2022

ARAPAHOE COUNTY PROPERTY ASSESSMENT STUDY

WILDROSE
APPRAISAL, INCORPORATED
Audit Division

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APPRAISAL, INCORPORATED
Audit Division

September 15, 2022

Ms. Natalie Mullis
Director of Research
Colorado Legislative Council
Room 029, State Capitol Building
Denver, Colorado 80203

RE: Final Report for the 2022 Colorado Property Assessment Study

Dear Ms. Mullis:

Wildrose Appraisal Inc.-Audit Division is pleased to submit the Final Reports for the 2022 Colorado Property Assessment Study.

These reports are the result of two analyses: A procedural audit and a statistical audit.

The procedural audit examines all classes of property. It specifically looks at how the assessor develops economic areas, confirms and qualifies sales, develops time adjustments and performs periodic physical property inspections. The audit reviews the procedures for determining subdivision absorption and subdivision discounting. Valuation methodology is examined for residential properties and commercial properties. Procedures are reviewed for producing mines, oil and gas leaseholds and lands producing, producing coal mines, producing earth and stone products, severed mineral interests, and non-producing patented mining claims.

Statistical audits are performed on vacant land, residential properties, commercial/industrial properties and agricultural land. A statistical analysis is performed for personal property compliance on the eleven largest counties: Adams, Arapahoe, Boulder, Denver, Douglas, El Paso, Jefferson, Larimer, Mesa, Pueblo and Weld. The remaining counties receive a personal property procedural study.

Wildrose Appraisal Inc. – Audit Division appreciates the opportunity to be of service to the State of Colorado. Please contact us with any questions or concerns.

Harry J. Fuller
Project Manager
Wildrose Appraisal Inc. – Audit Division

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INTRODUCTION

The State Board of Equalization (SBOE) reviews assessments for conformance to the Constitution. The SBOE will order revaluations for counties whose valuations do not reflect the proper valuation period level of value.

The statutory basis for the audit is found in C.R.S. 39-1-104 (16)(a)(b) and (c).

The legislative council sets forth two criteria that are the focus of the audit group:

To determine whether each county assessor is applying correctly the constitutional and statutory provisions, compliance requirements of the State Board of Equalization, and the manuals published by the State Property Tax Administrator to arrive at the actual value of each class of property.

To determine if each assessor is applying correctly the provisions of law to the actual values when arriving at valuations for assessment of all locally valued properties subject to the property tax.

The property assessment audit conducts a two-part analysis: A procedural analysis and a statistical analysis.

The procedural analysis includes all classes of property and specifically looks at how the assessor develops economic areas, confirms and qualifies sales, and develops time adjustments. The audit also examines the procedures for adequately discovering, classifying and valuing agricultural outbuildings, discovering subdivision build-out and subdivision discounting procedures. Valuation methodology for vacant land, improved residential properties and commercial properties is examined. Procedures for producing mines, oil and gas leaseholds and lands producing, producing coal mines, producing earth and stone products, severed mineral interests and non-producing patented mining claims are also reviewed.

Statistical analysis is performed on vacant land, residential properties, commercial/industrial properties, agricultural land, and personal property. The statistical study results are compared with State Board of Equalization compliance requirements and the manuals published by the State Property Tax Administrator.

Wildrose Audit has completed the Property Assessment Study for 2022 and is pleased to report its findings for Arapahoe County in the following report.

REGIONAL/HISTORICAL SKETCH OF ARAPAHOE COUNTY

Regional Information

Arapahoe County is located in the Front Range region of Colorado. The Colorado Front Range is a colloquial geographic term for the populated areas of the State that are just east of the foothills of the Front Range. It includes Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, El Paso, Jefferson, Larimer, Pueblo, and Weld counties.
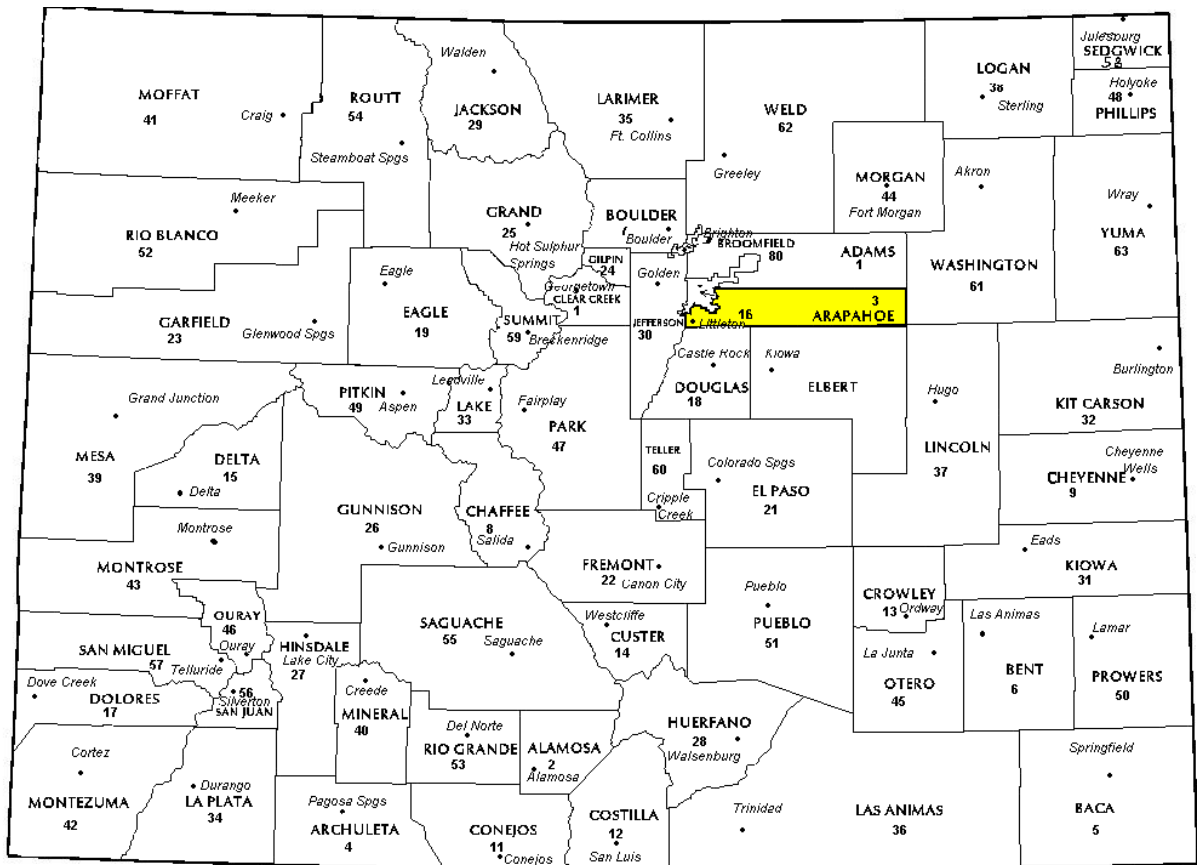
Historical Information

Arapahoe County has approximately 798.1 square miles and an estimated population of approximately 656,590 people, according to the U.S. Census Bureau's 2020 estimated census data. This represents a 14.8 percent change from April 1, 2010 to July 1, 2019.

Arapahoe County is the third most populous of the 64 Colorado counties. The county seat is Littleton and the most populous city is Aurora. Arapahoe County is part of the Denver-Aurora Metropolitan Statistical Area and the Denver-Aurora-Boulder Combined Statistical Area. Arapahoe County calls itself "Colorado's First County" since its origins predate the Pike's Peak Gold Rush.

On August 25, 1855, the Kansas Territorial Legislature created a huge Arapahoe County to govern the entire western portion of the Territory of Kansas. The county was named for the Arapaho Nation of Native Americans that lived in the region.

In July 1858, gold was discovered along the South Platte River in Arapahoe County (in present day Englewood). This discovery precipitated the Pike's Peak Gold Rush. Many residents of the mining region felt disconnected from the remote territorial governments of Kansas and Nebraska, so they voted to form their own Territory of Jefferson on October 24, 1859. The following month, the Jefferson Territorial Legislature organized 12 counties for the new territory, including a new Arapahoe County. Denver City served as the county seat of Arapahoe County.

The Jefferson Territory never received federal sanction, but on February 28, 1861, U.S. President James Buchanan signed an act organizing the Territory of Colorado. On November 1, 1861, the Colorado General Assembly organized the 17 original counties of Colorado including a new Arapahoe County. Arapahoe County originally stretched from the line of present-day Sheridan Boulevard 160 miles east to the Kansas state border, and from the line of present-day County Line Road 30 miles north to the Parallel 40° North (168th Avenue). Denver City served as the county seat of Arapahoe County until 1902.

In 1901, the Colorado General Assembly voted to split Arapahoe County into three parts: a new consolidated City and County of Denver, a new Adams County, and the remainder of the Arapahoe County to be renamed South Arapahoe County. A ruling by the Colorado Supreme Court, subsequent legislation, and a referendum delayed the reorganization until November 15, 1902. Governor James Bradley Orman designated Littleton as the temporary county seat of South Arapahoe County. On April 11, 1903, the Colorado General Assembly changed the name of South Arapahoe County back to Arapahoe County. On November 8, 1904, Arapahoe County voters chose Littleton over Englewood by a vote of 1310 to 829 to be the permanent county seat.
(Wikipedia.org)

RATIO ANALYSIS

Methodology

All significant classes of property were analyzed. Sales were collected for each property class over the eighteen month period from January 1, 2019 through June 30th, 2020. Property classes with less than thirty sales had the sales period extended in six month increments up to an additional forty-two months. If this extended sales period did not produce the minimum thirty qualified sales, the Audit performed supplemental appraisals to reach the minimum.

Although it was required that we examine the median and coefficient of dispersion for all counties, we also calculated the weighted mean and price-related differential for each class of property. Counties were not passed or failed by these latter measures, but were counseled if there were anomalies noted during our analysis. Qualified sales were based on the qualification code used by each county, which were typically coded as either "Q" or "C." The ratio analysis included all sales. The data was trimmed for counties with obvious outliers using IAAO standards for data analysis. In every case, we examined the loss in data from

trimming to ensure that only true outliers were excluded. Any county with a significant portion of sales excluded by this trimming method was examined further. No county was allowed to pass the audit if more than 5% of the sales were "lost" because of trimming.

All sixty-four counties were examined for compliance on the economic area level. Where there were sufficient sales data, the neighborhood and subdivision levels were tested for compliance. Although counties are determined to be in or out of compliance at the class level, non-compliant economic areas, neighborhoods and subdivisions (where applicable) were discussed with the Assessor.

Data on the individual economic areas, neighborhoods and subdivisions are found in the STATISTICAL APPENDIX.

