Mass Appraisal Report For Tax Year 2021

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Tarrant Appraisal District

2021 Mass Appraisal Report

INTRODUCTION

Scope of Responsibility for Mass Appraisal Reporting

The Tarrant Appraisal District has prepared and published this mass appraisal report in order to provide our citizens, taxpayers and taxing jurisdictions with a better understanding of the district's appraisal responsibilities and activities as they relate to the mass appraisal valuation of real and personal property in Tarrant County. When mass appraisal valuation techniques are employed and result in appraised values, the Chief Appraiser is required to prepare and certify a mass appraisal report at the conclusion of the appraisal portion of the property tax calendar.

Mass appraisal is defined as the process of valuing a group of similar properties as of a given date using standard methodology, employing common data, and allowing for statistical testing. Mass appraisal provides for a systematic approach and uniform application of appraisal methods and techniques to obtain estimates of values that allow for statistical review and analysis of the results. The 2021 mass appraisal efforts by Tarrant Appraisal District result in an estimate of value for all personal or real property that is subject to taxation in Tarrant County.

Texas appraisal districts are required by law to use appraisal methodology and procedures in the appraisal of property for ad valorem tax purposes that comply with the Texas Property Tax Code. Tax Code Section 23.01(h), effective January 1, 2020, cites the four sources of generally accepted appraisal methods and techniques as (1) the Appraisal of Real Estate published by the Appraisal Institute (2) the dictionary of Real Estate Appraisal published by the Appraisal Institute (3) the Uniform Standards of Professional Appraisal Practice published by the Appraisal Foundation and (4) a publication that includes information related to mass appraisal.

The purpose of the Uniform Standards of Appraisal Practice (USPAP) is to promote and maintain a high level of public trust in the appraisal practice by establishing requirements for appraisers. USPAP contains ten standards that establish the requirements for appraisal, appraisal review and appraisal consulting services and identify the methods for reporting the results of each activity. USPAP Standard 5 defines mass appraisal and identifies the required methods and techniques to conduct mass appraisal of real and personal property. USPAP Standard 6 defines the requirements and content needed to produce a mass appraisal report. USPAP is updated periodically and TAD's 2021 mass appraisal activities and subsequent mass appraisal report are completed in accordance with the 2020-2021 edition of the publication.

Mass Appraisal Report Overview - USPAP Standard 6-1

This mass appraisal report is written in compliance with the reporting requirements and content specified in Standard 6 of the Uniform Standards of Professional Appraisal Practice (USPAP). Under the Jurisdictional Exception rule in USPAP, mass appraisal-related law in the Texas Property Tax Code or state and local administrative rules or ordinances may preclude compliance with portions of USPAP and will be noted, where applicable.

In accordance with USPAP Standards Rule 6-1, it is the intent of this mass appraisal report to identify and clearly communicate the data collection, analyses, appraisal techniques, valuation conclusions and statistical testing that make up the annual mass appraisal efforts of Tarrant Appraisal District. A mass appraisal assignment differs from other appraisal assignments in that the subject of the appraisal is comprised of all property in Tarrant County that is subject to taxation and the assignment involves using appraisal rules and procedures prescribed by the Texas Property Tax Code.

Documentation for TAD's mass appraisal process and the appraisal results are provided in various forms including 1) resulting values that comprise the annual appraisal roll, 2) monthly supplemental rolls, 3) individual property records, 4) detailed property maps, 5) appraisal manuals and written procedures, 6) cost, sales and income data, 7) mass appraisal model documentation, 8) sale ratio reports and other statistical studies, 8) and other acceptable methods and output allowed or required by law. Much of this documentation, including this mass appraisal report, can be found on the TAD website at www.TAD.org. Statutes and regulations applicable to the mass appraisal requirements can be found on various governmental websites. A significant amount of property tax appraisal information can be found under the Property Tax Assistance Division (PTAD) section of Texas Comptroller's website.

TAD employs a third-party source to appraise taxable mineral interests. The third-party source, Pritchard & Abbott, is also required to complete a separate mass appraisal report under USPAP Standard 6, outlining the results of the specific appraisal assignment and results.

