

Office of Property Assessment

TAX YEAR 2025 RESIDENTIAL RATIO STUDIES

September 2024

OVERVIEW

The Office of Property Assessment (OPA) is responsible for determining the value of all real property in Philadelphia and is dedicated to doing so in a fair, accurate, and understandable way. OPA's primary goal is, through ongoing assessments, to improve the quality and uniformity of all property values and to instill confidence in Philadelphia taxpayers regarding the fairness of the property tax system, as well as the competency and professionalism of the assessment office.

TAX YEAR 2025 ASSESSMENT

For Tax Year 2025, OPA assessed and valued more than 580,000 properties in the city using mass appraisal valuation. Mass appraisal is the process of determining property values as of a given date by looking at sales information, property characteristics, and statistical methods. Mass appraisal is a widely accepted tool for the valuation of property for the purposes of taxation. A detailed overview of OPA's methodology for the Tax Year 2025 revaluation is available at https://www.phila.gov/documents/assessment-methodologies/

As of certification, this project resulted in 510,893 increases (87.04%), 45,312 decreases (7.72%), and 26,806 (4.57%) assessments that did not change from the prior year. An additional 3,976 (0.007%) assessments were for properties that had no prior value (new construction, subdivisions, etc.).

RATIO STUDY MEASURES

This ratio study report was conducted internally, and it measures the quality of residential real property assessments within the city of Philadelphia. This report measures the results of the Tax Year 2025 revaluation against actual market conditions. In addition to conducting an internal ratio study, OPA obtained an outside firm, Keene Mass Appraisal Consulting, to conduct an independent ratio study reviewing OPA's assessments for single family residential properties.

OPA uses a ratio study to evaluate the level and uniformity of completed assessments in accordance with International Association of Assessing Officers (IAAO) standards and recommendations. The IAAO is a professional organization of assessing officials that provides standards for assessment administration, educational programs, and research on assessment and tax policy issues. Additionally, the IAAO organization is a founding member of the Appraisal Foundation that developed the Uniform Standards of Professional Appraisal Practice (USPAP).

The IAAO's Standard on Ratio Studies was first published in September 1990 and was revised in April 2013. The IAAO standards are advisory in nature and provide guidance to those performing ratio studies in the mass appraisal field regarding design, statistics, performance measures and related issues in conducting ratio studies.

In accordance with these standards, OPA examines several metrics within the ratio study:

1. Ratio of assessed value to sales price. A ratio is the relationship between two numbers; in this case it is the relationship between the assessed value and sale price. The relationship between market value and sale price is commonly expressed as a percentage. This ratio measures how closely OPA market values compare to actual sales prices. Ratio studies that are run against the sales used in the model are part of the model calibration process. Ratio statistics that are run against projected or certified market values give us valuable information about assessment consistency and equity.

Ratios measure the overall level of assessment to selling prices of real estate, as indicated by the Market Value/Time Adjusted Sales Price (TASP) ratio. These may be the average of the assessed value/sale price ratios, the weighted average of the assessed value/sale price ratios or the median of the assessed value/sale price ratios. The average assessed value/sale price ratio is simply the average of all the ratios in the sample. The aggregate or "weighted" assessed value/sale price ratio is the result of dividing the total of the assessments by the total of the sale prices. The median assessed value/sale price ratio, which is the measure that OPA uses, is the midpoint ratio of all ratios after the ratios are arrayed from highest to lowest.

While the average, median, and weighted average measures of central tendency are all usually calculated, the median is the least affected by extreme ratios. Therefore, IAAO observes in its standards that the median is generally the preferred measure of central tendency for monitoring assessment performance. A median ratio of 1.00 indicates that the median assessment exactly matches the median sale price. The IAAO recommends a level of assessment ratio of between 0.90 to 1.10 across all types of properties and markets (90% to 110%). OPA's performance goal is to achieve a median ratio within a range between 0.95 to 1.02 (95% to 102%), to ensure the highest possible accuracy in our assessments.

2. Coefficient of Dispersion (COD). All properties should be measured at the same level of assessment. The COD measures uniformity of assessments and is the most commonly used measure of consistency across assessments. The COD is calculated by dividing the average absolute deviation by the median ratio. To calculate the average absolute deviation, subtract the median ratio from the individual ratios for each observation and add all the results, ignoring positive or negative signs, and then divide the sum by the number of ratios. The acceptable level for the coefficient of dispersion depends upon the type of properties being reviewed. In general, the lower the COD the more consistent and equitable the assessments. In a large city such as Philadelphia, which has a wide variety of housing stock, the IAAO recognizes that a COD of 15% is considered acceptable. Therefore, OPA's performance goal is to achieve a COD of 15% or less. For additional details around IAAO standards for

the COD, see <u>Standard on Ratio Studies; International Association of Assessing Officers;</u> <u>Kansas City, Mo; April 2013</u>

3. **Price Related Differential (PRD).** The PRD measures equity in high versus low valued properties. The PRD tests to see if higher and lower valued properties are assessed at the same level. The PRD is calculated by dividing the mean ratio by the weighted mean ratio. A result close to 1.00 is better in that it indicates that high and low valued properties are valued at the same level of assessment. The IAAO accepted range for PRD is between 0.98 to 1.03. **OPA's performance goal is to achieve a PRD between 0.98 and 1.03.** A PRD above 1.03 indicates an under-valuation of high-priced properties, while a PRD below 0.98 shows an under-valuation of low-priced properties.

The following sample table illustrates a sample computation of these statistics. The table is only for illustration and does not reflect results of an OPA assessment.