Conclusions

For this final analysis report, the minimum acceptable statistical standards allowed by the State Board of Equalization are:

ALLOWABLE STANDARDS RATIO GRID		
Property Class	**Unweighted Median Ratio**	**Coefficient of Dispersion**
Commercial/Industrial	Between .95-1.05	Less than 20.99
Condominium	Between .95-1.05	Less than 15.99
Single Family	Between .95-1.05	Less than 15.99
Vacant Land	Between .95-1.05	Less than 20.99

The results for Arapahoe County are:

Arapahoe County Ratio Grid					
Property Class	Number of Qualified Sales	Unweighted Median Ratio	Price Related Differential	Coefficient of Dispersion	Time Trend Analysis
Commercial/Industrial	249	0.986	1.017	8.7	Compliant
Single Family	18,697	1.000	1.002	1.8	Compliant
Vacant Land	142	1.011	1.026	20.1	Compliant

After applying the above described methodologies, it is concluded from the sales ratios that Arapahoe County is in compliance with SBOE, DPT, and Colorado State Statute valuation guidelines.

Recommendations

None

TIME TRENDING VERIFICATION

Methodology

While we recommend that counties use the inverted ratio regression analysis method to account for market (time) trending, some counties have used other IAAO-approved methods, such as the weighted monthly median approach. We are not auditing the methods used, but rather the results of the methods used. Given this range of methodologies used to account for market trending, we concluded that the best validation method was to examine the sale ratios for each class across the appropriate sale period. To be specific, if a county has considered and adjusted correctly for market trending, then the sale ratios should remain stable (i.e. flat) across the sale period. If a residual market trend is detected, then the county may or may not have addressed market trending adequately, and a further examination is warranted. This validation method also considers the number of sales and the length of the sale period. Counties with few sales across the sale period were carefully examined to determine if the statistical results were valid.

Conclusions

After verification and analysis, it has been determined that Arapahoe County has complied with the statutory requirements to analyze the effects of time on value in their county. Arapahoe County has also satisfactorily applied the results of their time trending analysis to arrive at the time adjusted sales price (TASP).

Recommendations

None

SOLD/UNSOLD ANALYSIS

Methodology

Arapahoe County was tested for the equal treatment of sold and unsold properties to ensure that "sales chasing" has not occurred. The auditors employed a multi-step process to determine if sold and unsold properties were valued in a consistent manner.

We test the hypothesis that the assessor has valued unsold properties consistent with what is observed with the sold properties based on several units of comparison and tests. The units of comparison include the actual value per square foot and the change in value from the previous base year period to the current base year. The first test compares the actual value per square foot between sold and unsold properties by class. The median and mean value per square foot is compared and tested for any significant difference. This is tested using non-parametric methods, such as the Mann-Whitney test for differences in the distributions or medians between sold and unsold groups. It is also examined graphically and from an appraisal perspective. Data can be stratified based on location and subclass. The second test compares the difference in the median change in value from the previous base year to the current base year between sold and unsold properties by class. The same combination of non-parametric and appraisal testing is used as with the first test. A third test employing a valuation model testing a sold/unsold binary variable while controlling for property attributes such as location, size, age and other attributes. The model determines if the sold/unsold variable is statistically and empirically significant. If all three tests indicate a significant difference between sold and unsold properties for a given class, the Auditor may meet with the county to determine if sale chasing is actually occurring,

or if there are other explanations for the observed difference.

If the unsold properties have a higher median value per square foot than the sold properties, or if the median change in value is greater for the unsold properties than the sold properties, the analysis is stopped and the county is concluded to be in compliance with sold and unsold guidelines. All sold and unsold properties in a given class are first tested, although properties with extreme unit values or percent changes can be trimmed to stabilize the analysis. The median is the primary comparison metric, although the mean can also be used as a comparison metric if the distribution supports that type of measure of central tendency.

The first test (unit value method) is applied to both residential and commercial/industrial sold and unsold properties. The second test is applied to sold and unsold vacant land properties. The second test (change in value method) is also applied to residential or commercial sold and unsold properties if the first test results in a significant difference observed and/or tested between sold and unsold properties. The third test (valuation modeling) is used in instances where the results from the first two tests indicate a significant difference between sold and unsold properties. It can also be used when the number of sold and unsold properties is so large that the non-parametric testing is indicating a false rejection of the hypothesis that there is no difference between the sold and unsold property values.

These tests were supported by both tabular and graphics presentations, along with written documentation explaining the methodology used.

Sold/Unsold Results	
Property Class	**Results**
Commercial/Industrial	Compliant
Single Family	Compliant
Vacant Land	Compliant

Conclusions

After applying the above described methodologies, it is concluded that Arapahoe County is reasonably treating its sold and unsold properties in the same manner.

Recommendations

None

AGRICULTURAL LAND STUDY

Acres By Subclass

Sprinkler 0.59%

Grazing 45.99%

Dry Farm 53.42%

Value By Subclass
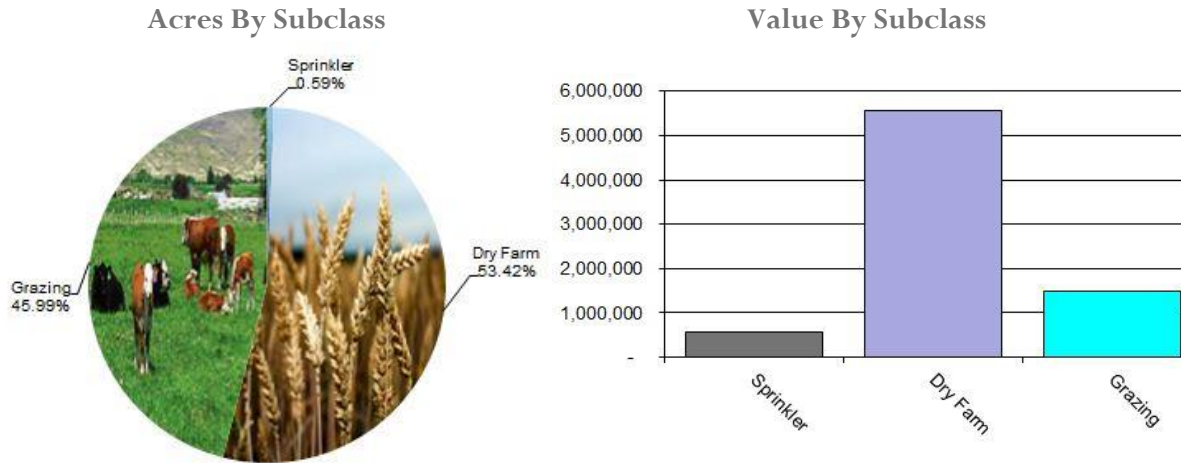
Agricultural Land

County records were reviewed to determine major land categories such as irrigated farm, dry farm, meadow hay, grazing and other lands. In addition, county records were reviewed in order to determine if: Aerial photographs are available and are being used; soil conservation guidelines have been used to classify lands based on productivity; crop rotations have been documented; typical commodities and yields have been determined; orchard lands have been properly classified and valued; expenses reflect a ten year average and are typical landlord expenses; grazing lands have been properly classified and valued; the number of acres in each class and subclass have been determined; the capitalization rate was properly applied. Also, documentation was required for the valuation methods used and any locally developed yields, carrying capacities, and expenses. Records were also checked to ensure that the commodity prices and expenses, furnished by the Property Tax Administrator (PTA), were applied properly.

(See Assessor Reference Library Volume 3 Chapter 5.)

Conclusions

An analysis of the agricultural land data indicates an acceptable appraisal of this property type. Directives, commodity prices and expenses provided by the PTA were properly applied. County yields compared favorably to those published by Colorado Agricultural Statistics. Expenses used by the county were allowable expenses and were in an acceptable range. Grazing lands carrying capacities were in an acceptable range. The data analyzed resulted in the following ratios:

Arapahoe County Agricultural Land Ratio Grid						
Abstract Code	Land Class	Number Of Acres	County Value Per Acre	County Assessed Total Value	WRA Total Value	Ratio
4107	Sprinkler	1,799	282.48	508,175	512,399	0.99
4127	Dry Farm	161,692	31.29	5,058,880	5,011,842	1.01
4147	Grazing	139,198	9.57	1,332,288	1,332,288	1.00
Total/Avg		309,436	22.30	6,899,343	6,856,529	1.01

Recommendations

None

Agricultural Outbuildings

Methodology

Data was collected and reviewed to determine if the guidelines found in the Assessor's Reference Library (ARL) Volume 3, pages 5.74 through 5.77 were being followed.

Conclusions

Arapahoe County has complied with the procedures provided by the Division of Property Taxation for the valuation of agricultural outbuildings.

Recommendations

None

Agricultural Land Under Improvements

Methodology

Data was collected and reviewed to determine if the guidelines found in the Assessor's Reference Library (ARL) Volume 3, pages 5.19 and 5.20 were being followed.

Conclusions

Arapahoe County has used the following methods to discover land under a residential improvement on a farm or ranch that is determined to be not integral under 39-1-102, C.R.S.:

- Questionnaires
- Field Inspections
- Phone Interviews
- In-Person Interviews with Owners/Tenants
- Written Correspondence other than Questionnaire
- Personal Knowledge of Occupants at Assessment Date
- Aerial Photography/Pictometry

Arapahoe County has used the following methods to discover the land area under a residential improvement that is determined to be not integral under 39-1-102, C.R.S.:

- Questionnaires
- Field Inspections
- Phone Interviews
- In-Person Interviews with Owners/Tenants
- Written Correspondence other than Questionnaire
- Personal Knowledge of Occupants at Assessment Date
- Aerial Photography/Pictometry

Arapahoe County has complied with the procedures provided by the Division of Property Taxation for the valuation of land under residential improvements that may or may not be integral to an agricultural operation.

Recommendations

None

SALES VERIFICATION

According to Colorado Revised Statutes:

A representative body of sales is required when considering the market approach to appraisal.

(8) In any case in which sales prices of comparable properties within any class or subclass are utilized when considering the market approach to appraisal in the determination of actual value of any taxable property, the following limitations and conditions shall apply:

(a)(I) Use of the market approach shall require a representative body of sales, including sales by a lender or government, sufficient to set a pattern, and appraisals shall reflect due consideration of the degree of comparability of sales, including the extent of similarities and dissimilarities among properties that are compared for assessment purposes. In order to obtain a reasonable sample and to reduce sudden price changes or fluctuations, all sales shall be included in the sample that reasonably reflect a true or typical sales price during the period specified in section 39-1-104 (10.2). Sales of personal property exempt pursuant to the provisions of sections 39-3-102, 39-3-103, and 39-3-119 to 39-3-122 shall not be included in any such sample.

(b) Each such sale included in the sample shall be coded to indicate a typical, negotiated sale, as screened and verified by the assessor. (39-1-103, C.R.S.)

The assessor is required to use sales of real property only in the valuation process.

(8)(f) Such true and typical sales shall include only those sales which have been determined on an individual basis to reflect the selling price of the real property only or which have been adjusted on an individual basis to reflect the selling price of the real property only. (39-1-103, C.R.S.)

Part of the Property Assessment Study is the sales verification analysis. WRA has used the above-cited statutes as a guide in our study of the county's procedures and practices for verifying sales.

WRA reviewed the sales verification procedures in 2022 for Arapahoe County. This study was conducted by checking selected sales from the master sales list for the current valuation period. Specifically WRA selected 61 sales listed as unqualified.

All of the sales in the unqualified sales sample had reasons that were clear and supportable.

