

Frederick County Pupil Yield Study

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Prepared by:
Frederick County Planning & Permitting Division
Frederick County Public Schools
Frederick County Interagency Information Technologies Division



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Planning & Permitting Division
Jim Gugel, Planning Director

Fredrick County Public Schools
Beth Pasierb, Supervisor of Facilities Planning

Interagency Information Technologies Division
Mary McCullough, GIS Project Manager

Office of the County Executive
Janice Spiegel, Education Liaison

INTRODUCTION

Frederick County Public Schools and the County Planning Department have used pupil yield factors since the 1980's for various comprehensive planning and capital facility planning purposes. In 1991, with the adoption of the County's Adequate Public Facilities Ordinance (APFO), the use of pupil yield factors was specifically applied to the testing of residential development projects to determine the adequacy of school capacity. Through most of the 1990's, the pupil yield factors were developed on a countywide basis and not at the individual school district.

It was not until 1998 that a more detailed student survey was conducted by Frederick County Public Schools to help in developing pupil yield factors by individual school districts. This survey, which was distributed to every student, was the first to track the number of students, their grade, and the dwelling type for every family.

Subsequent updates to the pupil yield factors using similar survey data were conducted in 2005 and 2007. The goal at that time was to update the factors every two years in order to better account for changes in demographics, household size, and the type of dwellings being constructed. The prior pupil yield study was released in 2014 though based on survey data from 2012. This gap was due to the implementation of Geographic Information System (GIS) mapping of the survey to more closely align dwelling types with student data.

This report is organized into the following sections:

- **Housing Construction Trends** – provides background information on housing construction activity and trends.
- **Methodology** - presents the methodology used for the student survey, generation of housing totals by type of unit for each school district, and the resulting pupil yield factors.
- **2017 Pupil Yield Rates** – summary of countywide rates and detailed rates for each school district/grade level.
- **Highlights and Next Steps**

HOUSING CONSTRUCTION TRENDS

Since the last pupil yield study in 2014, housing construction in the County has started to rebound from the recession. During the primary recession period of 2008 to 2012, the average annual number of housing permits issued was 640 dwellings/year, which includes the County and all of the municipalities. The County experienced a run of five (5) consecutive years with housing permits issued below 1,000 dwellings/year, which last occurred in the period 1967 to 1971. This is a significant drop from the average annual permit activity experienced between 2000 and 2010 (1,600 dwellings/year).

From 2013 through 2016, the average annual number of housing permits issued was 1,395 dwellings/year. While this average is still below historical levels the trend is showing a gradual increase in permit activity from year to year.

Two effects of the recession are an increase in renting rather than buying a home, and families with children staying in townhouses rather than moving to single-family detached homes. The increased demand in the rental market is illustrated by the significant increase in multi-family construction starting in 2012 and continuing through 2016. During this period, the average number of multi-family units permitted was 552 dwellings/year. This average represents an almost 400% increase from the previous 5-year average between 2007 and 2012 (112 dwellings/year). This trend may extend for several more years as a number of multi-family development projects located in the County come on line.

The financial affects of the housing bubble, particularly the drop in housing values and decreased employment opportunities, has created a situation wherein many families have remained either in multi-family dwellings or townhouses as their children reach school age. This situation has caused a resulting increase in the pupil yield rates for townhouses and multi-family dwellings.

A significant housing trend since the 2012 study is the increase in multi-family dwelling construction. The table below illustrates that since 2013, more multi-family dwellings are being constructed than either single-family or townhouses. This trend is likely to continue for the next two to three years as approved developments proceed into the construction phase.

	2010	2011	2012	2013	2014	2015	2016
Dwelling Type	# of unit % of total	# of unit % of total	# of unit % of total	# of unit % of total	# of unit % of total	# of unit % of total	# of unit % of total
Single Family	463 62%	366 69%	448 50%	405 33%	389 30%	371 32%	519 28%
Townhouse	223 30%	121 23%	168 19%	312 25%	352 27%	358 31%	389 21%
Multi-Family	57 8%	46 9%	277 31%	522 42%	577 44%	429 37%	958 51%
Total	743	533	893	1,239	1,318	1,158	1,868

Two-over-Two Dwellings

In recent years, a new housing unit type has emerged in Frederick County: the 'two-over-two' dwelling. This product is a 4-story attached dwelling with one unit occupying both the ground and 1st floor while and a second unit occupies both the 3rd and 4th floors. Although these dwellings have thus far been constructed as condominiums, they could also be developed as apartment/rental units.

