



Compromised Data Integrity in Student Enrollment Projections for HCPSS School Redistricting



By



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Polygon 147

On behalf all Howard County Residents

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Timeline



- **8/22/2017:** Polygon 147 data team identified a housing unit data problem, which has caused major errors in student enrollment projections across the County and a 49% overestimation of student enrollment in Polygon 147.
- **8/28/2017:** This data error was confirmed by the Department of Planning and Zoning (DPZ).
- **8/30/2017:** Polygon 147 met with Office of School Planning (OSP) and urged OSP to correct the data error for the whole county and revise the 2017 Feasibility Study and AAC Plan accordingly.
- **9/8/2017:** OSP published new student enrollment projection data online. However, the methods OSP inherited from the past mask, rather than fully address, the initial housing unit data error. Consequently, this data update has created even more polygon-level enrollment projection discrepancies.
- **9/15/2017:** Nearly 100 residents from Polygon 147 rallied in front of the BOE/Superintendent Office for fairness in the redistricting process, and published this PPT.

Student Enrollment Projection



How do HCPSS and OSP project future student enrollment at the polygon and school levels?

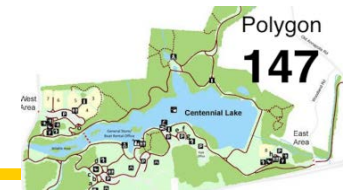
- Start with observed student enrollment in base year
- Future year projections employ several factors, including apartment turnover rate, house resale rate, student cohort survival ratio, kindergarten to child birth ratio, student yield rates by housing types, and **new housing unit data**, etc.
- Every year around December, the County Department of Planning and Zoning (DPZ) provides updated **new housing unit data** to HCPSS and OSP.
- Any error in the above input data can lead to a combined major error in student enrollment projections.
- School-level and polygon-level enrollment projections are based on two separate models, which often produce inconsistent results.

New Housing Unit Data



- In conducting the 2017 Feasibility Study and AAC process, OSP used outdated 2014 and inaccurate new housing unit data at the polygon level, even though they had access to the new 2016 data.
- Due to the incorrect data, new housing units used for student enrollment projections in many polygons are inaccurate.
- The inaccurate new housing unit data can lead to serious over- or under-estimation of student enrollment (e.g., 50% or more in many polygons).
- Unfortunately, Polygon 147 is one of many polygons with grossly inaccurate new housing unit data.
- See details on the next three slides for examples.

New Housing Unit Data Error



Polygon # 147 Plan: AACCON_4 - plan from meeting 8/15

Refresh ES High Middle Elem. (TNEWSCHL) Include Kind

Refresh MS Centennial HS Burleigh Manor MS Centennial Lane ES

Refresh HS Phasing: _____

	'17	'18	'19	'20	'21	'22	'23	'24
SFD	0	41	34	13	0	2	1	0
SFA	0	0	0	0	0	0	0	0
APT	0	0	0	0	0	0	0	0
Tot	0	41	34	13	0	2	1	0

	Kind.	Grd 1	Grd 2	Grd 3	Grd 4	Grd 5	Grd 6	Grd 7	Grd 8	Grd 9	Grd 10	Grd 11	Grd 12	ES tot	MS tot	HS Tot
Kind.	14								6	11						
Grd 1		8									6					
Grd 2			11									6				
Grd 3				12									4			
ES tot	67															
MS tot					33											
HS Tot																27

	'17	'18	'19	'20	'21	'22	'23	'24
ES	70	88	101	107	107	108	107	106
MS	37	40	45	51	54	56	59	62
HS	36	43	49	54	59	63	67	71

Adjacent schools:

Switch CIPs New Plan Switch Plans Pik-a-Poly First Prev. Next Last Go to-> 147 QUIT

#Polys	SCHOOL	FARM	MSA R	MSA M	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
50	Atholton HS	9.6%	75.0%	65.0%	103.2	103.3	105.5	106.2	107.7	111.6	111.8	114.3	115.4	117.3	122.0	124.1
39	Centennial HS	10.6%	73.0%	75.0%	102.7	108.0	111.0	112.4	114.9	116.8	117.6	117.9	119.3	120.6	122.1	124.1

- This is a screenshot displaying the software and data used by AAC and OSP for school redistricting.
- The outdated data and software show 88 new housing units (41+34+13) in the next three years in Polygon 147.
- BUT in reality, there will be no more new housing units in Polygon 147 in the next three years, 2018~2020.