Table 1: Sample computation of assessment performance measures

Rank	Parcel #	Appraised value	Saleprice*	Ratio	Statistic	Result
1	9	\$87,200	138,720	0.629	Number (n)	17
2	10	38,240	59,700	0.641	Totalappraised value	\$1,455,330
3	11	96,320	146,400	0.658	Total sale price	\$1,718,220
4	12	68,610	99,000	0.693	Avg appraised value	\$85,608
5	13	32,960	47,400	0.695	Avg saleprice	\$101,072
6	14	50,560	70,500	0.717		
7	15	61,360	78,000	0.787	Mean ratio	0.827
8	16	47,360	60,000	0.789	Median ratio	0.820
9	17	56,580	69,000	0.820	Weighted mean ratio	0.847
10	18	47,040	55,500	0.848		
11	19	136,000	154,500	0.880	Coefficient of dispersion	14.5
12	20	98,000	109,500	0.895	Price-related differential	0.98
13	21	56,000	60,000	0.933	PRB	-0.035
14	22	159,100	168,000	0.947	PRBcoefficient(t-value)	0.135 (2.4)
15	23	128,000	124,500	1.028		
16	24	132,000	127,500	1.035	95%conf.int.mean(two-tailed)	0.754 to 0.901
17	25	160,000	150,000	1.067	95%conf.int.median(two-tailed)	0.695 to 0.933
					95% conf.int.wtd.mean(two-tailed)	0.759 to 0.935

^{*}No outlier trimming or adjusted sale price

Through these metrics, ratio studies provide several objective standards by which one can evaluate assessment performance and measure the effectiveness of revaluation projects. As a diagnostic tool, they are used to identify locations or property types that are over or under assessed, for which the market is changing, where there are issues with data quality, where uniformity needs improvement, or where sales data may not be representative of unsold properties.

However, it is also important to understand that there are inherent challenges in all mass appraisal systems for both low and high value properties. At both the low and high ends of the range of values, there is more variance in price that is not attributable to the characteristics of the property as captured by the mass appraisal data files. In many cases, data for sales of low value properties is missing or incomplete. Many of these sales are not exposed to open markets or do not use real

estate professionals that report details about the properties or transactions. The only data available for a specific property may be a deed and what can be seen from the exterior of the property. Properties at the very high end of the spectrum may have significant differences in interior finishes which may not be known to assessors but are reflected in sales transactions. Therefore, some degree of distortion is expected in the ratio statistics for both low and high value properties.

For the Tax Year 2025 revaluation, OPA retained Keene Mass Appraisal Consulting to review and provide feedback on OPA's revaluation work, including performing an independent ratio study on OPA's assessments for single family residential properties. Keene's report was released in September and found that the Tax Year 2025 revaluation of properties in Philadelphia improved the equity, uniformity, and accuracy of single-family property valuations citywide. Keene's report is posted online at phila.gov/opa.

OPA INTERNAL RATIO STUDY RESULTS - COMPARISON TO SALE PRICES

The following tables present the results of the Tax Year 2025 ratio study for residential properties.

This study considers time adjusted sales price data for the period starting in January 2020 and ending in June of 2023. During a multi-year sales analysis period, market conditions may change. Through regression analysis, OPA builds a compound adjustment index for each assessment model that allows sales from earlier periods to be calibrated to the effective date of appraisal. By adjusting each sale for time, OPA is able to remove the time adjustment variables from the model and eliminate the need to "weight" sales based on the time that they occurred.

Only sales that have been validated as arm's-length transactions that are indicative of the values of other similar properties are used. Arm's-length means that a real estate transaction occurred in an open market arrived at through normal negotiations between an independent buyer and seller. Sales between related parties, to or from financial institutions or government agencies, sales to persons or organizations that typically do not engage in arms-length transactions, or sales with extreme ratios (which indicate abnormal transactions) are typically not used in this study. In addition, sales where the property changed in a significant way between the time of sale and the date of valuation are excluded. For example, if a property was sold in poor condition, but was subsequently rehabbed, and valued as rehabbed, the sale price no longer bears relationship to the market value of the property. Including these sales in a ratio study would distort the results. For more information on sales validation and sales adjustments, see Standard on Verification and Adjustment of Sales (IAAO 2020):

https://www.iaao.org/media/standards/Verification Adjustment of Sales.pdf

The data file used for ratio studies includes all the records used to model each zone group. Outliers were removed on a model-by-model basis using Cook's Distance and Studentized Residual metrics, which are standard statistical methods for identifying outliers. Additional records were excluded whose characteristics at the time of sale did not match current characteristics. For more

information on outlier standards, see the Standard on Ratio Studies (IAAO 2013) and Residuals and Influence in Regression (Cook, R.D. and Weisberg, S. 1982).

Residential - Combined

Results for all residential properties across the city are presented in Table 2 below. There were 32,330 sales examined within this ratio study. Citywide, the median ratio is 99.2% for all residential properties. This means that residential properties have been valued at 99.2% of their respective sale prices. This result falls within both OPA's targeted range of 95% to 102% and within the IAAO range of 90% to 110%. The citywide COD for residential properties is 10.8%, which is within the IAAO accepted range (< 15%) for assessed values in a jurisdiction like Philadelphia. The PRD is 1.002, which is also within the IAAO recommended range (0.98 to 1.03). A PRD within this range means that there is no statistically meaningful bias between how low value and high value properties are assessed.

Table 2: Combined Residential Properties

		Median		Weighted		
Style Group	Sales	Ratio	Mean Ratio	Mean Ratio	PRD	COD
Overall	32,330	99.2%	100.4%	99.0%	1.002	10.8%
IAAO Standard	N/A	90%-110%	90%-110%	90%-110%	0.98-1.03	< 15%
OPA Target	N/A	95%-102%	95%-102%	95%-102%	0.98-1.03	< 15%

Single Family Residences

Results for single family residences are summarized by geographic zone and major property type (singles/twins/rows) below. Results are based on 29,916 sales.