Many home builders have recently found that these dwellings have not been very popular and as a result have been replacing them with townhouses. This has occurred within several developments still in the subdivision/development stage. While there will continue to be some two-over-two's constructed in the next few years, it is unlikely the County will continue to see them proposed in new developments.

In 2012, a separate analysis of two-over-two projects in Urbana and the Dearbought development in the City of Frederick was conducted to determine if the pupil yield rate would be different from either townhouse or multi-family dwelling types. It was determined that the pupil yield rate for two-over-two dwellings fell between the rates for townhouses and multi-family. Based on this analysis, unique rates for two-over-two's have been used for Adequate Public Facility Ordinance (APFO) reviews since June 2012. For the 2017 study, with more two-over-two dwellings being constructed, the resulting pupil yields continue to fall between townhouses and multi-family.

However, it should be noted that two-over-two's have not been specifically identified as a separate dwelling type for the impact fees or school construction fees where they are counted as multi-family dwelling types.

METHODOLOGY

Current information for student grade levels and addresses comes from the Frederick County Public Schools (FCPS) student database with a GIS geocoding process. The current information for housing unit type and school district comes from GIS files. This study was based on an extract of the FCPS student data and GIS data, as of January 9, 2017.

FCPS Student Database

FCPS maintains a database that contains student addresses and grades. The data is sourced from parent/guardian enrollment forms, update forms and other sources. Administrative staff at each school are responsible for the data entry and maintenance of the data. The student data used in this study was current to January 9, 2017. The primary use of the student record is for GIS staff to match the address with the grade level and the number of students at that address.

Pupil Points

After the student address and grade data records were extracted from the FCPS Student Database, GIS staff geocoded them. Then, based on their geographic location, a dwelling type was matched to each student point record. Each pupil point record then represented a student with their grade and dwelling type to create the pupil points dataset.

Housing Unit Inventory

Separate from the above Pupil Points, a GIS file called the Housing Unit Inventory (HUI) was developed. The HUI is a point file with each point representing a housing unit within the County and all of the municipalities, except the City of Frederick. The inventory is updated on a regular basis with permit information for new residential dwellings and demolition permits. The data is comprehensive for the entire County with the exception of pre-2010 data within Frederick City.

City of Frederick Data

Since the HUI does not include pre-2010 data within City of Frederick, other sources and methodologies were used. For the 2012 Pupil Yield Study, polygons were created to represent census tracts for each school district within the City. Data from the 2011 3-Year American Communities Survey (ACS) and the 2011 Maryland State Department of Assessments and Taxation (SDAT) records were used to determine the number and type of dwellings within each polygon/census tract. The 2012 report team met, reviewed the polygons with their two options of unit type counts, and assigned the most logical number. This base line data for the City was also used for the compilation of the 2017 study. Permit data was then used to update the housing inventory from the 2012 base line to create a January 2017 representation of Frederick City housing units.

Calculating the Pupil Yield Factors

Two models were developed by the County's Geographic Information Systems (GIS) Team within ESRI ArcGIS software. One model counted each Pupil Point by dwelling type for each school district which yielded a count of pupils per dwelling type per school district. The second model applied the Housing Unit Inventory and Frederick City Data of Housing Units to calculate the total number of each dwelling type for each school district.

Based on the three dwelling types, pupil yield factors were calculated for each school district as follows:

$$\begin{array}{l} \textit{Total number of pupils (for each grade level)} \\ \div \\ \textit{Total number of dwellings (for each type)} \\ = \\ \textit{Pupils/dwelling (for each grade level and dwelling type)} \end{array}$$

For the two-over-two dwellings, a single pupil yield factor was calculated for each grade level since only a few school districts have this dwelling type.