Impact on Enrollment Projections



- The impact of the wrong and outdated housing unit data on student enrollment projections is shown in two examples below. These big projection errors significantly affect utilization ratios, feed, FARM and more.**

Centennial Lane ES Students from Polygon 147	2018	2019	2020
Using Outdated 2014 Data	88	101	107
Using Correct 2016 Data	73	72	72
Percentage of Overestimation	21%	40%	49%
Manor Woods ES Students from Polygon 1170	2018	2019	2020
Using Outdated 2014 Data	48	49	50
Using Correct 2016 Data	72	99	127
Percentage of Underestimation	-33%	-50%	-61%

Erroneous Decisions based on Wrong Data



- Here is one of many examples of how the Feasibility Study and AAC Plan could make incorrect decisions due to data errors.

Correct School Utilization Ratios mostly within Policy 6010 Target (90~110%) with correct new housing unit data

Year	2018	2019	2020	2021	2022
Centennial Lane ES	111%	109%	109%	108%	108%
Burleigh Manor MS	103%	104%	108%	107%	108%
Centennial HS	102%	106%	109%	110%	112%

Wrong School Utilization Ratios AAC used to Decide to Move Polygon 147 on 8/22 with outdated 2014 input data

Year	2018	2019	2020	2021	2022
Centennial Lane ES	114%	115%	115%	114%	115%
Burleigh Manor MS	104%	105%	110%	110%	111%
Centennial HS	103%	108%	111%	112%	115%

HCPSS and OSP Response



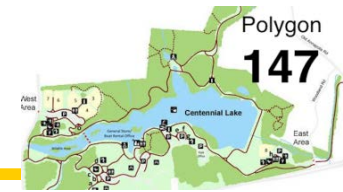
- Polygon 147 first confirmed this county-wide data error with Department of Planning and Zoning (DPZ) on 8/28/2017, and then met with the Office of School Planning (OSP) on 8/30/2017 and reported this major data error. We thank their staff for prompt responses to our data requests via calls, emails and MPIAs.
- OSP acknowledged data error in person and via email, updated their data, and published new enrollment data on the HCPSS Website on 9/8/2017.
<http://www.hcpss.org/school-planning/aac-process/#aug22>
- OSP also published a Data Memo explaining how they updated data on 9/8/2017.
<http://www.hcpss.org/f/schoolplanning/aac/memo-housing-data.pdf>

How did OSP Update the Data?



- **Step 1:** Replace the outdated housing unit data with the new 2016 housing unit data for each polygon.
- **Step 2:** Run the polygon-level student enrollment projection model again to obtain new and updated student enrollment projection data for each polygon.
- **Step 3:** Aggregate new **polygon-level** student enrollment data into new **school-level** enrollment totals based on new 2016 housing units.
- **Step 4:** Here is the controversial step in this data update process. If these **new school-level enrollment totals** do not match the **previously-projected school enrollment totals in the 2017 Feasibility Study**, OSP adjusts the new polygon-level student enrollment projections to force these two school-level projection totals to match each other. Consequently, student enrollment projections in many polygons that did not have any housing unit data errors have also been artificially adjusted due to this "error dispersion" method.
- An example is offered in the next slide.