For residential, commercial, and vacant land sales with considerations over $100,000, the contractor has examined and reported the ratio of qualified sales to total sales by class and performed the following analyses of unqualified sales:

> The contractor has examined the manner in which sales have been classified as qualified or unqualified, including a listing of each step in the sales verification process, any adjustment procedures, and the county official responsible for making the final decision on qualification.

> The contractor has reviewed with the assessor any analysis indicating that sales data are inadequate, fail to reflect typical properties, or have been disqualified for insufficient cause. In addition, the contractor has reviewed the disqualified sales by assigned code. If there appears to be any inconsistency in the coding, the contractor has

conducted further analysis to determine if the sales included in that code have been assigned appropriately.

Conclusions

Arapahoe County appears to be doing an adequate job of verifying their sales. WRA agreed with the county's reason for disqualifying each of the sales selected in the sample. There are no recommendations or suggestions.

Recommendations

None

ECONOMIC AREA REVIEW AND EVALUATION

Methodology

Arapahoe County has submitted a written narrative describing the economic areas that make up the county's market areas. Arapahoe County has also submitted a map illustrating these areas. Each of these narratives have been read and analyzed for logic and appraisal sensibility. The maps were also compared to the narrative for consistency between the written description and the map.

Conclusions

After review and analysis, it has been determined that Arapahoe County has adequately identified homogeneous economic areas comprised of smaller neighborhoods. Each economic area defined is equally subject to a set of economic forces that impact the value of the properties within that geographic area and this has been adequately addressed. Each economic area defined adequately delineates an area that will give "similar values for similar properties in similar areas."

Recommendations

None

NATURAL RESOURCES

Earth and Stone Products

Methodology

Under the guidelines of the Assessor's Reference Library (ARL), Volume 3, Natural Resource Valuation Procedures, the income approach was applied to determine value for production of earth and stone products. The number of tons was multiplied by an economic royalty rate determined by the Division of Property Taxation to determine income. The income was multiplied by a recommended Hoskold factor to determine the actual value. The Hoskold factor is determined by the life of the reserves or the lease. Value is based on two variables: life and tonnage. The operator determines these since there is no other means to obtain production data through any state or private agency.

Conclusions

The County has applied the correct formulas and state guidelines to earth and stone production.

Recommendations

None

Producing Oil and Gas

Methodology

Assessors Reference Library (ARL) Volume 3, Chapter 6: Valuation of Natural Resources

STATUTORY REFERENCES

Section § 39-1-103, C.R.S., specifies that producing oil or gas leaseholds and lands are valued according to article 7 of title 39, C.R.S. Actual value determined - when.

(2) The valuation for assessment of leaseholds and lands producing oil or gas shall be determined as provided in article 7 of this title. § 39-1-103, C.R.S.

Article 7 covers the listing, valuation, and assessment of producing oil and gas leaseholds and lands.

Valuation:
Valuation for assessment.
(1) Except as provided in subsection (2) of this section, on the basis of the information contained in such statement, the assessor shall value such oil and gas leaseholds and lands for assessment, as real property, at an amount equal to eighty-seven and one-half percent of:
(a) The selling price of the oil or gas sold there from during the preceding calendar year, after excluding the selling price of all oil or gas delivered to the United States government or any agency thereof, the state of Colorado or any agency thereof, or any political subdivision of the state as royalty during the preceding calendar year;
(b) The selling price of oil or gas sold in the same field area for oil or gas transported from the premises which is not sold during the preceding calendar year, after excluding the selling price of all oil or gas delivered to the United States government or any agency thereof, the state of Colorado or any agency thereof, or any political subdivision of the state as royalty during the preceding calendar year. § 39-7-102, C.R.S.

Conclusions

The county applied approved appraisal procedures in the valuation of oil and gas.

Recommendations

None

VACANT LAND

Subdivision Discounting

Subdivisions were reviewed in 2022 in Arapahoe County. The review showed that subdivisions were discounted pursuant to the Colorado Revised Statutes in Article 39-1-103 (14) and by applying the recommended methodology in ARL Vol 3, Chap 4. Subdivision Discounting in the intervening year can be accomplished by reducing the absorption period by one year.

In instances where the number of sales within an approved plat was less than the absorption rate per year calculated for the plat, the absorption period was left unchanged.

Conclusions

Arapahoe County has implemented proper procedures to adequately estimate absorption periods, discount rates, and lot values for qualifying subdivisions.

Recommendations

None

POSSESSORY INTEREST PROPERTIES

Possessory Interest

Possessory interest property discovery and valuation is described in the Assessor's Reference Library (ARL) Volume 3 section 7 in accordance with the requirements of Chapter 39-1-103 (17)(a) (II) C.R.S. Possessory Interest is defined by the Property Tax Administrator's Publication ARL Volume 3, Chapter 7: A private property interest in government-owned property or the right to the occupancy and use of any benefit in government-owned property that has been granted under lease, permit, license, concession, contract, or other agreement.

Arapahoe County has been reviewed for their procedures and adherence to guidelines when assessing and valuing agricultural and commercial possessory interest properties. The county has also been queried as to their confidence that the possessory interest properties have been discovered and placed on the tax rolls.

Conclusions

Arapahoe County has implemented a discovery process to place possessory interest properties on the roll. They have also correctly and consistently applied the correct procedures and valuation methods in the valuation of possessory interest properties.

Recommendations

None

PERSONAL PROPERTY AUDIT

Arapahoe County was studied for its procedural compliance with the personal property assessment outlined in the Assessor's Reference Library (ARL) Volume 5, and in the State Board of Equalization (SBOE) requirements for the assessment of personal property. The SBOE requires that counties use ARL Volume 5, including current discovery, classification, documentation procedures, current economic lives table, cost factor tables, depreciation table, and level of value adjustment factor table.

The personal property audit standards narrative must be in place and current. A listing of businesses that have been audited by the assessor within the twelve-month period reflected in the plan is given to the auditor. The audited businesses must be in conformity with those described in the plan.

Aggregate ratio will be determined solely from the personal property accounts that have been physically inspected. The minimum assessment sample is one percent or ten schedules, whichever is greater, and the maximum assessment audit sample is 100 schedules.

For the counties having over 100,000 population, WRA selected a sample of all personal property schedules to determine whether the assessor is correctly applying the provisions of law and manuals of the Property Tax Administrator in arriving at the assessment levels of such property. This sample was selected from the personal property schedules audited by the assessor. In no event was the sample selected by the contractor less than 30 schedules. The counties to be included in this study are Adams, Arapahoe, Boulder, Denver, Douglas, El Paso, Jefferson, Larimer, Mesa, Pueblo, and Weld. All other counties received a procedural study.

Arapahoe County is compliant with the guidelines set forth in ARL Volume 5 regarding discovery procedures, using the following methods to discover personal property accounts in the county:

- Public Record Documents
- Chamber of Commerce/Economic Development Contacts
- Personal Observation, Physical Canvassing or Word of Mouth
- Physically verifying 1/3 of county annually

The county uses the Division of Property Taxation (DPT) recommended classification and documentation procedures. The DPT's recommended cost factor tables, depreciation tables and level of value adjustment factor tables are also used.

Arapahoe County submitted their personal property written audit plan and was current for the 2022 valuation period. The number and listing of businesses audited was also submitted and was in conformance with the written audit plan. The following audit triggers were used by the county to select accounts to be audited:

- Accounts with obvious discrepancies
- New businesses filing for the first time
- Incomplete or inconsistent declarations
- Businesses with no deletions or additions for 2 or more years
- Non-filing Accounts - Best Information Available
- Accounts protested with substantial disagreement

Arapahoe County's median ratio is 1.00. This is in compliance with the State Board of Equalization (SBOE) compliance requirements which range from .90 to 1.10 with no COD requirements.

Conclusions

Arapahoe County has employed adequate discovery, classification, documentation, valuation, and auditing procedures for their personal property assessment and is in statistical compliance with SBOE requirements.

Recommendations

None

WILDROSE AUDITOR STAFF

Harry J. Fuller, *Audit Project Manager*

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APPENDICES

STATISTICAL COMPLIANCE REPORT
FOR ARAPAHOE COUNTY
2022

I. OVERVIEW

Arapahoe County is an urban county that is part of the Denver metropolitan area. The county has a total of 219,697 real property parcels, according to data submitted by the county assessor's office in 2022. The following provides a breakdown of property classes for this county:
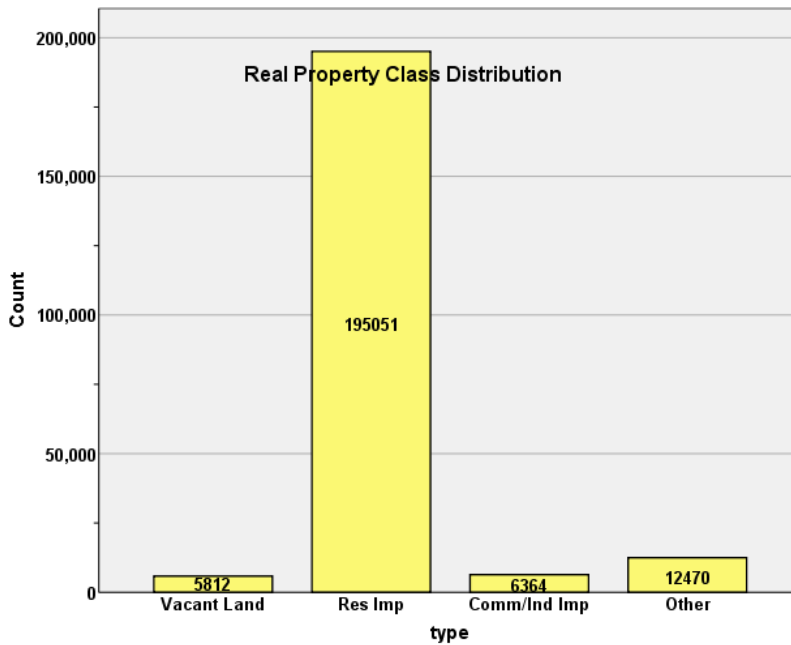
The vacant land class of properties was dominated by residential land. Residential and PUD lots (coded 100 and 400) accounted for 78.0% of all vacant land parcels.

For residential improved properties, single family properties accounted 84.6% of all residential properties. The next significant subclass of properties was condominiums (coded 1230), which accounted for 14.3% of all properties.

Commercial and industrial properties represented a much smaller proportion of property classes in comparison Commercial/industrial sales accounted for 2.9% of all such properties in this county.

II. DATA FILES

The following sales analyses were based on the requirements of the 2022 Colorado Property Assessment Study. Information was provided by the Arapahoe Assessor's Office in May 2022. The data included all 5 property record files as specified by the Auditor.