The median ratio for single family residential properties across the city is 99.2%, which is within both OPA's targeted range of 95% to 102% and the IAAO range of 90% to 110%. This means that single family residential properties citywide have been valued at approximately 99.2% of their respective sale prices.

The City's overall COD for single family residential properties is 10.7%, which is within the IAAO accepted range (< 15%) for assessed values for a jurisdiction like Philadelphia.

The City's overall PRD is 1.001, which is also within the IAAO accepted range (0.98 to 1.03). This means that there is no meaningful statistical bias between low value and high value property valuations across the city.

Table 3: Single Family Residences by Style

		Median		Weighted		
Style	Sales	Ratio	Mean Ratio	Mean Ratio	PRD	COD
Row	23,321	99.1%	100.4%	98.9%	1.002	11.3%
Single	1,622	99.0%	100.1%	99.1%	0.999	7.8%
Twin	4,973	99.7%	100.8%	99.7%	1.000	8.6%

Overall	29,916	99.2%	100.4%	99.1%	1.001	10.7%
IAAO Standard	N/A	90%-110%	90%-110%	90%-110%	0.98-1.03	< 15%
OPA Target	N/A	95%-102%	95%-102%	95%-102%	0.98-1.03	< 15%

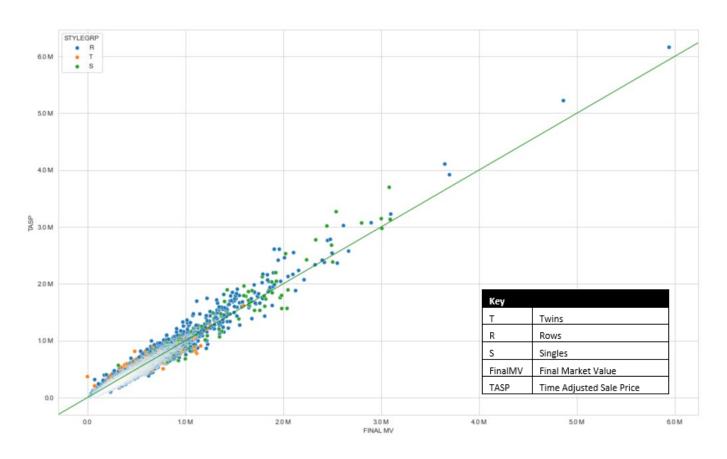
Table 4: Single Family Residences by Zone

For a map of the zones, see https://www.phila.gov/documents/assessment-methodologies/.

		Median		Weighted		
Zone	Sales	Ratio	Mean Ratio	Mean Ratio	PRD	COD
Α	2,242	98.8%	100.9%	99.5%	0.993	14.5%
В	969	97.5%	100.0%	97.0%	1.005	16.3%
С	3,110	99.4%	100.1%	99.5%	0.999	6.3%
D	2,080	99.5%	100.5%	99.8%	0.996	7.3%
Е	4,308	100.0%	101.4%	100.4%	0.996	9.4%
F	1,826	98.1%	99.3%	97.5%	1.006	14.0%
G	927	98.7%	100.5%	97.9%	1.007	17.1%
Н	1,080	96.7%	100.3%	98.9%	0.977	18.0%
J	2,600	98.5%	99.8%	98.2%	1.002	10.1%
К	2,146	99.6%	100.0%	99.1%	1.005	10.9%
L	909	100.7%	102.8%	101.6%	0.992	11.2%
M	3,082	98.1%	99.7%	98.2%	0.998	11.3%
N	1,718	99.5%	100.0%	99.3%	1.002	7.8%
Р	1,199	97.0%	98.4%	96.9%	1.001	8.7%
Q	412	98.7%	99.9%	98.8%	0.999	8.6%
S	1,308	103.1%	104.2%	102.5%	1.006	10.0%
Overall	29,916	99.2%	100.4%	99.1%	1.001	10.7%
IAAO Standard						
(Overall)	N/A	90%-110%	90%-110%	90%-110%	0.98-1.03	< 15%
OPA Target						
(Overall)	N/A	95%-102%	95%-102%	95%-102%	0.98-1.03	< 15%

The following scatter diagram illustrates how closely market values match time adjusted sales prices (TASP). Each point represents the intersection of TASP and assessed value. The line indicates where TASP and Assessed Value are equal.

Visual Comparison of 2025 Single Family Residences Market Values to Time Adjusted Sale Prices by Property Style



Multi-Family Residences

Results for small multi-family residences (2 to 4 units) are summarized by property type (built as or converted duplexes/triplexes/quadruplexes) and by major geographic areas of the city. Results are based on 2,414 sales.

The median ratio for multi-family residential properties across the city was 98.6%, which is within both OPA's targeted range of 95% to 102% and the IAAO range of 90% to 110%. This means that multi-family residential properties citywide have been valued at approximately 98.6% of their respective sale prices.

The City's overall COD for multi-family residential properties was 11.9%, which is within the IAAO accepted range (< 15%) for assessed values for a jurisdiction like Philadelphia. The City's overall PRD was 1.002, which is also within the IAAO accepted range (0.98 to 1.03). This means that there

is no meaningful statistical bias between low value and high value property valuations across the city.