2017 PUPIL YIELD RATES

When the pupil yield rates are applied to a development project, a common reaction has been that the total number of students generated from the build out of the development is too low. It is often stated that each home in a given development would generate two, three or more students. The common perception is that an overall average pupil yield rate of 0.42 students/dwelling is much lower than what is observed in new developments.

However, the basic methodology for determining pupil yield rates must reflect the number of students within the particular school district compared to the total number of dwellings in that school district. The use of the total number of dwellings is necessary to provide a true average pupil yield rate since every new home that is built does not generate school aged children.

The table on page 7 summarizes the countywide pupil yield rates for 2017 and provides a comparison with prior studies. A detailed list of the pupil yield rates by school district and dwelling type is also included in this report. For the purposes of this study: single-family detached dwellings include mobile homes; townhouse dwellings and duplex dwellings are grouped together; and, multi-family dwellings include condominiums and apartment (rental) units. This study also updated the pupil yield rate for two-over-two dwellings.

Data Anomalies

Utilization of the new GIS tool and updated methodologies gives us an opportunity to exactly match the dwelling type with the number of students at a specific residence. Prior inconsistencies, caused by respondents marking an incorrect dwelling type on the survey card, have been eliminated.

A list of some remaining anomalies, and how they are considered in the study, follows:

- A school district does not have a particular dwelling type
- A school district does not have any students in a particular dwelling type

In either of the anomalies listed above, the pupil yield calculation would be zero (0). For these anomalies, the countywide average for that grade level and dwelling type is applied. This is a common situation in the rural school districts at the elementary level which have smaller school district areas.

- There are more students than the number of dwellings for a particular dwelling type

This situation would result in a pupil yield factor of greater than one (1). This is a rarer situation and would also result in the use of the countywide average for that school district and dwelling type.

Current and Past Countywide Pupil Yield Rates

Dwelling Type	Study Year	Elementary	Middle	High	All Grades
Single Family	1998	.23	.14	.18	.56
	2005	.24	.13	.18	.56
	2007	.23	.13	.18	.54
	2012	.21	.11	.16	.48
	2017	.20	.10	.14	.45
Townhouse	1998	.20	.08	.09	.37
	2005	.24	.10	.13	.47
	2007	.24	.10	.13	.47
	2012	.26	.09	.12	.49
	2017	.27	.11	.13	.52
Multi-Family	1998	.06	.02	.02	.10
	2005	.05	.02	.02	.09
	2007	.05	.02	.02	.09
	2012	.11	.03	.05	.20
	2017	.13	.04	.05	.22
All Dwellings	1998	.20	.11	.14	.45
	2005	.21	.11	.15	.48
	2007	.21	.11	.15	.46
	2012	.20	.09	.13	.44
	2017	.20	.09	.13	.42

**2017 Pupil Yield Rates (effective July 1, 2017)
Frederick County Public Schools**

Elementary Schools	Single-Family	Townhouse	Multi-Family	Total
Ballenger Creek ES	0.20	0.25	0.14	0.21
Brunswick ES	0.25	0.25	0.11	0.23
Carroll Manor ES	0.25	0.33	0.06	0.25
Centerville ES	0.50	0.51	0.13	0.5
Deer Crossing ES	0.31	0.31	0.02	0.30
Emmitsburg ES	0.14	0.18	0.18	0.15
Glade ES	0.24	0.32	0.08	0.24
Green Valley ES	0.15	0.07	0.08	0.15
Hillcrest ES	0.30	0.33	0.31	0.32
Kempton ES	0.20	0.27	0.17	0.20
Lewistown ES	0.13	0.50	0.07	0.13
Liberty ES	0.15	0.50	0.06	0.15
Lincoln ES	0.14	0.22	0.10	0.15
Middletown ES and PS Total	0.20	0.36	0.11	0.21
Monocacy ES	0.13	0.40	0.21	0.23
Myersville ES	0.16	0.31	0.11	0.17
New Market ES	0.26	0.18	0.13	0.25
New Midway/Woodsboro ES	0.17	0.09	0.08	0.16
North Frederick ES	0.18	0.16	0.09	0.14
Oakdale ES	0.22	0.23	0.13	0.22
Orchard Grove ES	0.20	0.30	0.08	0.18
Parkway ES	0.11	0.08	0.03	0.08
Sabillasville ES	0.14	0.45	0.27	0.15
Spring Ridge ES	0.18	0.20	0.04	0.13
Thurmont ES and PS Total	0.16	0.29	0.09	0.16
Tuscarora ES	0.20	0.30	0.13	0.23
Twin Ridge ES	0.20	0.27	0.15	0.21
Urbana ES	0.25	0.38	0.05	0.25
Valley ES	0.16	0.30	0.11	0.16
Walkersville ES	0.17	0.17	0.05	0.16
Waverly ES	0.22	0.36	0.32	0.29
Whittier ES	0.23	0.52	0.16	0.29
Wolfsville ES	0.13	0.27	0.20	0.13
Yellow Spring ES	0.19	0.13	0.13	0.18
Countywide Average	0.201	0.272	0.132	0.203