III. RESIDENTIAL SALES RESULTS

There were 18,697 qualified residential sales for the 18-month sale period ending June 30, 2020. The sales ratio analysis was as follows:

Ratio Statistics

Median	1.000
Price Related Differential	1.002
Coefficient of Dispersion	1.8

We next stratified the sales ratio analysis by economic area and by neighborhoods, the latter with at least 30 sales:

Case Processing Summary

		Count	Percent
ECONAREA	1	36	0.2%
	2	64	0.3%
	3	479	2.6%
	4	416	2.2%
	5	700	3.8%
	6	307	1.6%
	7	750	4.0%
	8	3792	20.3%
	9	276	1.5%
	10	1859	10.0%
	11	3686	19.8%
	12	223	1.2%
	13	564	3.0%
	14	935	5.0%
	15	107	0.6%
	16	568	3.0%
	18	3602	19.3%
	19	223	1.2%
	103	1	0.0%
	104	20	0.1%
	105	1	0.0%
	106	3	0.0%
	107	1	0.0%
	108	1	0.0%
	109	1	0.0%
	110	1	0.0%
	111	1	0.0%
	112	9	0.0%
	113	17	0.1%
	114	4	0.0%
	117	1	0.0%
Overall		18648	100.0%
Excluded		49	
Total		18697	

Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion
1	.999	1.001	.014
2	1.000	1.001	.016
3	1.001	1.002	.019
4	1.000	1.001	.017
5	1.000	1.001	.016
6	1.000	1.004	.026
7	1.000	1.000	.017
8	1.000	1.001	.018
9	1.000	1.001	.026
10	1.000	1.000	.016
11	1.001	1.000	.020
12	1.000	1.006	.045
13	1.000	1.002	.017
14	1.000	1.001	.018
15	1.000	1.004	.023
16	1.000	.999	.026
18	1.000	1.000	.015
19	1.000	.999	.012
103	.916	1.000	.000
104	.974	1.003	.038
105	.917	1.000	.000
106	.952	.999	.008
107	1.020	1.000	.000
108	1.007	1.000	.000
109	.990	1.000	.000
110	.905	1.000	.000
111	.792	1.000	.000
112	.959	1.001	.025
113	.972	1.000	.039
114	.935	1.001	.016
117	.997	1.000	.000
Overall	1.000	1.002	.018

For the 19 economic areas with at least 30 sales, the median sales ratio and coefficient of dispersion metrics were all in compliance. We next stratified residential sales by neighborhoods with at least 30 sales, as follows:

Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion
2	1.003	1.001	.020
11	1.000	1.000	.013
22	.999	1.000	.014
32	.999	1.002	.034
36	1.000	1.000	.011
38	1.000	1.000	.010
45	1.006	1.000	.022
102	1.000	1.002	.020
110	.999	1.000	.008
111	1.000	1.001	.012
112	1.001	1.000	.011

115	.999	1.001	.022
149	1.001	1.000	.011
174	.998	1.001	.024
218	.998	1.001	.027
226	.997	1.002	.021
231	.997	1.007	.049
247	1.001	1.001	.015
248	1.000	1.003	.022
263	1.000	1.001	.014
264	1.000	1.001	.009
271	1.000	1.000	.006
273	1.000	1.001	.020
285	1.000	1.001	.012
304	1.000	1.001	.015
324	1.000	1.001	.022
344	1.002	1.003	.044
366	1.021	1.001	.020
374	1.000	1.000	.010
380	1.000	1.000	.009
387	.999	1.000	.013
391	1.000	1.001	.014
423	.998	1.000	.034
431	1.001	1.000	.018
457	1.000	1.001	.007
458	1.000	1.001	.014
481	.997	1.000	.024
509	1.000	1.001	.012
564	1.001	1.002	.036
594	1.002	1.003	.039
596	1.001	1.000	.015
601	1.003	1.001	.024
606	1.007	1.001	.027
607	1.001	1.000	.009
609	.999	1.001	.017
613	1.003	1.001	.017
616	1.014	1.000	.042
619	1.002	1.001	.022
628	1.009	1.001	.027
629	1.004	1.001	.013
630	1.002	1.000	.020
648	.999	1.000	.015
654	1.005	1.000	.014
655	1.002	1.001	.027
683	.999	1.000	.014
701	1.000	1.000	.013
702	.998	1.000	.013
718	1.002	1.002	.023
758	.993	1.000	.019
759	1.011	1.001	.028
761	1.001	1.000	.013
763	.999	1.001	.009
844	.992	1.001	.027
847	1.000	1.001	.012
881	.990	1.001	.018
915	1.000	1.002	.020
960	1.000	1.000	.012
1018	1.000	1.001	.014

1021	1.000	1.000	.011
1024	1.001	1.001	.021
1046	1.000	1.001	.018
1047	.999	1.001	.015
1054	1.000	1.001	.014
1090	.999	1.002	.024
1097	1.000	1.002	.026
1116	1.000	1.001	.020
1172	1.003	1.000	.031
1210	.998	1.001	.019
1291	1.001	1.001	.016
1313	1.001	1.000	.010
1324	1.000	1.001	.012
1454	1.000	1.000	.008
1456	1.009	1.002	.042
1564	.999	1.001	.015
1566	1.000	1.001	.012
1583	1.001	1.000	.008
1586	1.001	1.000	.010
1588	1.001	1.001	.009
1589	.999	1.000	.009
1590	1.000	1.000	.011
1591	1.000	1.000	.016
1647	.999	1.001	.016
1659	1.000	1.001	.021
1725	.999	1.001	.017
1763	1.000	1.000	.009
1766	1.000	1.000	.008
1776	1.000	1.002	.022
1808	1.002	1.001	.014
1811	1.002	1.002	.028
1834	1.006	1.005	.065
1860	1.000	1.001	.015
1863	1.001	1.001	.007
1866	1.001	1.001	.013
1876	.998	1.000	.017
1903	.992	.998	.031
1907	1.001	1.001	.012
1913	.999	1.000	.009
1918	.997	1.002	.030
1921	1.000	1.000	.009
1923	1.000	1.001	.015
1936	1.000	1.000	.006
1939	.999	1.001	.020
1940	1.000	1.000	.010
1947	1.001	1.002	.032
1978	1.001	1.000	.013
1982	1.001	1.001	.018
1983	1.003	1.001	.023
1984	1.000	1.000	.017
1987	.995	1.001	.024
2000	1.000	1.000	.005
2007	.999	1.000	.014
2017	1.001	1.001	.010
2025	.999	1.002	.030
2050	.999	1.000	.016
2052	1.001	1.001	.017

2053	1.002	1.000	.019
2060	1.000	1.000	.024
2068	.997	1.001	.026
2074	.999	1.001	.015
2076	1.006	1.003	.034
2083	1.005	1.000	.009
2085	1.000	1.001	.026
2086	1.002	1.001	.020
2088	1.015	1.004	.053
2094	.997	1.001	.025
2101	1.001	1.000	.008
2106	.997	1.002	.034
2107	1.002	1.002	.012
2108	1.010	1.002	.031
2110	1.002	.996	.033
2126	1.001	1.001	.015
2131	.997	1.001	.017
2133	1.000	1.003	.030
2146	1.000	1.001	.022
2161	.999	1.000	.011
2162	.999	1.001	.016
2172	1.000	1.001	.012
2181	1.000	1.000	.020
2193	1.015	1.001	.039
2238	1.002	1.001	.018
2250	1.001	1.001	.017
2270	.997	1.002	.027
2276	1.001	1.000	.013
2289	1.005	1.001	.029
2291	1.002	1.002	.026
2294	1.000	1.002	.019
2300	1.000	1.000	.013
2306	1.001	1.000	.013
2313	1.000	1.000	.011
2317	.999	1.000	.006
2327	1.001	1.001	.013
2332	1.002	1.001	.018
2333	1.009	1.001	.026
2334	.997	1.001	.023
2335	1.014	1.001	.024
2363	1.001	1.000	.008
2405	1.000	1.000	.010
2414	1.000	1.001	.016
2448	1.009	1.003	.044
2465	.999	1.001	.018
2473	1.000	1.000	.011
2477	1.015	1.002	.046
2490	.989	1.001	.030
2500	1.002	1.001	.015
2516	1.001	1.000	.015
2549	1.000	1.000	.011
2613	1.000	1.000	.012
2688	.997	1.000	.015
2752	.999	1.001	.014
2764	1.000	1.001	.012
2766	1.004	1.002	.031
2779	1.002	1.001	.032

2798	1.003	1.001	.022
2801	1.002	1.000	.016
2902	1.000	1.000	.007
2906	.999	1.000	.010
2913	1.000	1.001	.026
2938	1.001	1.000	.009
2939	1.001	1.001	.013
Overall	1.000	1.000	.020

The above ratio statistics, stratified by neighborhoods, were in compliance with the standards set forth by the Colorado State Board of Equalization (SBOE) for the overall residential sales. The following graphs describe further the sales ratio distribution for all of these properties:

ALL SALES

SALES LESS THAN $4,000,000
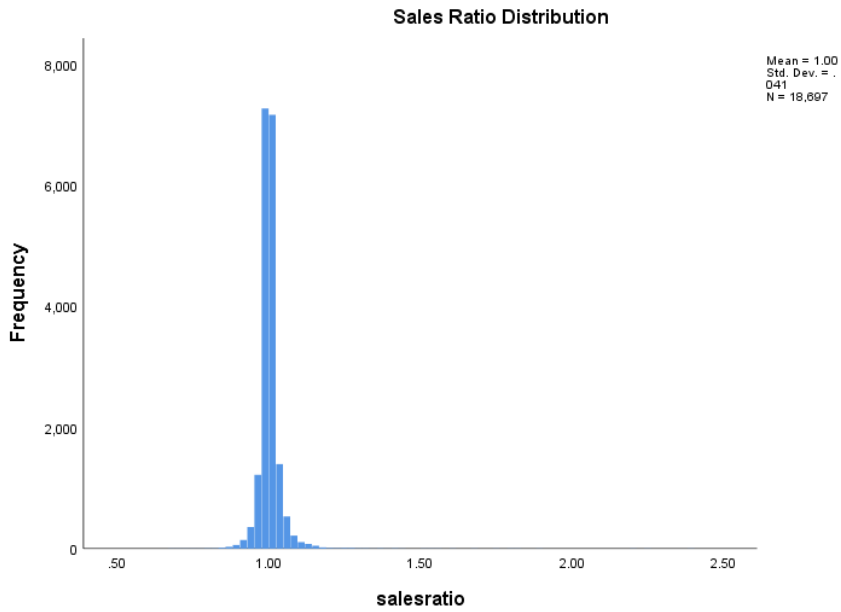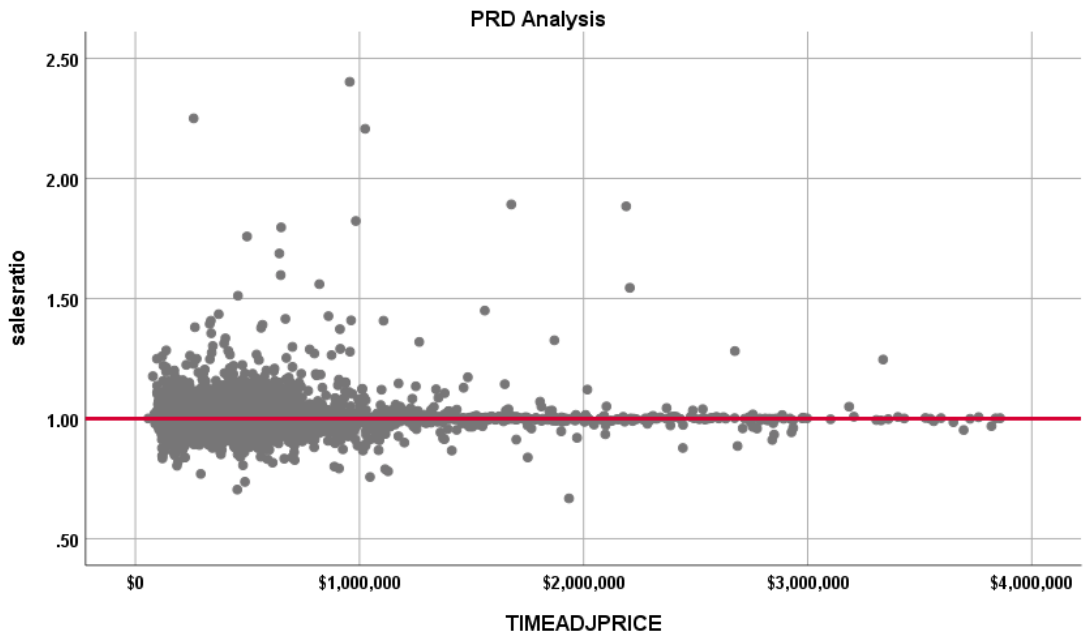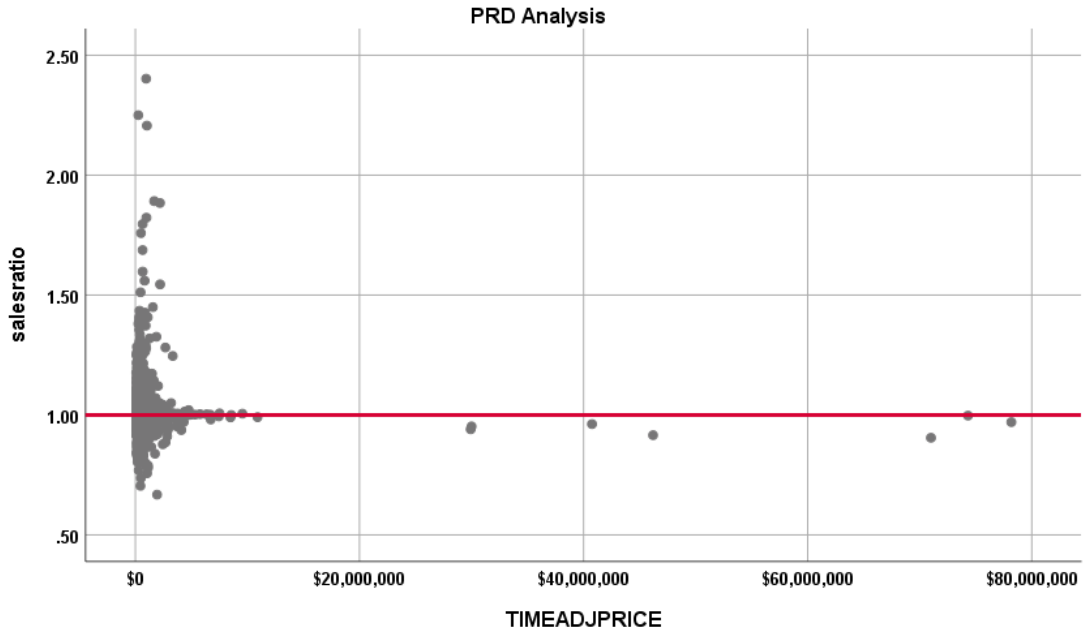
Subclass 1212 PRD Analysis

We next analyzed residential properties identified as 1212 using the state abstract code system. These include single family residences, town homes and purged manufactured homes. The following indicates the distribution of sales ratios across the sale price spectrum:
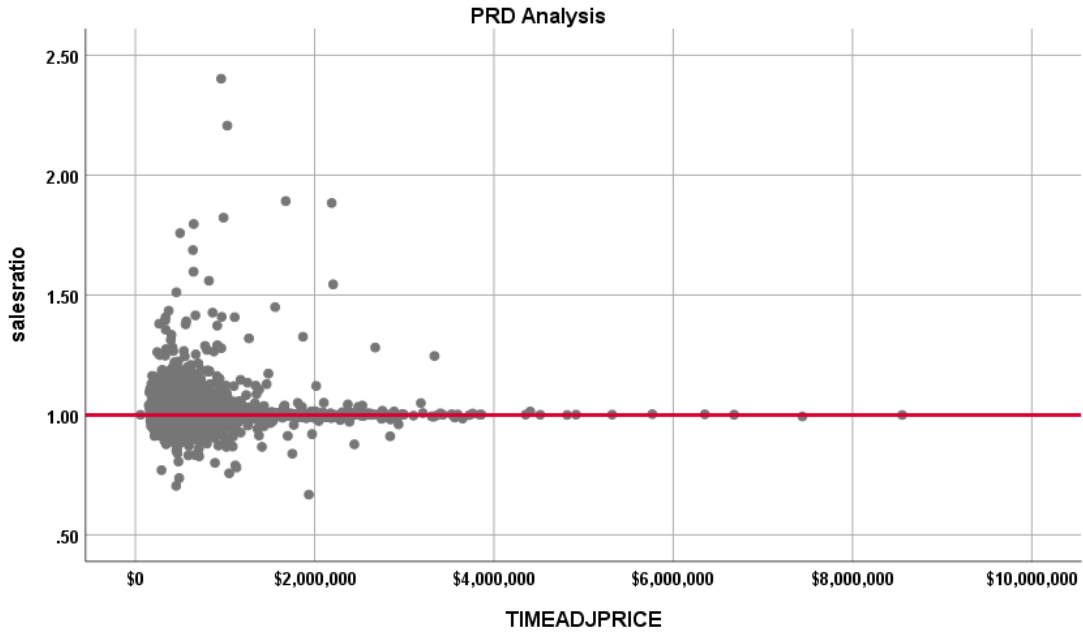
PRD Analysis

The Price-Related Differential (PRD) for 1212 sales is 0.999. This is within the IAAO standards for the PRD. We also performed a regression analysis between the sales ratio and the assessor's current value to further test for regressivity or progressivity in the residential sales valuation, as follows:

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.996	.001		1676.434	.000
	CurrTot	.0000000161	.000	.127	15.788	.000

a. Dependent Variable: salesratio

At 0.0000000161, the slope of the line is not significant, which indicates that sales ratios are similar across the entire sale price array. We also stratified the sales ratio analysis by the sale price range, as follows:

Case Processing Summary

		Count	Percent
SPRec	LT $300K	1246	8.2%
	$300K to $400K	4838	31.9%
	$400K to $500K	4540	29.9%
	$500K to $600K	2208	14.6%
	$600K to $750K	1297	8.5%
	$750K to $1000K	561	3.7%
	$1000K to $2000K	367	2.4%
	Over $2000K	115	0.8%
Overall		15172	100.0%
Excluded		0	
Total		15172	

Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
LT $300K	1.002	1.000	.020	3.5%
$300K to $400K	1.001	1.000	.014	2.6%
$400K to $500K	1.000	1.000	.015	3.1%
$500K to $600K	1.000	1.000	.016	3.1%
$600K to $750K	1.000	1.000	.021	5.0%
$750K to $1000K	1.000	.999	.027	8.9%
$1000K to $2000K	1.000	1.000	.028	9.8%
Over $2000K	1.000	1.003	.027	10.6%
Overall	1.000	.999	.017	4.0%

The above indicates that the sales ratio distribution was more or less consistent across the sale price range for Arapahoe County.

Residential Market Trend Analysis

We next analyzed the residential dataset using the 18-month sale period, with the following results:

Coefficients[a]

ECONAREA	Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
.	1	(Constant)	.998	.009		112.324	.000
		SalePeriod	.000	.001	.067	.459	.648
1	1	(Constant)	1.002	.006		156.480	.000
		SalePeriod	.000	.001	.051	.298	.768
2	1	(Constant)	.991	.008		121.045	.000
		SalePeriod	.001	.001	.162	1.296	.200
3	1	(Constant)	.998	.003		350.727	.000
		SalePeriod	.000	.000	.061	1.340	.181
4	1	(Constant)	1.004	.003		332.469	.000
		SalePeriod	.000	.000	-.067	-1.361	.174
5	1	(Constant)	1.002	.002		410.067	.000
		SalePeriod	.000	.000	.016	.416	.678
6	1	(Constant)	1.005	.005		190.888	.000
		SalePeriod	.000	.001	-.011	-.197	.844
7	1	(Constant)	1.005	.002		425.497	.000
		SalePeriod	.000	.000	-.071	-1.949	.052
8	1	(Constant)	1.004	.001		1102.364	.000
		SalePeriod	.000	.000	-.041	-2.506	.012
9	1	(Constant)	1.009	.005		203.101	.000
		SalePeriod	-.001	.000	-.111	-1.853	.065
10	1	(Constant)	1.005	.001		689.670	.000
		SalePeriod	.000	.000	-.058	-2.483	.013
11	1	(Constant)	1.005	.001		845.295	.000
		SalePeriod	.000	.000	.025	1.533	.125
12	1	(Constant)	1.000	.018		54.170	.000

			B	Std. Error	Beta	t	Sig.
		SalePeriod	.003	.002	.111	1.657	.099
13	1	(Constant)	1.007	.005		197.124	.000
		SalePeriod	.000	.001	-.012	-.283	.777
14	1	(Constant)	1.003	.002		402.066	.000
		SalePeriod	9.696E-5	.000	.013	.388	.698
15	1	(Constant)	1.019	.011		92.214	.000
		SalePeriod	-.001	.001	-.109	-1.124	.263
16	1	(Constant)	1.023	.008		135.227	.000
		SalePeriod	-.001	.001	-.063	-1.500	.134
18	1	(Constant)	1.003	.001		1198.997	.000
		SalePeriod	-5.787E-5	.000	-.011	-.675	.500
19	1	(Constant)	1.003	.003		361.162	.000
		SalePeriod	.000	.000	-.077	-1.152	.251
104	1	(Constant)	.978	.032		30.116	.000
		SalePeriod	.000	.003	-.009	-.038	.970
106	1	(Constant)	.956	.028		34.580	.018
		SalePeriod	-.001	.003	-.177	-.179	.887
112	1	(Constant)	.928	.020		45.707	.000
		SalePeriod	.004	.003	.406	1.176	.278
113	1	(Constant)	.942	.022		43.723	.000
		SalePeriod	.003	.002	.356	1.473	.161
114	1	(Constant)	.924	.014		65.981	.000
		SalePeriod	.002	.002	.567	.974	.433

a. Dependent Variable: salesratio

The above analysis indicated that no significant residential market trend was present in the sale data within each economic area. We concluded that the assessor has adequately adjusted for market trending for residential properties.