General Assumptions and Limiting Conditions

 The value results from TAD's mass appraisal process are subject to the following assumptions and conditions:

- All property is appraised in accordance with all state, special and local tax laws enacted and in effect as of the specified appraisal date. TAD adheres to and meets all requirements regarding the appraisal standards, procedures and methodology established by the Comptroller's Property Tax Assistance Division.

- All property is appraised in fee simple title, unless otherwise provided by law and as if free of any liens, restrictions or encumbrances that would affect the fair market value to the extent that is not obvious to the general marketplace or made known to the appraisal staff. Property is appraised as though under responsible, adequately capitalized ownership and competent property

management. The appraised values do not include the value of intangible property or other non-taxable interests.

- Property characteristics data upon which the appraisals are based is assumed to be correct to the extent and means that they can be verified by the appraisal staff. Property characteristics are verified through various means including physical inspections, use of orthophotography, information provided by property owners and agents, and other third-party information deemed reliable.

- Sales data is collected, confirmed, screened and adjusted in accordance with IAAO standards. In the absence of such validation, sales data from third party vendors or other trusted sources is considered reliable.

- It is assumed that all applicable zoning and use regulations and restrictions have been complied with unless a nonconformity is stated, defined and considered in the appraisal of an individual property. All required licenses, certificates of occupancy, consents or other legislative or administrative authority from local, state or national government or any designated private entity have been or can be obtained or renewed for any use on which the value estimate contained in this report is based.

- Unless otherwise stated in an individual property record, TAD appraisers are not aware of the existence of hazardous substances or other environmental conditions. The value estimates are predicated on the assumption that there is no such condition on or in the property or in such proximity thereto that it would cause a loss in value. No responsibility is assumed for any such conditions, or for any specialized expertise or engineering knowledge required to discover them.

- It is assumed that the utilization of the land and improvements of the properties described are within the boundaries or property lines, and that there are no encroachments or trespasses unless noted on the appraisal record.

- Geographical data is maintained in a complete set, compiled according to current standards and is considered accurate at the time of the appraisals.

- A list of staff providing significant mass appraisal assistance to the Chief Appraiser signing this certification is attached to this report. The compensation of appraisal district employees is not contingent upon the development or reporting of a predetermined or prescribed value. See Addendum for list of key employees that provided mass appraisal assistance in a management or key support role.

Mass Appraisal Assignment Elements

USPAP Standards Rule 6-2 provides the requirements for the contents of a mass appraisal report. Key elements in the mass appraisal report reflect the adherence to the mass appraisal development requirements specified in USPAP Standard 5. The appraisal assignment is first identified by the following conditions:

Client and Intended Use of Mass Appraisal Report

Tarrant Appraisal District appraises property solely for ad valorem purposes, to provide a value of all real and personal property within the jurisdictional boundaries of Tarrant County in an equitable and efficient manner and in accordance with the laws of the State of Texas.

In ad valorem taxation, the appraised values are prepared and provided to the taxing units for the purpose of creating a tax roll. The taxing units are the primary intended users of TAD's appraisal records. The general public and all governmental agencies are also permitted by law to have access to appraised values and other valuation and property records information unless prohibited by specific statutes that may exempt certain information from public disclosure.

Effective Date of Appraisal and Date of Report

All property is appraised at market value as of January 1, 2021, except as otherwise provided by law. Texas law allows that owners of specific inventory may elect to use a valuation date of September 1. The effective date of this mass appraisal report is as of the 12/31/2021.

Definition and Type of Value Appraised

The majority of mass appraisals are determined on the basis of market value. The definition of market value used in mass appraisal is in accordance with those defined by the Texas Property Tax Code. Under the tax code, "market value" means the price at which a property would transfer for cash or its equivalent under prevailing market conditions if:

- exposed for sale in the open market with a reasonable time for the seller to find a purchaser;

- both the seller and the buyer know of all the uses and purposes to which the property is adapted and for which it is capable of being used and of the enforceable restrictions on its use, and;

- both the seller and buyer seek to maximize their gains and neither is in a position to take advantage of the exigencies of the other.

