
STATE OF INDIANA

DEPARTMENT OF LOCAL GOVERNMENT FINANCE



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TO: Assessing Officials

FROM: Barry Wood, Assessment Division Director

RE: Ratio Study Guidance

DATE: January 27, 2022

The purpose of this memorandum is to provide guidance to assessing officials regarding changes in the Department of Local Government Finance’s (“Department”) ratio study review process for the 2022 assessment year.

Like the Department did for the 2021 Ratio Study filing process, for 2022, the Department will continue integrating Microsoft Teams into the submission, review, and approval process. Microsoft Teams is a unified communications platform that combines workplace chat, file storage, and application integration.

As part of the 2021 filing process, the Department compiled the name and email address for each person who was included in the county’s “Team” (vendors, office staff, etc.). Each “Team” automatically includes the assessor. It should also include the individual from within the assessor’s office or the vendor who works on the Ratio Study and typically communicates with the Department during the review process.

If your county would like to add someone (e.g., your vendor) to your “Team” or remove someone from the prior year, please send the contact information (name and email address) to Barry Wood at Bwood@dlgf.in.gov.

I. Formatting for Ratio Study Spreadsheets

The ratio study format is fully described in the attached example. As in prior years, ratio studies must be submitted in a spreadsheet compatible with Microsoft Excel 2013. The spreadsheet must contain one tab with ratio study data for each of the following types of property:

- Industrial Vacant
- Industrial Improved
- Commercial Vacant
- Commercial Improved
- Residential Vacant
- Residential Improved

In addition, the study should contain a *Summary* tab detailing the number of sales used and ratio statistics in each section of the ratio study.

Multi-Parcel Sales

Please note that like last year, there will not be a “MultiParcelSales” tab. Every parcel in the Ratio Study must be included in the Formatted tab (including non-primary parcels).

Note: All parent parcels must be marked “Y” in the Primary column.

Groupings

Groupings cannot have overlapping study sections. For example, Group001 cannot include parcels marked in both ResImp and ResVac study sections. Likewise, parcels in a multiple parcel sale must be included in the same grouping/study section. When a township stands alone (it is not grouped or subdivided), use “None” in the grouping column.

AV Increases/Decreases

If there are Assessed Value (“AV”) changes within a Township/Study Section which are greater than 10%, those explanations must be included in the Narrative Template.

NOTE: AV changes are based on the prior year AV with the prior year property class and the current year AV with the current year property class.

R Software

“R software,” which the Department uses in the review of the ratio study is not as particular as previously used software; however, some formatting is still necessary. The Formatted tab must be named “Formatted.” The Workbook tab must be named “Workbook.” There should be four (4) cyclical columns: 2018, 2019, 2020, and 2021 Cyclical Reassessment.

Column names for the Workbook and the Formatted tab must be as shown in the examples below:

Workbook Column Names	Example
Parcel Number	12-34-56-789-123.456-789
Township Number	Three-digit number
Township Name	Jackson Township
Neighborhood Code	12345
Prior Year Property Class	500
Current Year Property Class Code	510
Taxing District	Three-digit number
Prior Year Land AV	2000
Prior Year Improvement AV	0
Prior Year Total AV	2000
Current Year Land AV	2500
Current Year Improvement AV	95000
Current Year Total AV	97500
2018 Cyclical Reassessment	Y/N
2019 Cyclical Reassessment	Y/N
2020 Cyclical Reassessment	Y/N
2021 Cyclical Reassessment	Y/N

Ratio Study Column Names	Example
SDFID	C01-2019-9876543
Parcel Number	12-34-56-789-123.456-789
MultiParcel	Y/N
Primary	Y/N
Study Section	ResImp
Grouping	must be unique for each study section; use "None" when township/study section does not have different groupings
Township Name	Jackson Township
Neighborhood	12345
Property Class	510
Taxing District	three-digit number
Sale Date	MM/DD/YY
Study Sale Price	100000
Current Land AV	2500
Current Improvement AV	95000
Current Total AV	97500

The R software will sum all parcels with the same SDFID; hence, the MPS tab is no longer needed. Multiple parcel sales with unique SDFIDs for each parcel will be put into a spreadsheet for review, if applicable.