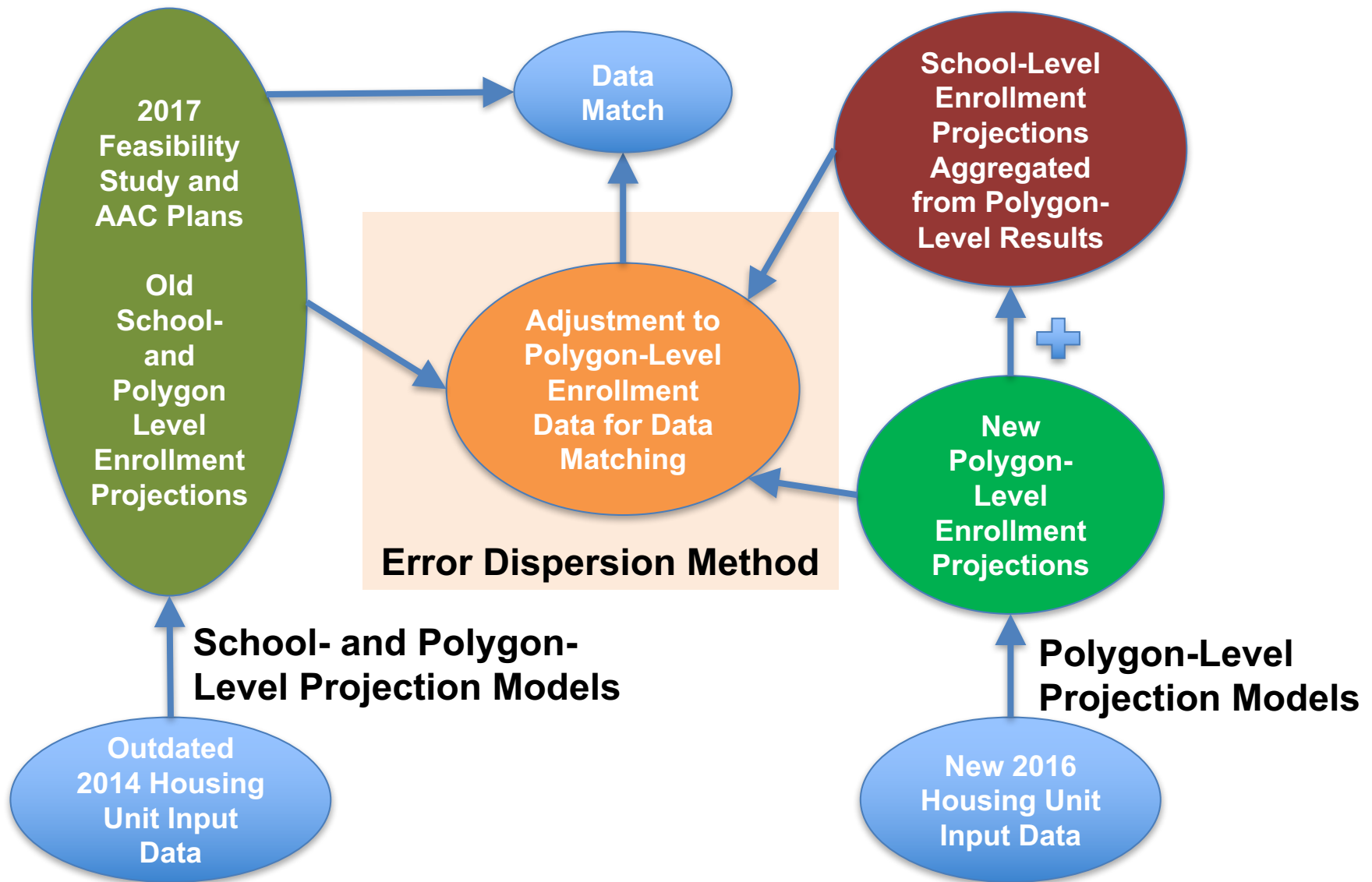
OSP Data Update Example



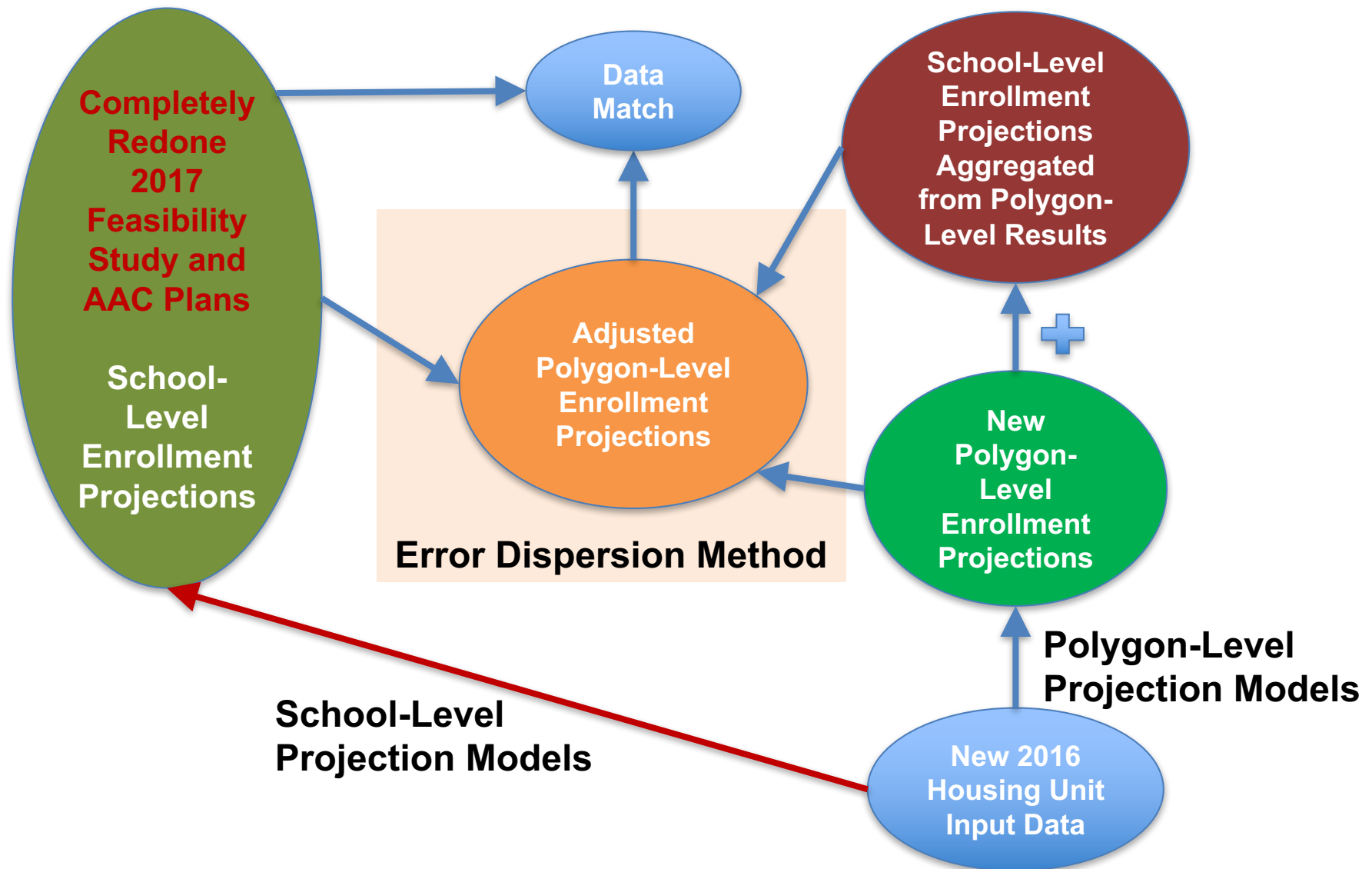
- In this example, Polygons 147 and 173, due to revised new housing unit data, saw major changes in student enrollment projections.
- To force the student enrollment number at CLES based on the new housing unit data to match the school-level enrollment data in the 2017 Feasibility Study, enrollment projections in other CLES polygons are adjusted, such that the net change of student enrollment projection at the school level is **ZERO**. This negates the effects of correcting the new housing data error, and led to artificial enrollment projection changes at many polygons.