Table 5: Multi-Family Residences by Style

		Median	Weighted Mean				
Style	Sales	Ratio	Mean Ratio	Ratio	PRD	COD	
Duplex Built-As							
(M2B0)	1,150	98.6%	100.0%	98.9%	0.997	10.0%	
Duplex Conv. (M2C0)	735	99.0%	100.9%	98.8%	1.002	13.5%	
Triplex Built-As							
(M3B0)	75	98.7%	101.0%	98.4%	1.004	11.6%	
Triplex Conv. (M3C0)	341	98.3%	99.1%	97.0%	1.013	14.7%	
Quadplex Built-As							
(M4B0)	31	99.9%	100.5%	100%	0.999	10.6%	
Quadplex Conv.							
(M4C0)	82	97.8%	97.9%	96.2%	1.017	12.7%	
Overall	2,414	98.6%	100.1%	98.4%	1.002	11.9%	
IAAO Standard							
(Overall)	N/A	90%-110%	90%-110%	90%-110%	0.98-1.03	< 15%	
OPA Target (Overall)	N/A	95%-102%	95%-102%	95%-102%	0.98-1.03	< 15%	

Table 6: Multi-Family Residences by Zone

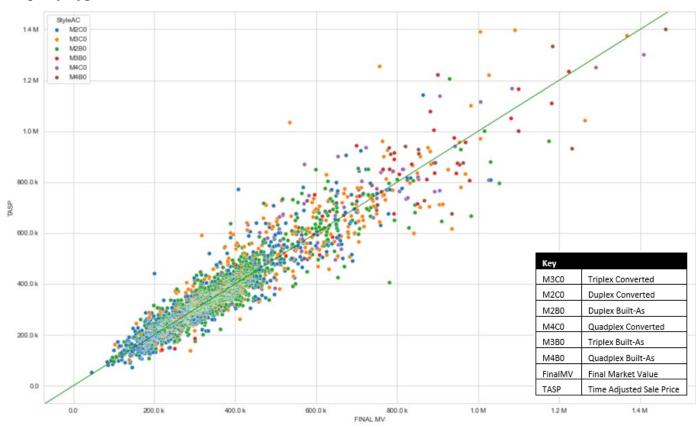
For a map of the zones, see https://www.phila.gov/documents/assessment-methodologies/.

ZONE	Sales	Median Ratio	Mean Ratio	Weighted Mean Ratio	PRD	COD
А	346	98.0%	99.5%	97.4%	1.005	15.6%
В	56	99.6%	105.0%	100.3%	0.993	17.2%
С	278	97.2%	98.1%	97.2%	0.999	7.3%
D	239	99.8%	99.8%	99.2%	1.006	7.1%
Е	407	99.6%	101.4%	100.2%	0.993	10.1%
F	67	95.2%	98.5%	93.4%	1.020	15.7%
G	115	96.3%	100.3%	98.4%	0.979	14.5%
Н	190	97.6%	100.5%	96.6%	1.010	18.4%
J	91	101.6%	99.6%	98.5%	1.032	10.9%
K	50	100.0%	102.3%	100.3%	0.997	11.9%
L	94	93.1%	95.3%	93.4%	0.997	12.3%
М	220	97.7%	99.5%	97.1%	1.006	12.5%
N	101	103.7%	103.1%	101.4%	1.022	9.6%

Р	100	101.8%	101.8%	100.4%	1.014	8.3%
Q	23	98.3%	99.6%	97.3%	1.010	11.3%
S	37	100.5%	102.1%	102.2%	0.983	11.7%
Overall	2,414	98.6%	100.1%	98.4%	1.002	11.9%
IAAO Standard						
(Overall)	N/A	90%-110%	90%-110%	90%-110%	0.98-1.03	< 15%
OPA Target						
(Overall)	N/A	95%-102%	95%-102%	95%-102%	0.98-1.03	< 15%

The following scatter diagram illustrates how closely market values match time adjusted sale prices (TASP). Each point represents the intersection of TASP and assessed value. The line indicates where TASP and Assessed Value are equal.

Visual Comparison of 2025 Multi-Family Market Values to Time Adjusted Sale Prices by Property Type