Tax Code Chapter 23 Subchapter B contains numerous special appraisal provisions and alternative value definitions for specific types of property, creating a jurisdictional exception to USPAP. Most notable

categories include residential homestead property (Sec. 23.23), agricultural and timber property (Chapter 23, Subchapters C and D), real and personal property inventory (Sec. 23.12), certain types of dealer inventory (Sec. 23.121, 23.124, 23.1241 and 23.127), taxable leaseholds (Sec. 23.13), oil or gas interest (Sec 23.175) nominal value (Sec. 23.18) and restricted use properties (Sec. 23.83).

Property Appraised/Property Rights Appraised

The mass appraisal report pertains to all taxable real and tangible personal property appraised by Tarrant Appraisal District and included in the appraisal records for the 2021 tax year. The definition of "property" can be found in Section 1.04 of the Tax Code. Effective as of September 1, 2007, the Tarrant Appraisal District boundaries are the same as the county's boundaries. TAD is responsible for local property tax appraisal and exemption administration for the seventy jurisdictions or taxing units located in Tarrant County.

 A listing of all appraisal records is created and maintained accordingly for all properties known to the district at the time of this report with the exception of certain properties that remain subject to valuation for 2021. Section 25.02 defines the form and content for appraisal records. Appraisal records, at a minimum:

- include the name and address of the owner or, if the name or address is unknown, a statement that it is unknown;

- real property;

- separately taxable estates or interests in real property, including taxable possessory interests in exempt real property, personal property;

- personal property;

- the appraisal of land and if the land is appraised as provided by Subchapter C, D, E, H, Chapter 23, the market value of the land;

- the appraised value of improvements to land;

- the appraised value of a separately taxable estate or interest in land;

- the appraised value of personal property;

- the kind of any partial exemption the owner is entitled to receive, whether the exemption applies to appraised or assessed value, and in the case of an exemption authorized by Section 11.23, the amount of the exemption;

- the tax year to which the appraisal applies; and

- An identification of each taxing unit in which the property is taxable.

Additional property information is collected and maintained for appraisal purposed and may be stored in the CAMA system or other software repositories.

The property rights appraised are fee simple interests, except for leasehold interest in property exempt to the holder or the property's title.

SCOPE OF WORK – MASS APPRAISAL VALUATION PROCESS

Scope of work is the type and extent of research and analyses that an appraiser performs. Scope of work includes, but is not limited to: the extent to which the property is identified; the extent to which tangible property is inspected; the type and extent of data research; and the type and extent of analyses completed and applied to arrive at opinions or conclusions.

Article VIII, Section 1 states that:

(a) Taxation shall be equal and uniform. (b) All real property and tangible personal property in this State, unless exempt as required or permitted by this Constitution, whether owned by natural persons or corporations, other than municipal, shall be taxed in proportion to its value, which shall be ascertained as may be provided by law.

The Texas Legislature has provided further guidance in defining the scope of work in Section 23.01 of the Texas Property Tax Code in Subchapter A entitled "Appraisals Generally". All of these legally required mandates affect both the appraisal assignment elements and the scope of work for all appraisal districts in Texas.

The scope of work for mass appraisal valuation may be defined generally as follows:

1. Discovery and identification of properties to be appraised in the mass appraisal through physical inspection or by other reliable means of identification, including deeds or other legal documentation, aerial photography, land-based photographs, surveys, maps and property sketches;

 2. Applying standardized procedures for data collection, validation and reporting that are used to identify and update relevant characteristics of each property in the appraisal records and valuation data utilized in the cost, income and sales comparison approach to value.

3. Analyzing and defining markets, submarkets and neighborhoods in Tarrant County;

4. Identifying characteristics that affect property value in each market area, including: a. Location and market area; b. Physical attributes of property such as size, age, and condition; c. Legal and economic attributes and trends; d. Easements, covenants, leases, reservations, contracts, declarations, special assessments, ordinances or legal restrictions. e. Determine Highest and Best Use for each property.