The Ratio Study File must be named “County Name Ratio Study” (e.g., Adams County Ratio Study) and the Workbook file must be named “County Name Workbook (e.g., Adams County Workbook).” Also, the Grouping must be unique for each study section. Grouping “A” cannot contain both ResImp and ResVac. Use “None” if there are no special groupings. The Sales Reconciliation must be named “County Name Sales Reconciliation” (e.g., Adams County Sales Reconciliation) and contain the same columns in the same order as the potentially valid sales file generated by the Department.

II. Sales Reconciliation

After a county has received compliance status, the Department will generate your Sales Reconciliation (potentially valid sales) from the sales files. Please note that this may take a few days. This is not a comprehensive list of all sales that will be in your Ratio Study, nor is it a requirement to include all of these sales. Providing this file before the Ratio Study is submitted is intended to help expedite the Ratio Study review process.

When the file is generated, the Department will upload it to your “Team” and notify you in Microsoft Teams.

Please notify the Department in Microsoft Teams that you have received the file (“👍”, @mention the Department member who uploaded the file, etc.). The sales on this list that are not included in the Ratio Study will require an explanation.

III. Submission Files

All of the following files must be submitted as separate files and formatted correctly to be considered a compliant submission:

- Narrative (use the required template)
- Ratio Study
- Workbook (must be a separate file)
- Sales Reconciliation (with explanations)

IV. Narrative Template

The sales window and time adjustment must explain the various groupings. If the AV increase/decrease in a major property class within a Township is $\geq 10\%$ or greater, please explain the changes. The AV change equals the prior-year value for the prior property class compared with the current year value for the current property class.

Regarding the cyclical reassessment review, was there a land order completed in 2021? Also, please note any other changes or issues. Please note that the Narrative Template has been redesigned.

V. How to Submit Files

Counties and vendors will be added to Microsoft Teams as guests. Other than assessors, guests will not be added without the express consent of the county. Guests will receive an invitation to join the team via email from Microsoft. Please follow the prompts in the email to accept this invitation. Guests who were included in the 2021 Ratio Study review will be carried over for the 2022 review.

During the Ratio Study season, always keep Microsoft Teams open to get notifications immediately (Note: Set Microsoft Teams up to auto-start. Microsoft Teams will open when you start your computer.).

To submit your Ratio Study files, locate, and click on the 2022 channel in your “Team.” At the top of the screen, you will see tabs named Conversation, Files, etc. Click on Files. Below these tabs, you will find an “Upload” button. Select the Upload button and navigate to the appropriate files. When you select your files and click “Open” they will upload to this channel. Repeat these steps for all files if uploading individually. Excel files should be submitted in xlsx format to allow for editing in Teams.

Notify the Department by tagging @Barry Wood, and @Julie Waddell in the conversations tab. If you do not use the @mention, the Department staff will not know of your submission. The Department will acknowledge receipt of your Ratio Study.

VI. Duplicates

Before the review begins, the Department will check for duplicates in the Ratio Study (SDFID) and Workbook (parcel #). If there are duplicates in either of the files, the Department will upload a spreadsheet with these duplicates and ask for an explanation or removal from the files in Microsoft Teams.

VII. Discrepancies

Before the review process begins and after duplicates are removed, the Department will check for discrepancies in AVs between the Workbook and Ratio Study. If there are any discrepancies for which staff cannot determine the reason, the Department will upload a file containing these duplicates and you will be asked to either make the necessary corrections or provide an explanation.

VIII. Assignment

The Ratio Study submission will be deemed compliant once all files are submitted, all formatting is correct, there are no duplicates, and there are no discrepancies. A Ratio Study will not be considered timely submitted until the above are completed. At this time all statistics will be run, and AV files will be generated. Your Ratio Study will then be assigned to a field representative for review.