CLES Current Attendance Area Polygons	OSP Enrollment Projection Comparison								
	2018-2019			2019-2020			2020-2021		
	Based on Old Housing Data	Based on New Housing Data	Delta between Old and New Data	Based on Old Housing Data	Based on New Housing Data	Delta between Old and New Data	Based on Old Housing Data	Based on New Housing Data	Delta between Old and New Data
19	66	67	1	64	68	4	63	66	3
97	130	133	3	126	132	6	121	127	6
→ 147	88	73	-15	101	72	-29	107	72	-35
156	58	59	1	56	59	3	55	58	3
→ 173	8	8	0	22	8	-14	26	29	3
184	14	15	1	14	15	1	14	14	0
1019	34	34	0	32	34	2	32	33	1
1147	0	0	0	0	0	0	0	0	0
1156	27	27	0	26	28	2	27	28	1
1173	27	27	0	27	28	1	27	28	1
1184	32	34	2	30	34	4	30	33	3
2147	77	77	0	73	77	4	72	75	3
2156	23	24	1	22	24	2	23	24	1
2173	26	30	4	25	31	6	26	30	4
2184	89	91	2	85	90	5	84	88	4
3147	1	1	0	1	1	0	1	1	0
4147	1	1	0	1	1	0	1	1	0
5147	37	37	0	35	38	3	35	37	2
Total	738	738	0	740	740	0	744	744	0

The Old Method Inherited by OSP



How the Data Should be Updated



Compromised Data Integrity



- The OSP method that produced the updated student enrollment projections on 9/8/2017 **masks** the new housing unit data error, rather than fully addresses it.
- The enrollment projection data were updated after the Feasibility Study and AAC meetings, which resulted in an unfair redistricting process (especially for 45% of all polygons with housing data errors and for 84% of all polygons with significant enrollment projection errors).
- In addition, the OSP methodology has produced many new polygon-level enrollment projection discrepancies that did not exist before the 9/8/2017 data update.
- Consequently, the latest enrollment projections are **still unreliable**, after the data revision on 9/8/2017.

Outdated and Unreliable Methods



- The student enrollment projection methods inherited by OSP are outdated and produce **unreliable data** for redistricting or other purposes such as APFO tests.
- **45%** of all the ES-level enrollment projections fluctuate by **more than 10%** just between the 2016 Feasibility Study and the 2017 Feasibility Study, while these projections should be very stable in consecutive years.
- How can OSP, AAC, Superintendent and Board of Education make big redistricting decisions that impact communities so much, based on such unreliable and unstable student enrollment projections?

Conclusions



- Polygon 147 worked in good faith within the established process, but is concerned that data errors have not been addressed adequately.
- The accuracy of the 2017 Feasibility Study and AAC Plan have been compromised since the beginning of the process due to inaccurate student enrollment projections. The 2017 Feasibility Study and the AAC Plans must be **completely redone** with accurate data.
- OSP should replace its old redistricting software that has no quality control or quality assurance mechanisms.

Our Petition



- **Ensure the Correct Student Enrollment Projection Data are Used in the Feasibility Study and AAC Plan**

With the data errors, the previous Feasibility Study and AAC Plan must be completely redone for the public to have faith in this redistricting process.

- **Pursue External and Unbiased Data Assessment**

The Superintendent and the Board of Education should recruit independent and third-party experts to assess and correct all student enrollment projection data and methodologies in the redistricting process.

- **A Transparent, Accurate, and Fair Process for All**

Data and software used for redistricting should be made available to all communities to avoid digital gaps.

United for HoCo Schools!