5. Developing appraisal models (cost, market and income) that reflects the relationships among the property characteristics affecting the value in each market area and determines the contribution of individual property characteristics;

6. Reconciling the model values and apply the conclusions reflected in the model to the characteristics of the properties being appraised; and

7. Performing statistical analysis and performance testing to measure results for accuracy and uniformity.

Delineation of Mass Appraisal Assignments by Property Type

The first step in the appraisal process is to identify the properties that are subject to the mass appraisal process. The tax code definition of real property means land, an improvement, a mine or quarry, a mineral in place, standing timber or an estate or interest, other than a mortgage or deed of trust creating a lien on property or an interest securing payment or performance of an obligation. Personal property is defined as property that is not real property. Personal property appraisals do not include the value of intangibles.

As mentioned in the definition of the scope of work, TAD appraisers identify property characteristics and determine the highest and best use of each property. In order to more accurately and efficiently perform mass appraisals, Tarrant Appraisal District's appraisal responsibilities are divided between three appraisal departments; Residential Real Property, Commercial Real Property and Business Personal Property/Minerals primarily based on property type. Additionally, the Property Tax Assistance Division of the Comptroller's office requires properties to be given a classification (state class code) for the purpose of reporting values to the state. TAD uses several data fields, including the Comptroller's state class code to identify the type of property being appraised and determine appraisal department responsibilities. At a high level, property is classified as residential, multifamily, vacant land, qualified open space land, rural property, commercial, industrial, utilities, minerals or business personal property. See the addendum for a list of the PTAD Property Classifications for 2021 as utilized by TAD.

Valuation Reports by Appraisal Divisions

Each of the appraisal departments carries out the scope of work necessary to produce credible results that are appropriate for the type of property that is being appraised. The next three sections of this mass appraisal report will identify the appraisal methodology and techniques utilized for collecting and analyzing property-specific and market-specific data, delineating market areas, developing the recognized approaches to value, application of valuation models and value reconciliation for each of the three appraisal departments at TAD.

Residential Valuation Process

Identification of Properties Appraised

The residential appraisal staff appraisers are responsible for developing equal and uniform market values for improved and vacant residential property. There are approximately 627,228 residential parcels, including 31,722 vacant residential properties and 4,709 agricultural properties in Tarrant County.

Residential appraisal assignments are delineated from commercial assignments on the basis of state use code, established by the Property Tax Assistance Division of the State Comptroller. Generally, the residential staff values residential single family, multifamily housing (other than apartments), vacant residential lots, improvements on rural acreage, open-space & agricultural appraisal, mobile homes and residential inventory properties.

Appraisal Resources

- **Personnel** - The residential appraisal staff consists of appraisers and support staff. A detailed count may be found in the 2021 and 2022 adopted budgets.

DATA COLLECTION / VALIDATION

Data Collection/Appraisal Manuals

A common set of data characteristics for each residential dwelling in Tarrant County is collected by appraisers in the field and entered to the CAMA system. This property-specific data serves as the basis for the appropriate appraisal approach in determining opinions of value. Residential appraisal also utilizes and relies upon verified sales data, construction cost data, and information from other real estate sources. Appraisers may also review real estate related publications and real estate related websites to determine patterns, trends, supply and demand within the local markets

Exterior Field Review

The appraiser identifies individual properties in need of field review through examples such as: sales ratio analysis, ARB hearings, building permits, property owner's requests, aerial photography and other sources. Sold properties are reviewed on a regular basis to check for accuracy of data characteristics before they are used in reappraisal analysis.

As the district's parcel count has increased through new home construction, and existing home remodeling, the appraisers are required to perform associated field activity. Increased sales activity can result in a more substantial field effort on the part of the appraisers to review and reconcile sales that fall outside acceptable ranges. Additionally, the appraisers frequently field review data items such as quality of construction, condition, and physical, functional and economic obsolescence, factors contributing significantly to the market value of the property. The following chart contains historical and projected permit activity for residential property.

The following chart contains historical permit activity for residential property.

