.6	1122	1332	84.2

Columbia - West

	2007 Projected Pop.	Capacity	Projected Utilization	2008 Projected Pop.	Capacity	Projected Utilization	2009 Projected Pop.	Capacity	Projected Utilization	2010 Projected Pop.	Capacity	Projected Utilization	2011 Projected Pop.	Capacity	Projected Utilization	2012 Projected Pop.	Capacity	Projected Utilization
Bryant Woods ES	323	355	91.0	321	355	90.4	335	355	94.4	347	355	97.7	349	355	98.3	362	355	102.0
Clemens Crossing ES	483	522	92.5	502	522	96.2	544	522	104.2	585	522	112.1	632	522	121.1	660	522	126.4
Longfellow ES	392	396	99.0	397	418	95.0	414	418	99.0	425	418	101.7	419	418	100.2	415	418	99.3
Running Brook ES	370	405	91.4	359	405	88.6	331	405	81.7	315	405	77.8	309	405	76.3	310	405	76.5
Swansfield ES	510	484	105.4	492	528	93.2	488	528	92.4	477	528	90.3	441	528	83.5	412	528	78.0
Region Totals	**2078**	**2162**	**96.1**	**2071**	**2228**	**93.0**	**2112**	**2228**	**94.8**	**2149**	**2228**	**96.5**	**2150**	**2228**	**96.5**	**2159**	**2228**	**96.9**
Harpers Choice MS	563	506	111.3	534	506	105.5	503	506	99.4	474	506	93.7	515	506	101.8	553	506	109.3
Wilde Lake MS	455	506	89.9	464	506	91.7	485	506	95.8	509	506	100.6	523	506	103.4	508	506	100.4
(Region MS Totals)	1018	1012	100.6	998	1012	98.6	988	1012	97.6	983	1012	97.1	1038	1012	102.6	1061	1012	104.8
Wilde Lake HS	1373	1332	103.1	1344	1332	100.9	1315	1332	98.7	1286	1332	96.5	1267	1332	95.1	1246	1332	93.5

Northern

	2007 Projected Pop.	Capacity	Projected Utilization	2008 Projected Pop.	Capacity	Projected Utilization	2009 Projected Pop.	Capacity	Projected Utilization	2010 Projected Pop.	Capacity	Projected Utilization	2011 Projected Pop.	Capacity	Projected Utilization	2012 Projected Pop.	Capacity	Projected Utilization
Centennial Lane ES	626	503	124.5	648	628	103.2	716	628	114.0	790	628	125.8	863	628	137.4	916	628	145.9
Hollifield Station ES	590	666	88.6	570	666	85.6	554	688	80.5	537	688	78.1	516	688	75.0	510	688	74.1
Manor Woods ES	637	647	98.5	652	647	100.8	715	669	106.9	775	669	115.8	845	669	126.3	900	669	134.5
Northfield ES	555	522	106.3	587	522	112.5	631	522	120.9	687	522	131.6	736	522	141.0	772	522	147.9
St Johns Lane ES	564	553	102.0	562	553	101.6	576	597	96.5	597	597	100.0	605	597	101.3	630	597	105.5
Waverly ES	498	675	73.8	520	675	77.0	571	675	84.6	604	775	77.9	627	775	80.9	656	775	84.6
Region Totals	**3470**	**3566**	**97.3**	**3539**	**3691**	**95.9**	**3763**	**3779**	**99.6**	**3990**	**3879**	**102.9**	**4192**	**3879**	**108.1**	**4384**	**3879**	**113.0**
Burleigh Manor MS	662	662	100.0	673	662	101.7	660	662	99.7	638	662	96.4	624	662	94.3	657	662	99.2
Dunloggin MS	572	526	108.7	551	526	104.8	531	526	101.0	528	526	100.4	558	526	106.1	574	526	109.1
Patapsco MS	666	662	100.6	666	662	100.6	665	662	100.5	648	662	97.9	647	662	97.7	625	662	94.4
(Region MS Totals)	1900	1850	102.7	1890	1850	102.2	1856	1850	100.3	1814	1850	98.1	1829	1850	98.9	1856	1850	100.3
Centennial HS	1442	1332	108.3	1443	1332	108.3	1480	1332	111.1	1471	1332	110.4	1480	1332	111.1	1491	1332	111.9
Marriotts Ridge HS	1239	1332	93.0	1268	1332	95.2	1293	1332	97.1	1293	1332	97.1	1306	1332	98.0	1301	1332	97.7
Mt Hebron HS	1394	1332	104.7	1422	1332	106.8	1446	1332	108.6	1439	1332	108.0	1403	1332	105.3	1399	1332	105.0
(Region HS Totals)	4075	3996	102.0	4133	3996	103.4	4219	3996	105.6	4203	3996	105.2	4189	3996	104.8	4191	3996	104.9

The Remaining Worksheets in the Countywide Workbook

The worksheets that have not been discussed above are primarily reports that have been requested by parties other than the School Planning Office. Most of them (such as "10yr by School" and the various "15yr" worksheets) present the separate school projections for future years on a single report. The five worksheets that have "Acc" in their name are used in future years to summarize the accuracy of this year's projection over time. The six "1yr Staff" worksheets that precede the "1yr Staff Cnty" worksheet that we discussed earlier are used to gather data by planning region from the separate school projection worksheets and set up the "1yr Staff Cnty" worksheet. The last four worksheets, "Peggy's Staffing" through "Redist Adj", are used to reformat the school projection data so that they can be more easily input to the School System's operating budget development process.

This concludes the walkthrough of the Howard County Public School System's enrollment projection tool. We hope that the information presented above has made its inner workings seem more understandable. If the methodology and data still seem like a great mystery to you, do not despair – even those of us who utilize it intensely every year are mystified by the tool or its behavior from time to time. It's best to remember the immortal words attributed to the great projecter Yogi Berra:

"It ain't easy to make predictions, especially about the future!"