IX. Review Process

Once the assigned field representative has reviewed your files, they will upload a checklist with additional questions about items such as groupings, AV changes >10%, out-of-tolerance statistics, and cyclical reassessment.

As a reminder, in accordance with 50 IAC 27-4-5, the median ratio must fall between 0.90 and 1.10 for any class of property. The coefficient of dispersion (COD) standard for improved residential property is 15.0 or less, 20.0 or less for all other property types. The price-related differential (PRD) must be between 0.98 and 1.03.

Answer the questions within the file that was uploaded in Microsoft Teams. After all checklist questions have been answered, the Ratio Study will go through a second review. Once the second reviewer has completed their review and all AVs are considered final, two statistical tests will be run.

X. Statistical Tests

The Department will conduct the Spearman Rank test, which is a test for vertical equity. This test is done for groupings with 5-20 sales. If there is vertical inequity, this will need to be corrected. Make corrections to the Ratio Study file submitted in Microsoft Teams.

The Department will also conduct the Mann-Whitney test, which is a test for the equal appraisal between sold and unsold properties. The Department will review all neighborhoods that have a statistically significant difference between the sold and unsold parcels and request an explanation for specific parcels. Please explain these parcel changes in the spreadsheet uploaded to Microsoft Teams. Also, include a Standard Operating Procedure (“SOP”) for effective age changes with the narrative to help expedite this process.

XI. Things That Cause Delays

The following are items that may cause a delay in the review and approval of the county’s ratio study:

- Incorrect formatting.
- Insufficient explanation on reconciliation.
- The Narrative does not explain the AV changes.
- Delayed response to messages.
- No grouping explanations.
- The Narrative Template is not used.
- Providing overly generalized explanations.

XII. How to Get a Timely Approval

The following are items that can help expedite the review and approval of the county’s ratio study:

- Become familiar with Microsoft Teams.
- Submit all files.
- Format all files correctly.
- Include all necessary information in the Narrative.
- Include a Standard Operating Procedure for effective age changes in the Narrative.
- Keep Microsoft Teams open during the ratio study review process.
- Review notifications immediately.
- Mark activity as unread if you are unable to respond immediately.
- “👍” posts you have reviewed.
- @mention the individual with whom you are communicating.
- Learn to make changes within the uploaded files before the Ratio Study begins.

XII. 2022 Annual Adjustment

As in prior years, the Department requires each county assessor to have an approved ratio study prior to submitting 2022 certified assessed values to the county auditor. Per Indiana Code 6-1.1-5-14, the county assessor must deliver the real estate book (i.e., roll 2022 pay 2023 gross assessed values and balance) to the county auditor by **July 1, 2022**. Per Indiana Code 6-1.1-14-12, each county must submit its ratio study and coefficient of dispersion study to the Department by **March 1**. Additionally, a county’s ratio study will not be reviewed until all datasets are compliant, particularly the Sales Disclosure Data File (50 IAC 27-9-1).

As part of the annual adjustment process, values in the ratio study are set using local market data, such as the sale prices of comparable properties. **If necessary, further adjustment based on local market data (“trending”) may be performed to meet ratio study standards. However, the purpose of the 2022 annual adjustment process is to value properties at their market value-in-use, as indicated by compliance with ratio study standards. If this goal is met without trending, no further adjustment is necessary.**

ASSESSMENT DATE AND VALUATION DATE

- The assessment and valuation date are both January 1, 2022. All real property should reflect characteristics as of this date.
- Depreciation should also be applied relative to January 1, 2022 and updated on an annual basis. If an adjustment is necessary, and depreciation has not been updated as part of the annual adjustment process, the adjustment factor may need to be revised to consider increased depreciation from the last physical reassessment. Since normal (physical) depreciation refers to the normal wear and tear of an improvement, generally there would be an increase in depreciation even if the cost changes were insignificant. Even if the sales (market data) indicate there was no additional change within the market, the neighborhood (market) factor adjustment would account for this. Hence, counties should apply depreciation by accounting for the additional age of the improvement.