Comparison of Tax Year 2024 and Tax Year 2025

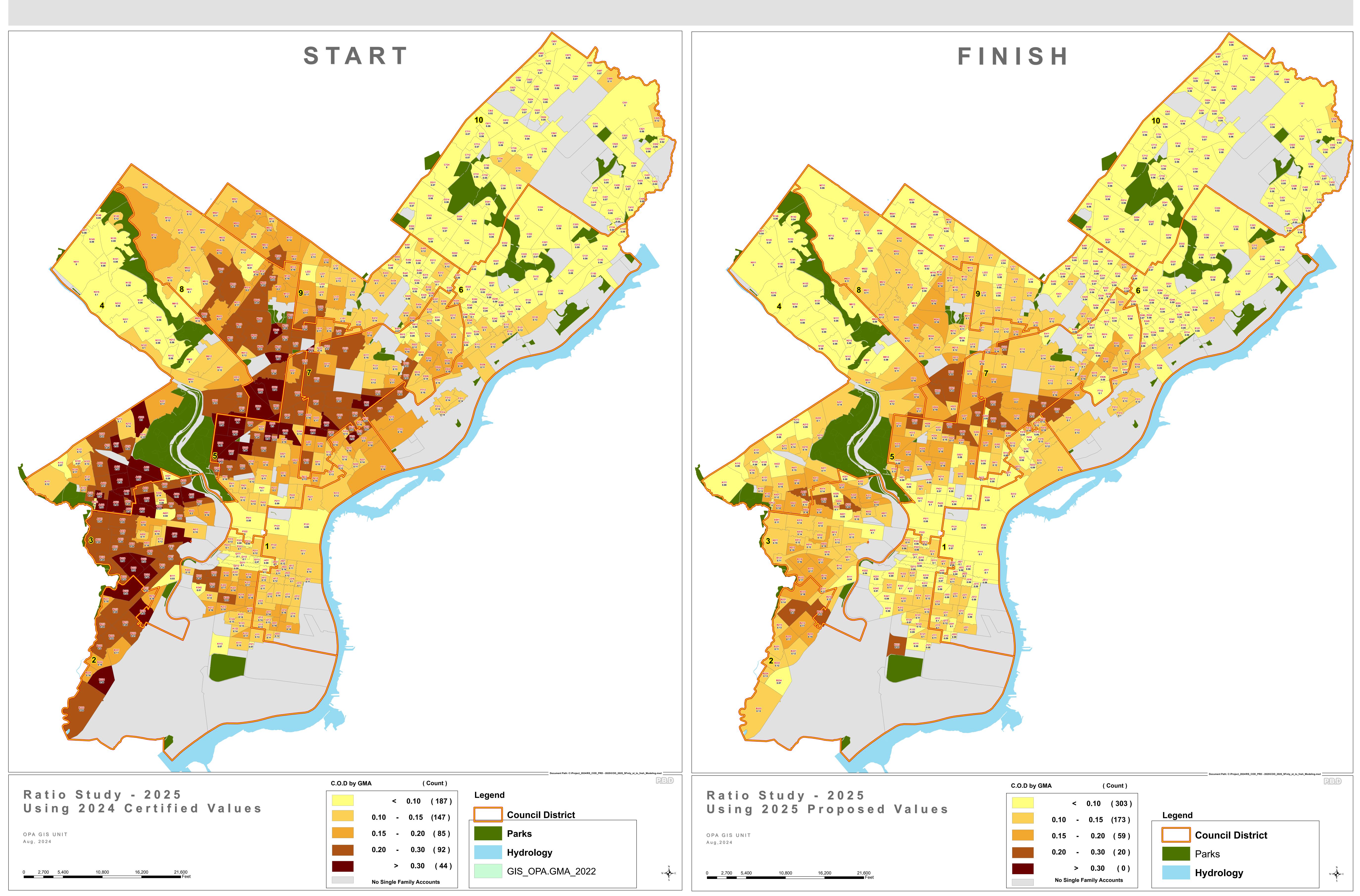
The following pages contain several maps showing comparisons between Tax Year 2024 and Tax Year 2025 for COD, PRD, current median ratio, and weighted average market value by Geographic Market Areas (GMA).

For Tax Year 2023, OPA extended the First Level Review (FLR) deadline for the revaluation to December of 2022. That limited OPA's time to perform a Tax Year 2024 revaluation while also reviewing and addressing FLRs. The FLR deadline extension was made at the request of City Council and OPA noted at the time the extension was granted that it could impact the Tax Year 2024 revaluation.

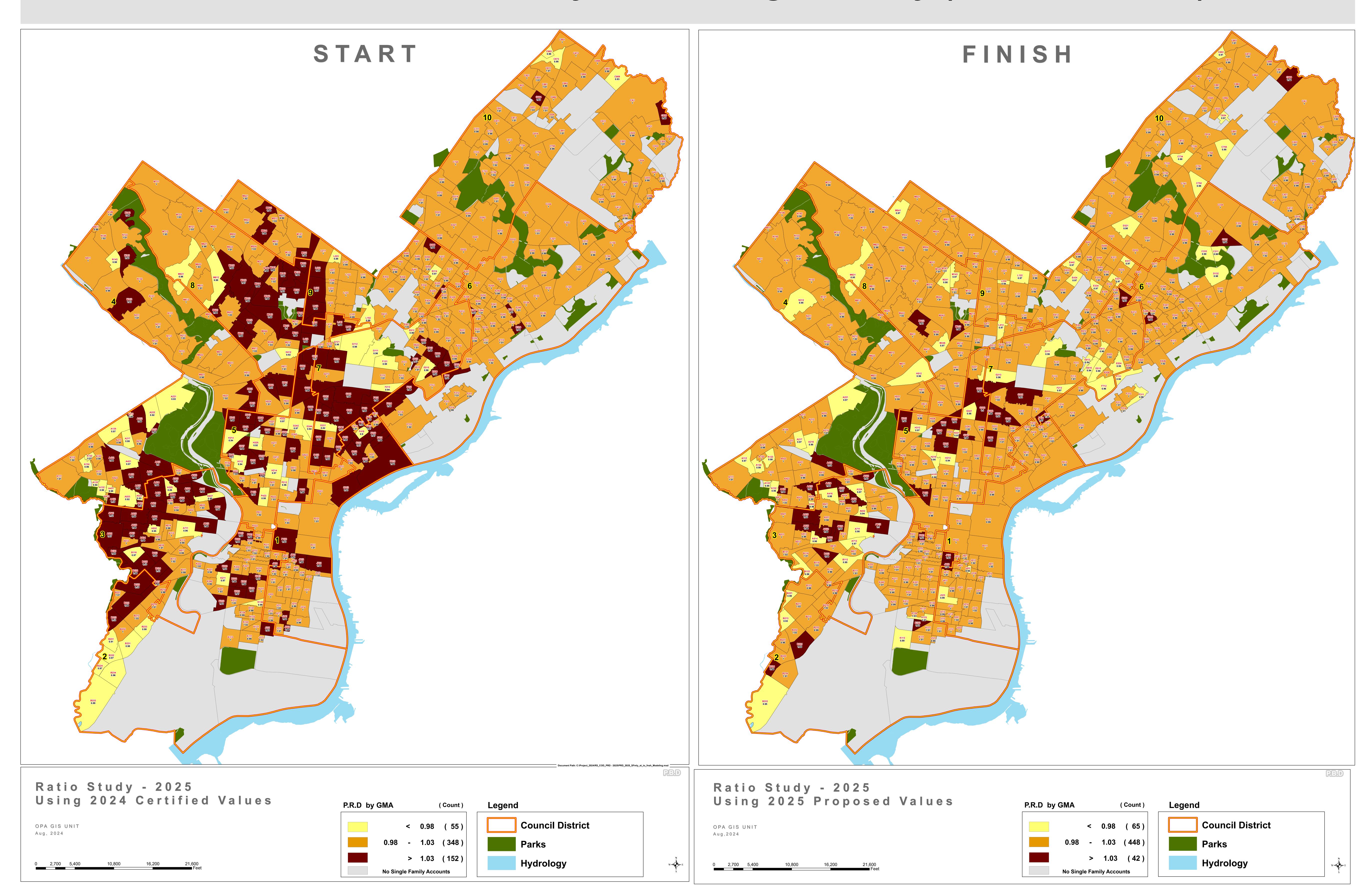
These maps show how the Tax Year 2025 revaluation improved performance measures throughout Philadelphia, creating more accurate and reliable assessments.