Sold/Unsold Analysis

In terms of the valuation consistency between sold and unsold residential properties, we compared the median actual value per square foot for 2022 between each group. The following results present the overall results, as well as by economic area, for sold and unsold properties:

Report
VALSF

sold	N	Median	Mean
UNSOLD	176327	$237	$258
SOLD	18696	$240	$260

Report
VALSF

ECONAREA	sold	N	Median	Mean
1	UNSOLD	297	$361	$349
	SOLD	36	$357	$350
2	UNSOLD	993	$314	$316
	SOLD	64	$366	$363
3	UNSOLD	4897	$231	$244
	SOLD	479	$235	$242
4	UNSOLD	5230	$260	$261

	SOLD	416	$282	$283
5	UNSOLD	8115	$220	$231
	SOLD	700	$222	$235
6	UNSOLD	3390	$206	$216
	SOLD	307	$206	$216
7	UNSOLD	7588	$202	$207
	SOLD	750	$211	$214
8	UNSOLD	29885	$214	$224
	SOLD	3792	$220	$227
9	UNSOLD	2151	$204	$210
	SOLD	276	$206	$214
10	UNSOLD	23751	$258	$272
	SOLD	1859	$276	$293
11	UNSOLD	28539	$230	$241
	SOLD	3686	$235	$248
12	UNSOLD	3586	$440	$470
	SOLD	223	$452	$477
13	UNSOLD	6176	$305	$312
	SOLD	564	$315	$325
14	UNSOLD	8701	$362	$406
	SOLD	934	$373	$390
15	**UNSOLD**	**1508**	**$302**	**$302**
	SOLD	**107**	**$346**	**$337**
16	UNSOLD	6991	$273	$295
	SOLD	568	$282	$308
18	UNSOLD	31178	$226	$235
	SOLD	3602	$234	$242
19	UNSOLD	1358	$245	$249
	SOLD	223	$224	$237

There was one economic areas with greater than 10 percent difference in the median value per square foot between sold and unsold properties (in red) – for this economic area, we next compared the median change in taxable years 2018 and 2020 between sold and unsold properties for these two economic areas. This test indicated a difference of less than 5 percent. Based on these results, we concluded that there was no significant gap in value between residential sold and unsold properties by economic area for Arapahoe County.

We next compared residential sold and unsold properties for neighborhood with at least 30 sales using the median value per square foot method. Neighborhoods with more than a 10 percent difference in the value per square foot test were identified, as follows:

VALSF NBHD		N	Median	Mean			DIFF NBHD		N	Median	Mean		
36	UNSOLD	682	$222	$249			36	0	682	1.09	1.10		
	SOLD	44	$284	$269	-28%	-8%		1	44	1.13	1.13	-3%	-3%
102	UNSOLD	1218	$242	$246			102	0	1218	1.09	1.09		
	SOLD	103	$216	$239	11%	3%		1	103	1.09	1.09	0%	0%
457	UNSOLD	468	$268	$274			457	0	468	1.04	1.03		
	SOLD	37	$313	$303	-17%	-10%		1	37	1.06	1.06	-2%	-2%
628	UNSOLD	190	$195	$199			628	0	3	1.14	1.13		
	SOLD	30	$220	$220	-13%	-10%		1	21	1.15	1.22	-1%	-9%
718	UNSOLD	594	$342	$346			718	0	593	1.08	1.09		
	SOLD	50	$381	$389	-12%	-12%		1	50	1.13	1.15	-5%	-6%
847	UNSOLD	757	$228	$233			847	0	757	1.01	1.02		
	SOLD	52	$256	$260	-12%	-12%		1	52	1.09	1.10	-8%	-8%
1210	UNSOLD	647	$247	$243			1210	0	647	1.05	1.06		
	SOLD	54	$284	$273	-15%	-12%		1	54	1.13	1.13	-8%	-6%
1324	UNSOLD	799	$379	$377			1324	0	799	1.10	1.11		
	SOLD	67	$424	$425	-12%	-13%		1	67	1.11	1.14	-2%	-3%
1647	UNSOLD	507	$334	$326			1647	0	507	1.01	1.02		
	SOLD	42	$371	$367	-11%	-13%		1	42	1.09	1.10	-8%	-8%
1808	UNSOLD	611	$226	$244			1808	0	611	1.05	1.06		
	SOLD	33	$258	$272	-14%	-11%		1	33	1.10	1.11	-5%	-4%
1983	UNSOLD	129	$197	$192			1983	0	2	1.14	1.14		
	SOLD	50	$222	$215	-13%	-12%		1	33	1.14	1.24	0%	-8%
2085	UNSOLD	251	$198	$195			2085	0	49	1.06	1.07		
	SOLD	144	$227	$231	-15%	-19%		1	133	1.07	1.09	-1%	-2%
2088	UNSOLD	151	$230	$236			2088	0	29	1.12	1.15		
	SOLD	50	$259	$266	-13%	-13%		1	38	1.14	1.16	-1%	-1%
2250	UNSOLD	820	$223	$228			2250	0	820	1.05	1.05		
	SOLD	44	$252	$254	-13%	-11%		1	44	1.12	1.11	-7%	-6%
2465	UNSOLD	702	$247	$249			2465	0	702	0.98	0.99		
	SOLD	39	$279	$282	-13%	-13%		1	39	1.07	1.09	-10%	-10%
2500	UNSOLD	809	$319	$320			2500	0	808	1.02	1.04		
	SOLD	63	$365	$362	-14%	-13%		1	63	1.10	1.12	-8%	-8%

Please note that the above 16 neighborhoods with a difference of over 10 percent using the value per square foot test were also tested using the median and mean percent change in value method. Only one neighborhood was identified out of a total of 189 residential neighborhoods, or 0.5 percent of all neighborhoods.

Based on the above overall results, we concluded that the assessor has valued sold and unsold residential properties in a similar manner.

IV. COMMERCIAL/INDUSTRIAL SALE RESULTS

There were 249 qualified commercial/industrial sales for the 18-month sale period ending June 30, 2020. The sales ratio analysis was as follows:

Ratio Statistics

Median	0.986
Price Related Differential	1.017
Coefficient of Dispersion	8.7

The above ratio statistics were in compliance overall with the standards set forth by the Colorado State Board of Equalization (SBOE) for the overall commercial sales. The following histogram describes further the sales ratio distribution for these properties:

Mean = .96
Std. Dev. = .156
N = 249

Commercial Sale Price by Sales Ratio
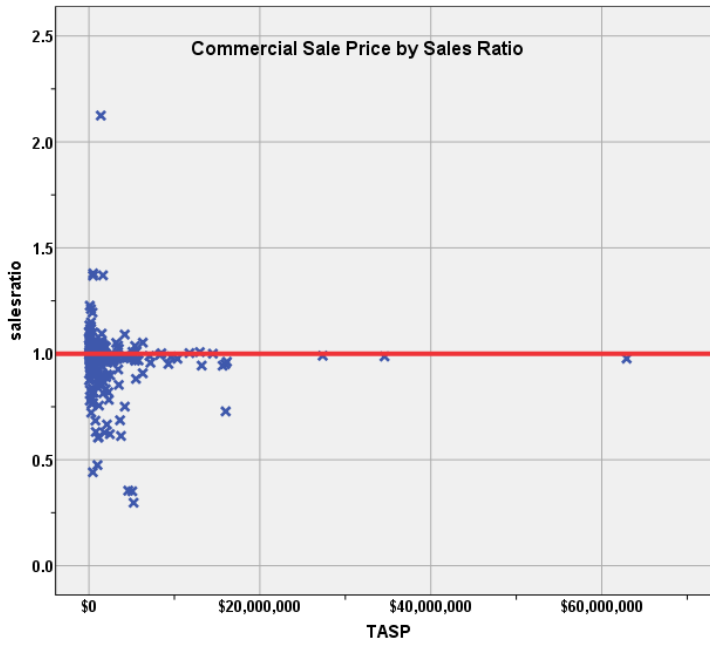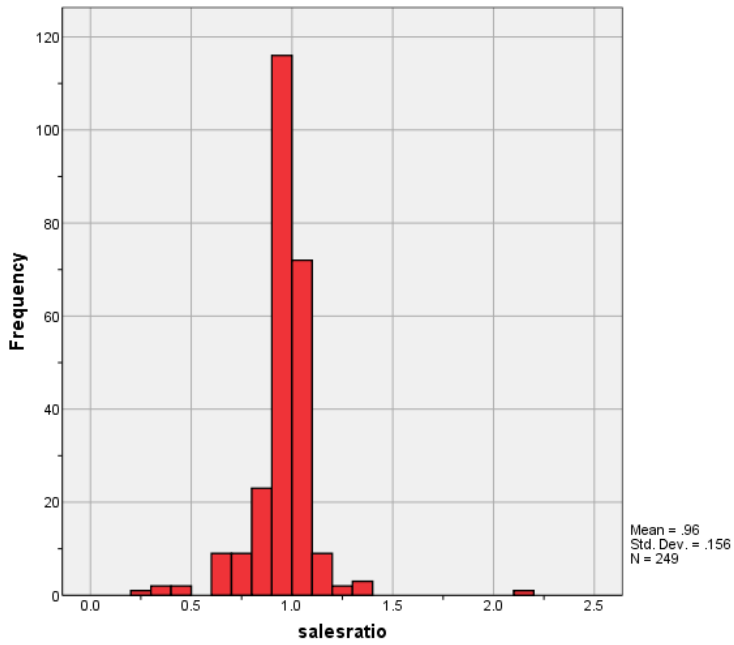
SALES LESS THAN $10,000,000

Commercial Sale Price by Sales Ratio
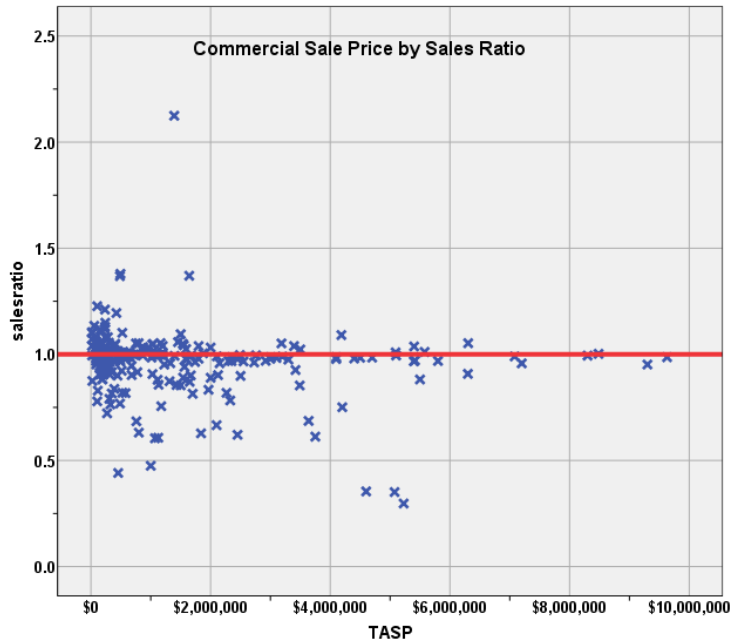
The above histogram indicates that the distribution of the sale ratios was within state mandated limits. No sales were trimmed.