- Note: Please note, the [Location Cost Multipliers](#) (LCM) and the Cost Schedules have been updated for the January 1, 2022 assessment date.

PARCEL CHARACTERISTICS

All properties must be assessed based on their characteristics as of January 1, 2022.

RATIO STUDY REVIEW STANDARDS

Sales Window:

The assessing official may use sales of properties from the period **from January 1, 2021, to December 31, 2021**, for the January 1, 2022, assessment date. **New this year: Assessing officials may use a different sales window (e.g., November 1, 2020 – October 31, 2021). However, the sales window must cover at least twelve (12) months.** A longer time period may be required to produce a representative sample in some counties; however, no more than five (5) years of sales may be used in the ratio study. Older sales must be time-adjusted as appropriate and in accordance with the methods prescribed in the *2013 IAAO Standard on Ratio Studies*.

Multiple Sales Years:

Similar to the 2021 assessment process, counties may use sales older than one year in one township without expanding the sales window for other townships. However, time adjustments for older sales must be performed using all comparable older sales, including those sales whose inclusion in the ratio study is not necessary because of sufficient current sales. This will promote equity among townships with different sales windows without requiring the addition of older sales in townships where they are not needed for assessment purposes.

For example, Adams Township has sufficient 2021 sales, but Boone Township does not. The sales window is expanded to 2020 sales for Boone Township. The county does not need to expand the sales window to 2020 sales for Adams Township. However, the county should use comparable 2020 and 2021 sales from both Adams and Boone Townships to determine whether a time adjustment is necessary for the 2020 sales used in Boone Township.

Sales Chasing:

Appendix E of the *2013 IAAO Standard on Ratio Studies* lists several methods that oversight agencies may use to detect sales chasing. Of these, the Department primarily uses the Mann-Whitney test outlined in E.2: Comparison of Average Value Changes. In *Mass Appraisal of Real Property*, Robert Gloude mans notes that:

When calculating average value changes, new parcels and parcels that have undergone a change in use or physical change (such as additions or renovations) should be excluded. (pp. 311 – 312)

Because 2018 marked the first phase of the cyclical reassessment, 2019 marked the second phase of the cyclical reassessment, 2020 marked the third phase of the cyclical reassessment, and 2021 marked the fourth phase of the cyclical reassessment, it may be difficult to discern between

changes attributable to the reassessment process and changes attributable to sales chasing (hence the need for the additional columns in the Workbook to designate whether a parcel was reassessed in the first, second, third or fourth phase of the cyclical reassessment). As indicated previously, the Mann-Whitney test will be utilized for the 2022 annual adjustment process for detecting sales chasing. However, parcels that were part of the fourth phase of the cyclical reassessment (as identified in the Workbook) will be excluded from the test. Additionally, the Department may use other methods described in Appendix D to detect sales chasing.

Number of Sales Used:

The IAAO states:

“There is a general relationship between statistical reliability and the number of observations in a sample. The larger the sample size, the greater the reliability.”

In the 2021 Real Property Manual – Chapter 2, page 7 states:

For purposes of this section, a “representative number” shall mean a number that is no less than three percent (3%) of the total number of parcels within the neighborhood established under the section headed neighborhood.”

However, this particular chapter deals with land valuation and mentions the use of 18 months of sales rather than the old ratio study standard of 14 months when the assessment date was March 1. Although one sale in a neighborhood may represent 3% of the total number of parcels in a neighborhood, a sample size of one is not great enough to warrant a trend. The reliability of the trending factor based on one sale is very low and could potentially result in losing an appeal. Assessing officials should not use one sale to trend a neighborhood. Alternatively, prior year sales could be used (if time adjusted), or neighborhoods could be combined to ensure a representative number of sales are used.

Questions about this memorandum may be directed to Barry Wood, Assessment Division Director, at bwood@dlgf.in.gov or (317) 232-3762.

Training materials will be available on the Ratio Study page of the [Department’s website](#).