Using the zoom function provides a more detailed view of the smaller geographic units.

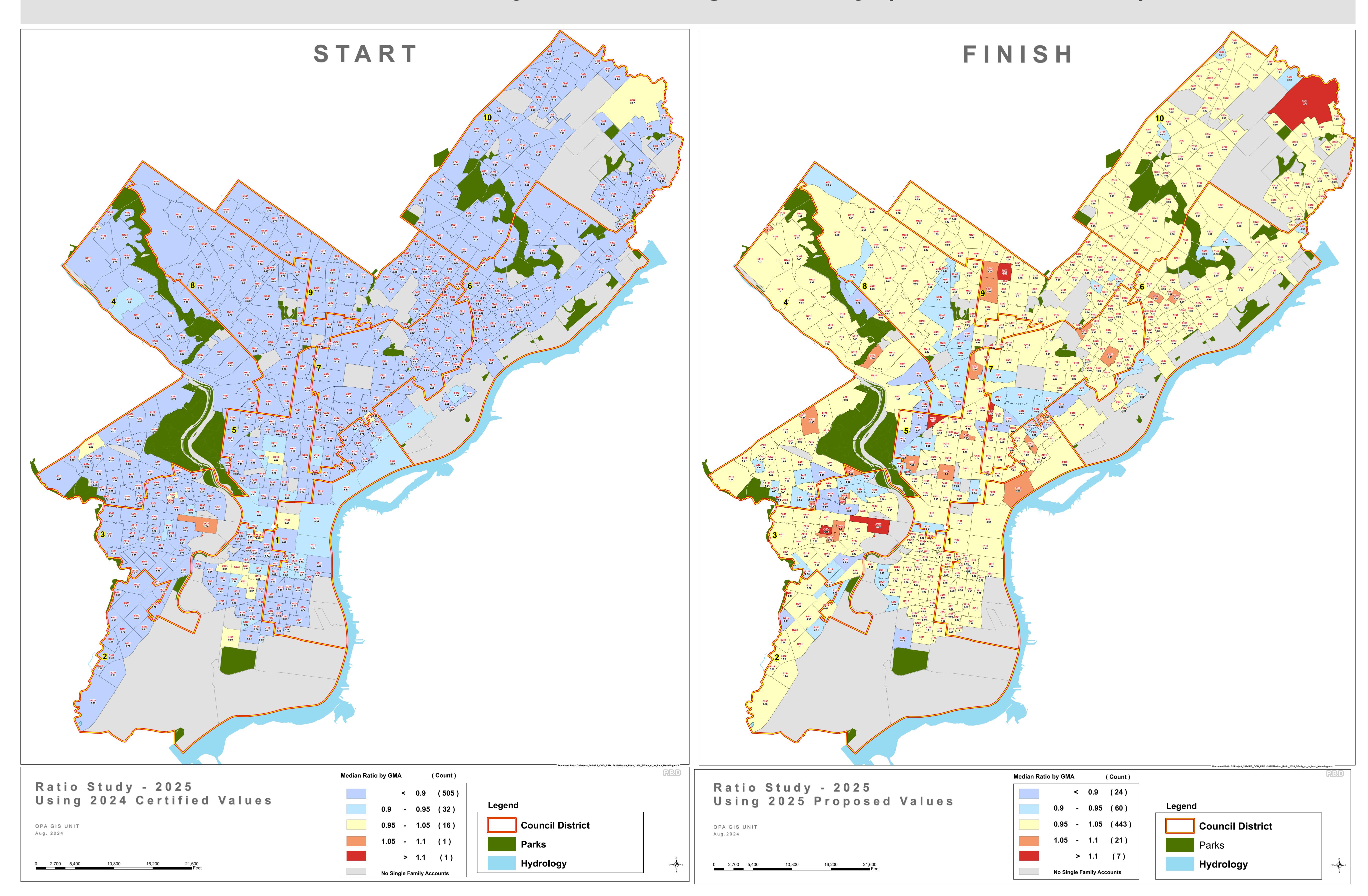
Coefficient of Dispersion by GMA - Single Family (Start to Finish)