Commercial Market Trend Analysis

We next analyzed the commercial dataset using the 24-month sale period, with the following results:

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.944	.015		64.799	.000
	SalePeriod	.003	.001	.116	1.805	.072

a. Dependent Variable: salesratio
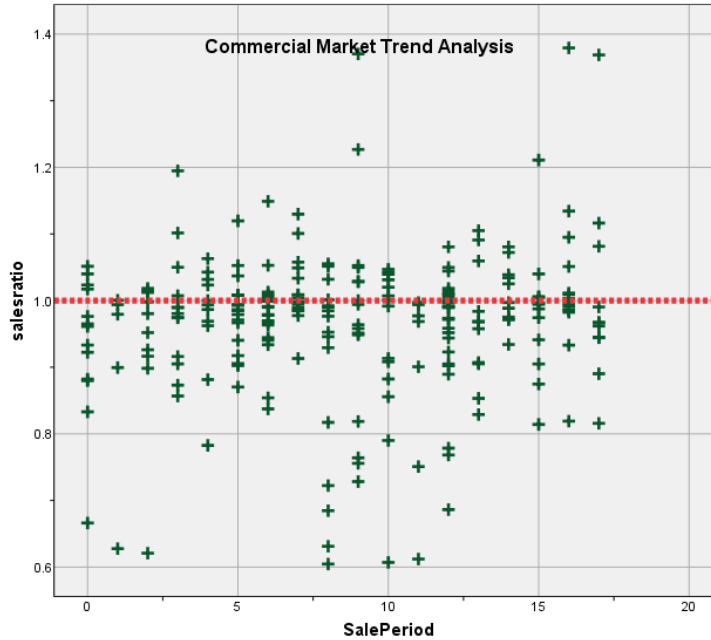
Based on the overall results, we concluded that the assessor has adequately dealt with market trending for commercial properties.

Sold/Unsold Analysis

In terms of the valuation consistency between sold and unsold commercial properties, we first compared the median value per square foot between sold and unsold commercial properties, as follows:

Report
VALSF

sold	N	Median	Mean
UNSOLD	6096	$140	$180
SOLD	249	$165	$184

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of VALSF is the same across categories of sold.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .01.

Report

VALSF

ABSTRIMP	sold	N	Median	Mean
2212	UNSOLD	959	$153	$181
	SOLD	10	$129	$173
2220	UNSOLD	635	$122	$137
	SOLD	39	$146	$188
2230	UNSOLD	1519	$201	$263
	SOLD	41	$207	$247
2235	UNSOLD	1101	$106	$121
	SOLD	38	$137	$145
2245	UNSOLD	1639	$155	$166
	SOLD	113	$170	$180

We also compared the median change in actual value for taxable years 2018 and 2020 between each group by subclass. The following were the results:

Report

DIFF

ABSTRIMP	sold	N	Median	Mean
2212	UNSOLD	933	1.07	1.09
	SOLD	8	1.38	1.38
2220	UNSOLD	624	1.02	1.08
	SOLD	35	1.32	1.37
2230	UNSOLD	1412	1.09	1.10
	SOLD	38	1.12	1.24
2235	UNSOLD	1062	1.24	1.22
	SOLD	36	1.43	1.44
2245	UNSOLD	1590	1.13	1.15
	SOLD	113	1.13	1.17

Based on the above differences for Subclasses 2212 and 2245, we advised the assessment staff to track valuations of sold and unsold properties more carefully moving forward.

V. VACANT LAND SALE RESULTS

There were 149 qualified vacant land sales for the 18-month sale period ending June 30, 2020. We trimmed 7 sales using IAAO standards, resulting in a final count of 142 sales. The sales ratio analysis results were as follows:

Ratio Statistics

Median	1.011
Price Related Differential	1.026
Coefficient of Dispersion	20.1

The above ratio statistics were in compliance overall with the standards set forth by the Colorado State Board of Equalization (SBOE) for the overall vacant land sales. The following graphs describe further the sales ratio distribution for all of these properties:

Vacant Land Sale Price by Sales Ratio
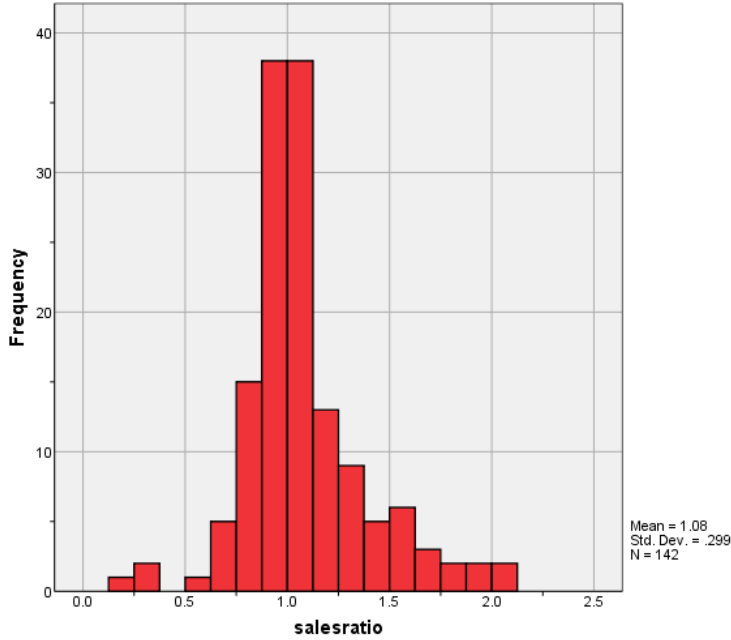
The above histogram indicates that the distribution of the vacant land sale ratios was within state mandated limits, while the above scatter plot indicated that there was no price related differential issues. No sales were trimmed.

Vacant Land Market Trend Analysis

We next analyzed the vacant land dataset using the 24-month sale period, with the following results:

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.019	.047		21.667	.000
	SalePeriod	.008	.005	.127	1.517	.132

a. Dependent Variable: salesratio
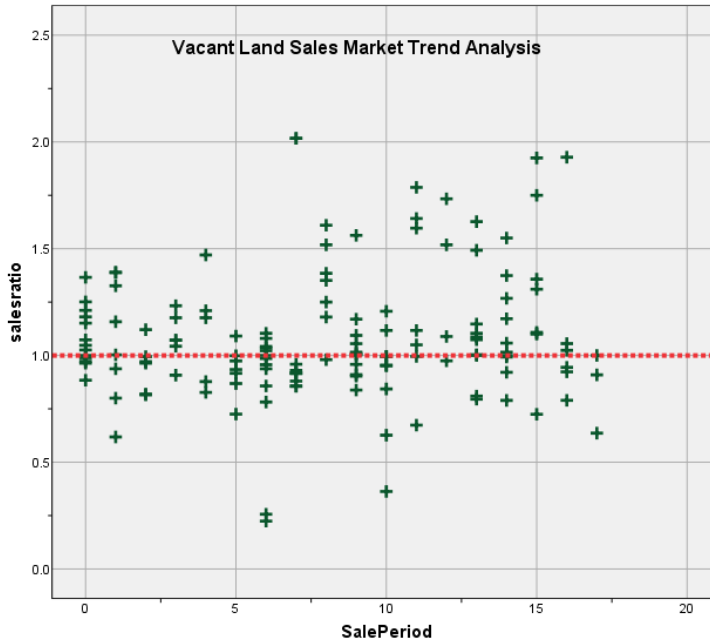
The above analysis indicated that no significant market trending was present in the vacant land sale data. We concluded that the assessor has adequately dealt with market trending for vacant land properties.

Sold/Unsold Analysis

In terms of the valuation consistency between sold and unsold vacant land properties, we compared the median change in actual value for taxable years 2018 and 2020 between each group. The following were the results:

Report

DIFF

sold	N	Median	Mean
UNSOLD	3341	1.00	1.04
SOLD	124	1.11	1.20

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of DIFF is the same across categories of sold.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .00.

We next examined the change in value for subdivisions with at least 3 sales:

Report
DIFF

SUBDIVNO	sold	N	Median	Mean
1315	UNSOLD	42	1.40	1.48
	SOLD	7	.88	1.17
18131	UNSOLD	6	1.06	1.06
	SOLD	3	1.03	1.04
22235	UNSOLD	12	.88	.89
	SOLD	10	.88	.88
33222	UNSOLD	3	1.00	.95
	SOLD	3	.86	1.05
33223	UNSOLD	10	1.00	.95
	SOLD	6	1.00	1.19
53966	UNSOLD	1	1.12	1.12
	SOLD	3	1.12	1.14
61888	UNSOLD	1	1.09	1.09
	SOLD	5	1.04	1.07
66499	UNSOLD	40	1.83	1.54
	SOLD	5	1.83	1.83
67789	UNSOLD	4	.94	.86
	SOLD	4	.48	.58

Based on the comparison between sold and unsold properties at the subdivision level, we concluded that the county assessor valued sold and unsold vacant land properties consistently.

VI. CONCLUSIONS

Based on this statistical analysis, there were no significant compliance issues concluded for Arapahoe County as of the date of this report.

STATISTICAL ABSTRACT

Residential

ECONAREA	Mean	95% Confidence Interval for Mean		Median	95% Confidence Interval for Median		Actual Coverage	Weighted Mean	95% Confidence Interval for Weighted Mean		Price Related Differential	Coefficient of Dispersion	Coefficient of Variation
		Lower Bound	Upper Bound		Lower Bound	Upper Bound			Lower Bound	Upper Bound			Mean Centered
.	1.002	.994	1.009	1.001	1.000	1.003	95.6%	.981	.966	.996	1.021	.014	2.7%
1	1.003	.996	1.010	.999	.995	1.006	97.1%	1.002	.996	1.008	1.001	.014	2.1%
2	1.000	.992	1.008	1.000	.999	1.002	96.7%	.999	.990	1.007	1.001	.016	3.1%
3	1.002	.999	1.005	1.001	1.000	1.001	95.6%	1.000	.996	1.003	1.002	.019	3.3%
4	1.001	.998	1.004	1.000	.999	1.001	95.6%	1.000	.997	1.003	1.001	.017	3.2%
5	1.002	1.000	1.005	1.000	1.000	1.001	95.5%	1.001	.999	1.004	1.001	.016	3.2%
6	1.004	.999	1.009	1.000	.999	1.001	96.0%	1.000	.996	1.004	1.004	.026	4.6%
7	1.001	.999	1.003	1.000	.999	1.000	95.5%	1.001	.998	1.003	1.000	.017	3.2%
8	1.002	1.001	1.003	1.000	1.000	1.000	95.1%	1.001	1.000	1.002	1.001	.018	3.0%
9	1.001	.996	1.005	1.000	.997	1.002	95.3%	.999	.995	1.004	1.001	.026	3.8%
10	1.002	1.001	1.004	1.000	1.000	1.000	95.4%	1.002	1.000	1.004	1.000	.016	3.1%
11	1.006	1.005	1.007	1.001	1.000	1.001	95.0%	1.006	1.005	1.007	1.000	.020	3.5%
12	1.026	1.007	1.045	1.000	1.000	1.001	95.6%	1.020	1.005	1.034	1.006	.045	14.2%
13	1.006	1.001	1.011	1.000	1.000	1.000	95.2%	1.004	1.000	1.008	1.002	.017	6.4%
14	1.004	1.002	1.007	1.000	1.000	1.001	95.0%	1.003	1.001	1.006	1.001	.018	3.8%
15	1.008	.997	1.019	1.000	.998	1.003	96.7%	1.004	.993	1.016	1.004	.023	5.7%
16	1.014	1.006	1.022	1.000	1.000	1.001	95.1%	1.015	1.005	1.026	.999	.026	9.7%
18	1.002	1.001	1.003	1.000	1.000	1.000	95.3%	1.002	1.001	1.003	1.000	.015	2.6%
19	1.001	.998	1.003	1.000	.999	1.001	95.6%	1.001	.998	1.005	.999	.012	2.1%