Middle Schools	Single-Family	Townhouse	Multi-Family	Total
Ballenger Creek MS	0.12	0.14	0.04	0.11
Brunswick MS	0.10	0.12	0.04	0.10
Crestwood MS	0.08	0.11	0.04	0.08
Gov TJ MS	0.11	0.07	0.02	0.06
Middletown MS	0.11	0.16	0.03	0.11
Monocacy MS	0.08	0.13	0.08	0.09
New Market MS	0.11	0.11	0.05	0.11
Oakdale MS	0.14	0.11	0.02	0.13
Thurmont MS	0.07	0.11	0.04	0.07
Urbana MS	0.19	0.19	0.04	0.18
Walkersville MS	0.10	0.09	0.03	0.09
West Frederick MS	0.10	0.12	0.05	0.09
Winsor Knolls MS	0.11	0.12	0.08	0.11
Countywide Average	0.105	0.116	0.041	0.096

High Schools	Single-Family	Townhouse	Multi-Family	Total
Brunswick HS	0.14	0.12	0.03	0.13
Catoctin HS	0.11	0.13	0.04	0.11
Frederick HS	0.13	0.14	0.06	0.11
Gov TJ HS	0.11	0.11	0.06	0.09
Linganore HS	0.15	0.13	0.08	0.15
Middletown HS	0.15	0.18	0.04	0.14
Oakdale HS	0.21	0.14	0.03	0.18
Tuscarora HS	0.15	0.14	0.06	0.13
Urbana HS	0.22	0.20	0.05	0.21
Walkersville HS	0.13	0.10	0.03	0.11
Countywide Average	0.149	0.134	0.055	0.130
Countywide Average for all Schools	0.455	0.522	0.228	0.429
2 Over 2 Dwellings	Elementary 0.16	Middle 0.08	High 0.07	0.11

HIGHLIGHTS AND NEXT STEPS

Continuing the trend observed in the 2012 study, the rates for multi-family dwellings continue to increase. This is likely due to effects from the recession and housing bubble which caused families to either: (1) stay in multi-family dwellings as children reached school age; or, (2) down size to a multi-family dwelling from a single-family house or townhouse for economic reasons. This increase in rates is also now being observed for townhouse dwellings.

These conditions may also account for a slight decrease in the rate for single-family detached dwellings.

Pupil Yield Highlights

- The 2017 rates showed a slight increase for townhouse and multi-family dwelling types and a very slight decrease for single-family. These shifts occurred across all grade levels.
- Centerville Elementary – highest overall rate at 0.50
- TJ Middle – lowest overall rate at 0.06
- Centerville ES (0.50), Urbana MS (0.18), Linganore HS (0.08) – highest rate at each school level
- Elementary Level – highest spread of rates for each dwelling type:
 - Single-Family – 0.11 to 0.50
 - Townhouse – 0.07 to 0.52
 - Multi-Family – 0.02 to 0.32

Next Steps

Staff will continue to track pupil generation from two-over-two dwelling units. The intent of the analysis will be to assess whether this type of unit should continue to have its own pupil generation category rather than being grouped with the multi-family category. This would affect the APFO testing of new developments or the retesting for approved developments.

Staff will continue with an update cycle every two (2) years. A target for the next update would be the fall of 2019.