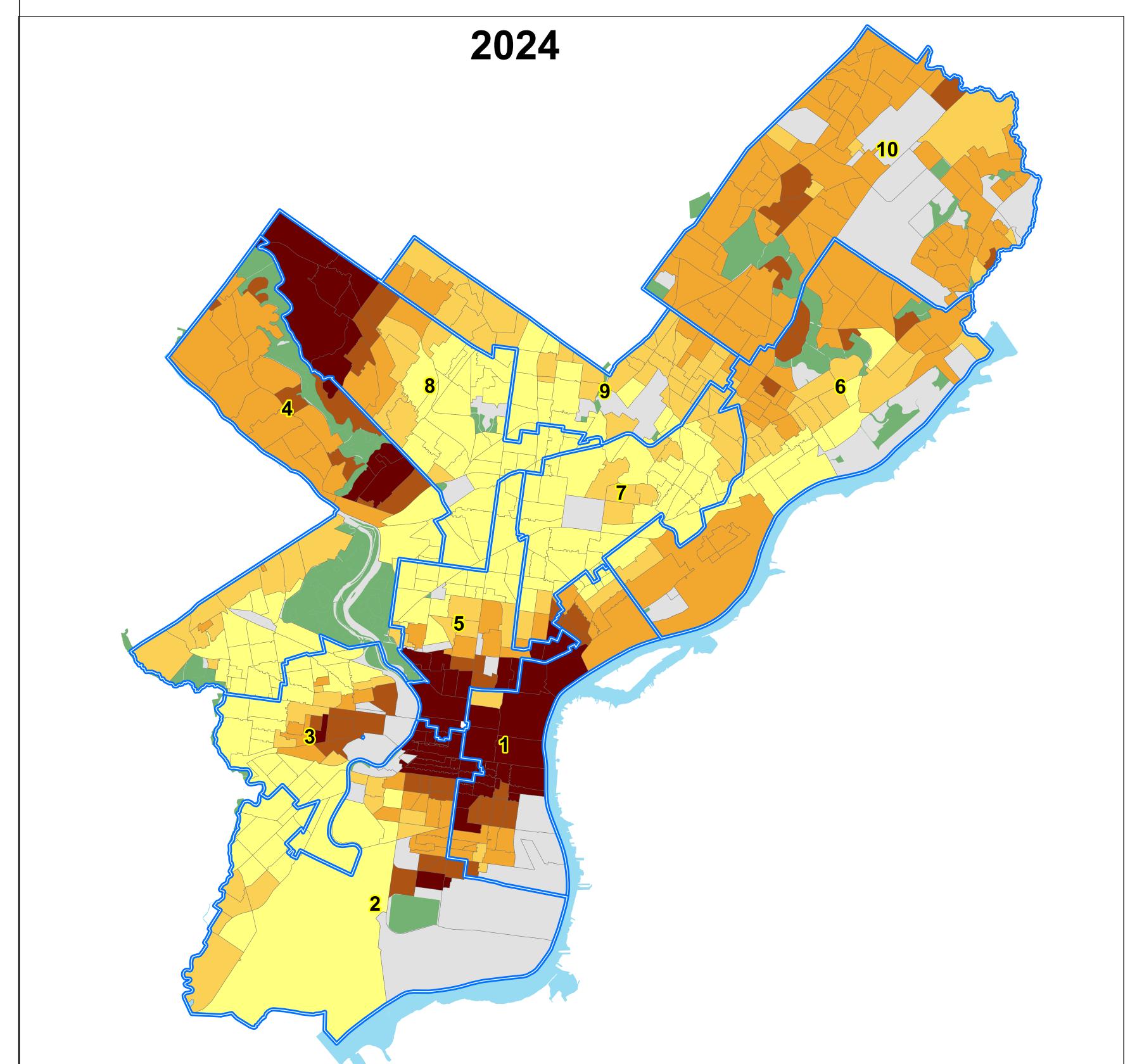
Price Related Differential by GMA - Single Family (Start to Finish)