Commercial/Industrial

Ratio Statistics for CurrTot / TASP

| Mean | 95% Confidence Interval for Mean | | Median | 95% Confidence Interval for Median | | | Weighted Mean | 95% Confidence Interval for Weighted Mean | | Price Related Differential | Coefficient of Dispersion | Coefficient of Variation |
	Lower Bound	Upper Bound		Lower Bound	Upper Bound	Actual Coverage		Lower Bound	Upper Bound			Mean Centered
.960	.941	.980	.986	.975	.991	95.8%	.944	.918	.971	1.017	.087	16.2%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Vacant Land

Ratio Statistics for CurrLnd / TASP

| Mean | 95% Confidence Interval for Mean | | Median | 95% Confidence Interval for Median | | | Weighted Mean | 95% Confidence Interval for Weighted Mean | | Price Related Differential | Coefficient of Dispersion | Coefficient of Variation |
	Lower Bound	Upper Bound		Lower Bound	Upper Bound	Actual Coverage		Lower Bound	Upper Bound			Mean Centered
1.080	1.030	1.129	1.011	.995	1.058	96.4%	1.052	.965	1.140	1.026	.201	27.7%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Residential Median Ratio Stratification

Subclass

Case Processing Summary

		Count	Percent
ABSTRIMP	0	1	0.0%
	1212	15171	81.1%
	1215	65	0.3%
	1220	29	0.2%
	1225	36	0.2%
	1230	3395	18.2%
Overall		18697	100.0%
Excluded		0	
Total		18697	

Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
0	.770	1.000	.000	.
1212	1.000	.999	.017	4.0%
1215	.993	1.016	.081	18.1%
1220	.955	1.006	.048	6.2%
1225	.968	1.011	.028	4.0%
1230	1.000	1.001	.024	3.8%
Overall	1.000	1.002	.018	4.1%

Improvement Age

Case Processing Summary

		Count	Percent
AgeRec	0	1	0.0%
	Over 100	103	0.6%
	75 to 100	205	1.1%
	50 to 75	2234	11.9%
	25 to 50	8205	43.9%
	5 to 25	4744	25.4%
	5 or Newer	3205	17.1%
Overall		18697	100.0%
Excluded		0	
Total		18697	

Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
0	.770	1.000	.000	.
Over 100	1.001	1.002	.014	2.9%
75 to 100	1.000	1.000	.013	3.3%
50 to 75	1.000	.999	.019	5.3%
25 to 50	1.000	1.002	.017	3.9%

5 to 25	1.000	1.004	.014	2.5%
5 or Newer	1.002	1.001	.028	5.3%
Overall	1.000	1.002	.018	4.1%

Improved Area

Case Processing Summary

		Count	Percent
ImpSFRec	0	1	0.0%
	LE 500 sf	34	0.2%
	500 to 1,000 sf	2253	12.1%
	1,000 to 1,500 sf	5886	31.5%
	1,500 to 2,000 sf	5046	27.0%
	2,000 to 3,000 sf	4198	22.5%
	3,000 sf or Higher	1279	6.8%
Overall		18697	100.0%
Excluded		0	
Total		18697	

Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
0	.770	1.000	.000	.
LE 500 sf	.988	1.000	.035	5.9%
500 to 1,000 sf	1.000	1.001	.023	4.0%
1,000 to 1,500 sf	1.000	1.001	.017	3.3%
1,500 to 2,000 sf	1.000	1.000	.017	3.1%
2,000 to 3,000 sf	1.000	1.001	.016	3.5%
3,000 sf or Higher	1.001	1.014	.028	9.1%
Overall	1.000	1.002	.018	4.1%

Improvement Quality

Case Processing Summary

		Count	Percent
QUALITY		1	0.0%
	A	914	4.9%
	B	7965	42.6%
	C	9629	51.5%
	D	51	0.3%
	R	10	0.1%
	X	127	0.7%
Overall		18697	100.0%
Excluded		0	
Total		18697	

Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
	.770	1.000	.000	.
A	1.001	.997	.022	6.8%
B	1.000	1.003	.018	3.6%
C	1.000	1.003	.018	3.6%
D	1.001	1.005	.023	5.1%
R	1.001	1.000	.005	0.7%
X	1.001	1.008	.049	17.3%
Overall	1.000	1.002	.018	4.1%

Commercial Median Ratio Stratification

Sale Price

Case Processing Summary

		Count	Percent
SPRec	LT $25K	6	2.4%
	$50K to $100K	10	4.0%
	$100K to $150K	21	8.4%
	$150K to $200K	13	5.2%
	$200K to $300K	29	11.6%
	$300K to $500K	29	11.6%
	$500K to $750K	16	6.4%
	$750K to $1,000K	11	4.4%
	Over $1,000K	114	45.8%
Overall		249	100.0%
Excluded		0	
Total		249	

Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
LT $25K	1.056	1.007	.058	8.6%
$50K to $100K	1.026	1.004	.044	5.6%
$100K to $150K	.997	1.000	.047	8.6%
$150K to $200K	.933	1.002	.067	9.1%
$200K to $300K	.976	1.001	.067	9.7%
$300K to $500K	.989	.993	.111	17.8%
$500K to $750K	.991	.999	.047	7.7%
$750K to $1,000K	1.001	1.005	.135	23.0%
Over $1,000K	.978	.997	.098	19.5%
Overall	.986	1.017	.087	16.0%

Subclass

Case Processing Summary

		Count	Percent
ABSTRIMP	2212	10	4.0%
	2215	1	0.4%
	2220	39	15.7%
	2225	2	0.8%
	2230	41	16.5%
	2235	38	15.3%
	2245	113	45.4%
	2250	4	1.6%
	3215	1	0.4%
Overall		249	100.0%
Excluded		0	
Total		249	

Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
2212	.980	1.033	.054	13.8%
2215	.995	1.000	.000	.
2220	.992	1.003	.044	7.8%
2225	.858	1.071	.276	39.1%
2230	.880	1.026	.214	34.3%
2235	.984	1.002	.067	13.2%
2245	.992	1.008	.060	8.4%
2250	.885	.975	.125	14.6%
3215	1.007	1.000	.000	.
Overall	.986	1.017	.087	16.0%

Improvement Age

Case Processing Summary

		Count	Percent
AgeRec	Over 100	2	0.8%
	75 to 100	3	1.2%
	50 to 75	25	10.0%
	25 to 50	116	46.6%
	5 to 25	89	35.7%
	5 or Newer	14	5.6%
Overall		249	100.0%
Excluded		0	
Total		249	

Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
Over 100	1.021	1.005	.028	4.0%
75 to 100	.946	1.001	.060	10.0%
50 to 75	.987	1.069	.099	15.9%
25 to 50	.990	1.017	.099	18.8%
5 to 25	.979	.995	.061	10.1%
5 or Newer	.958	1.095	.137	22.5%
Overall	.986	1.017	.087	16.0%

Improved Area

Case Processing Summary

		Count	Percent
ImpSFRec	LE 500 sf	9	3.6%
	500 to 1,000 sf	39	15.7%
	1,000 to 1,500 sf	35	14.1%
	1,500 to 2,000 sf	17	6.8%
	2,000 to 3,000 sf	14	5.6%
	3,000 sf or Higher	135	54.2%
Overall		249	100.0%
Excluded		0	
Total		249	

Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
LE 500 sf	1.040	1.010	.053	7.2%
500 to 1,000 sf	.990	1.008	.052	7.3%
1,000 to 1,500 sf	.974	1.021	.071	10.1%
1,500 to 2,000 sf	.968	1.028	.098	13.8%
2,000 to 3,000 sf	.983	1.020	.115	18.5%
3,000 sf or Higher	.985	1.009	.098	19.3%
Overall	.986	1.017	.087	16.0%

Improvement Quality

Case Processing Summary

		Count	Percent
QUALITY	A	1	0.4%
	B	27	10.8%
	C	198	79.5%
	D	23	9.2%
Overall		249	100.0%
Excluded		0	
Total		249	

Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
A	.977	1.000	.000	.
B	.991	1.030	.082	23.1%
C	.984	1.028	.084	14.5%
D	.994	1.024	.114	18.8%
Overall	.986	1.017	.087	16.0%

Vacant Land Median Ratio Stratification

Sale Price

Case Processing Summary

		Count	Percent
SPRec	LT $25K	2	1.4%
	$25K to $50K	5	3.5%
	$50K to $100K	19	13.4%
	$100K to $150K	16	11.3%
	$150K to $200K	14	9.9%
	$200K to $300K	21	14.8%
	$300K to $500K	11	7.7%
	$500K to $750K	18	12.7%
	$750K to $1,000K	10	7.0%
	Over $1,000K	26	18.3%
Overall		142	100.0%
Excluded		0	
Total		142	

Ratio Statistics for CurrLnd / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
LT $25K	1.200	1.006	.092	13.0%
$25K to $50K	1.518	1.015	.198	25.7%
$50K to $100K	1.176	.987	.250	33.7%
$100K to $150K	1.079	.997	.086	12.5%
$150K to $200K	.992	1.004	.129	23.4%
$200K to $300K	.975	1.010	.156	22.8%
$300K to $500K	.923	.992	.156	25.8%
$500K to $750K	1.010	.992	.194	30.1%
$750K to $1,000K	.934	.998	.182	26.6%
Over $1,000K	1.000	.975	.214	30.6%
Overall	1.011	1.026	.201	30.3%

Subclass

Case Processing Summary

		Count	Percent
ABSTRLND	0	7	4.9%
	100	28	19.7%
	200	2	1.4%
	400	35	24.6%
	1112	57	40.1%
	1125	6	4.2%
	1135	1	0.7%
	1230	1	0.7%
	2112	1	0.7%
	2130	3	2.1%
	2135	1	0.7%
Overall		142	100.0%
Excluded		0	
Total		142	

Ratio Statistics for CurrLnd / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
0	.908	1.034	.102	13.3%
100	.997	1.064	.097	14.8%
200	.932	.999	.002	0.3%
400	1.002	1.027	.079	10.5%
1112	1.176	1.107	.235	29.8%
1125	1.206	.984	.269	42.5%
1135	1.518	1.000	.000	.
1230	.256	1.000	.000	.
2112	1.121	1.000	.000	.
2130	.636	.959	.292	43.8%
2135	1.147	1.000	.000	.
Overall	1.011	1.026	.201	30.3%