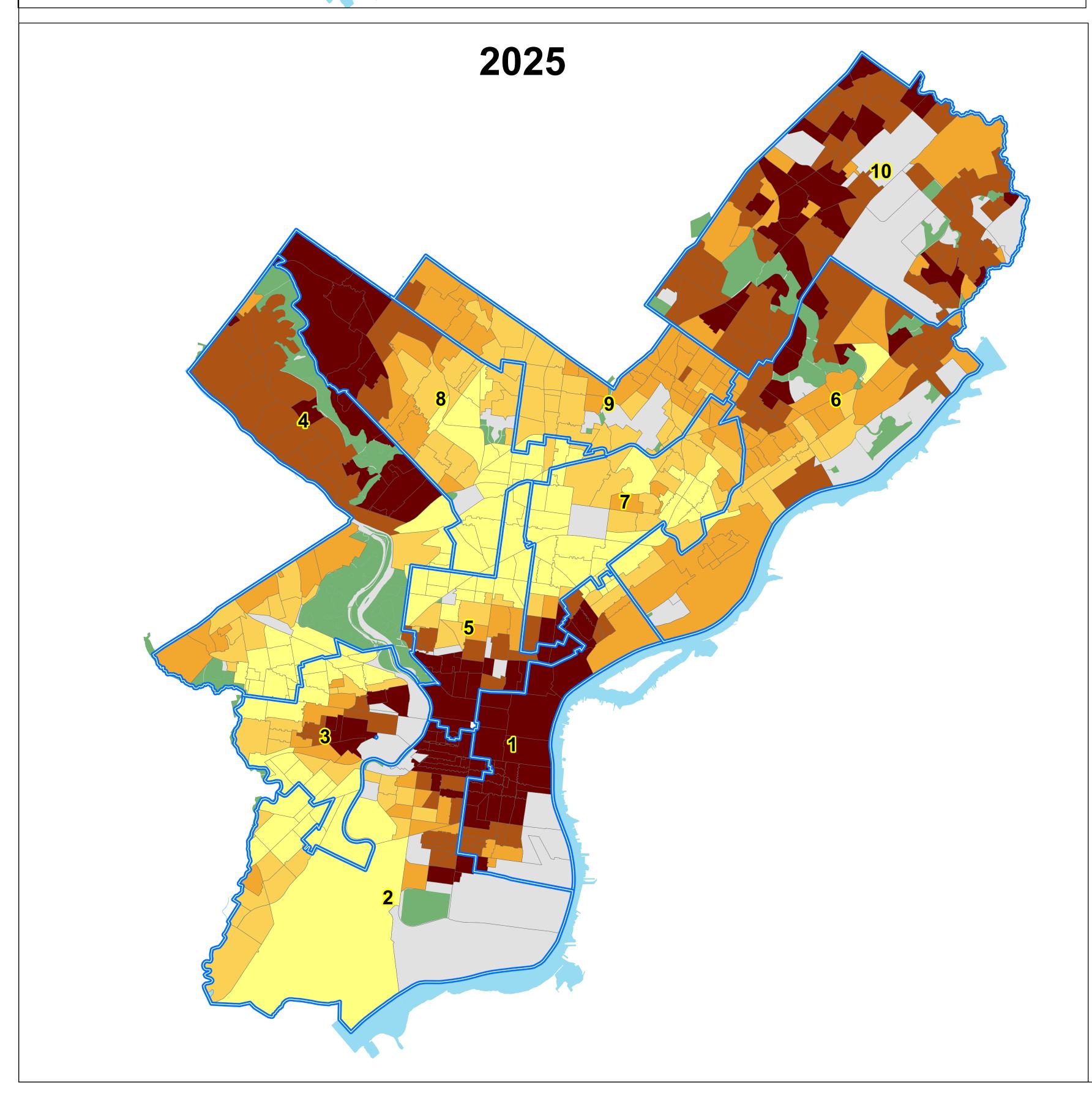


Median Ratio by GMA - Single Family (Start to Finish)

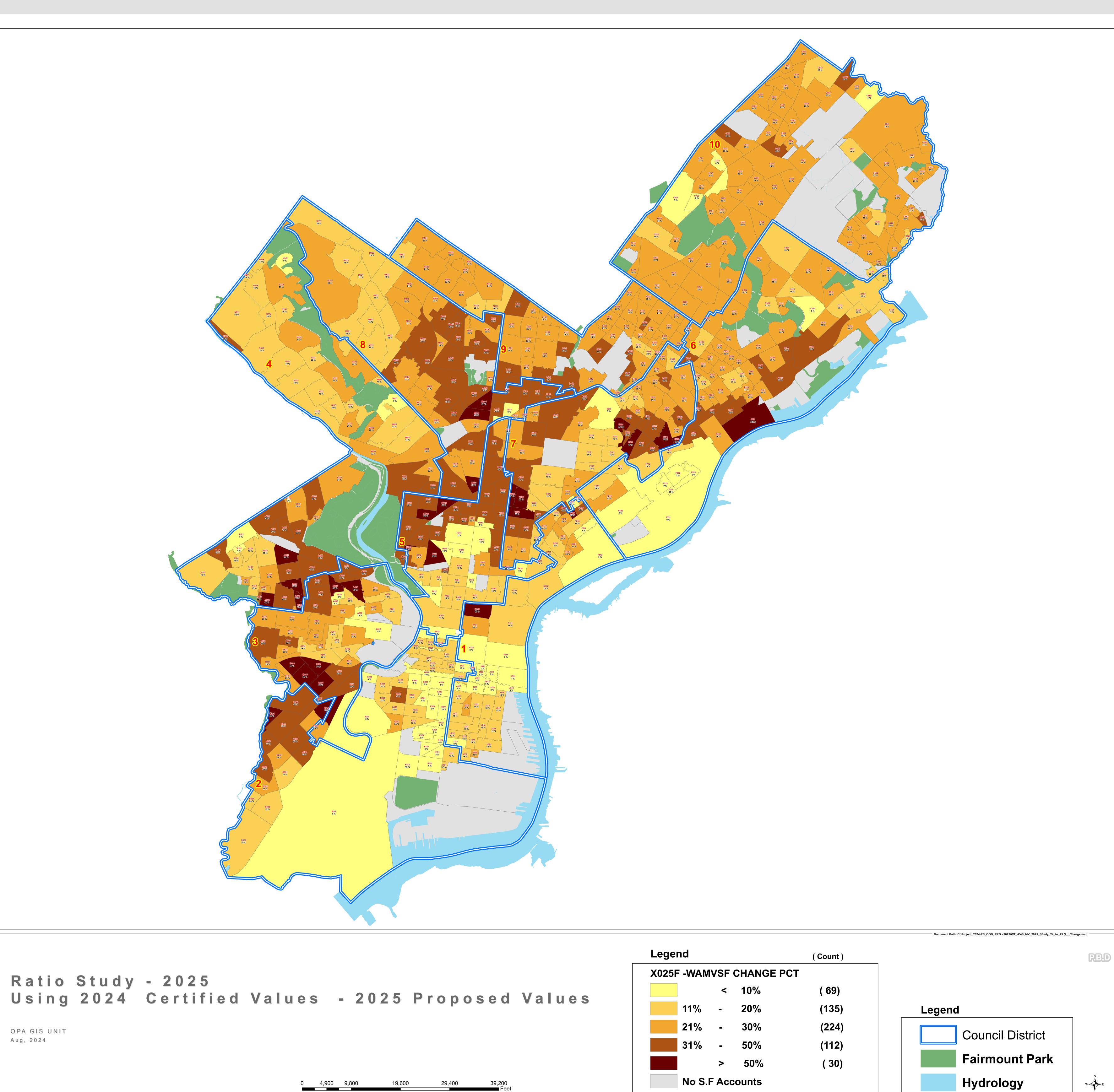


Weighted Average Market Value Per Sq. Ft by GMA Single Family (2024 & 2025)





Weighted Average Market Value Per Sq.Ft Percentage Change by GMA Single Family (2024 & 2025)



Weighted Average Market Value Per Sq.Ft by GMA - Single Family (2024 & 2025)