Year	New Construction	Other	Grand Total
2017	6309	9098	15407
2018	5501	9502	15003
2019	6494	8598	15092
2020	7771	12288	20059
2021	8616	18448	27064

Office Review

A routine valuation review of all properties as outlined in the discussion of ratio studies and market analysis is conducted. Previous values resulting from protest hearings, informal negotiation, arbitration, or litigation are individually reviewed to determine if the value remains appropriate for the current year.

When possible, residential new construction is physically examined as part of an annual building permit data collection process. If appraisers are not able to physically examine property, other inspection methods may be utilized for data collection purposes. Appraisers determine size, style, quality, condition, year built, effective year of construction and other property characteristics and features that are used in the cost and sales comparison valuation methods.

DATA ANALYSIS

Land Analysis

Residential land analysis is conducted by the residential staff prior to neighborhood sales analysis. From these land analyses, land models are developed to determine a primary land rate. Specific land adjustments may be applied, where necessary, to account for characteristics of a neighborhood or a specific parcel. Parcels outside the neighborhood norm for characteristics such as view, shape, size, and topography, among others may also be adjusted. When available data exists, appraisers may use the comparable sales data, allocation by abstraction or allocation by ratio methods to ensure that the land values developed best reflect the contributory market value of the land to the overall property value.

Area Analysis

Data on regional economic forces such as demographic patterns, regional location factors, employment and income patterns, general trends in real property prices and rents, interest rate trends, availability of vacant land, and construction trends and costs are collected from private vendors and public sources and provide the appraisers a current economic outlook on the real estate market. Information is gathered from real estate publications and other outside sources including seminars, conferences, and continuing education courses approved by the Texas Comptroller's Office.

Residential Neighborhood and Market Analysis

TAD's residential market areas are defined by thorough analysis of homogenous geographic areas. The analysis consists of the examining of how physical, economic, governmental and social forces and other influences affect property values within these areas. The effects of these forces are also used to identify, classify, and stratify comparable properties into smaller, manageable subsets of the universe of properties known as neighborhoods (see Appendix C for a listing of all neighborhoods defined by the Residential Appraisal Division). Analysis of comparable market sales data forms the basis of estimating market activity and the level of supply and demand affecting market prices for any given market area, neighborhood or district. Market sales reflect the effects of these market forces and are interpreted by residential staff into an indication of market value ranges for a given neighborhood. Sales also provide an indication of property component changes considering a given time period relative to the date of appraisal. Although all three approaches to value (Cost, Market, Income) are considered, market value can best be interpreted and applied using two generally accepted appraisal techniques known as the cost and market or comparable sales approach. For low density, multiple family properties, the income approach to value may also be utilized, in the absence of recent sales data.
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The first step in neighborhood analysis is the identification of a group of properties that share certain common traits. A "neighborhood" for analysis purposes is defined as a geographic grouping of properties where the property's physical, economic, governmental and social forces are generally similar and uniform. Geographic stratification takes into consideration the local supply and demand factors that vary across a jurisdiction. Once a neighborhood with similar characteristics has been identified, the next step is to define its boundaries. This process is known as delineation. Some factors used in neighborhood delineation include location, sales price range, lot size, age of dwelling, quality of construction and condition of dwellings, square footage, and story height. Delineation can involve the physical drawing of neighborhood boundary lines on a map, but it can also involve statistical separation or stratification based on attribute analysis. Part of neighborhood analysis is the consideration of discernible patterns of growth that influence a neighborhood's individual market. Few neighborhoods are fixed in character. Each neighborhood may be characterized as being in a stage of growth, stability or decline. The growth period is a time of development and construction. As new neighborhoods in a community are developed, they compete with existing neighborhoods. An added supply of new homes tends to induce a population shift from older homes to newer homes. In the period of stability, or equilibrium, the forces of supply and demand are about equal. Generally,

in the stage of equilibrium, older neighborhoods can be more desirable due to their stability of residential character and proximity to the workplace and other community facilities. The period of decline may reflect diminishing demand or desirability. Declining neighborhoods may also experience renewal, reorganization, rebuilding, or restoration, which promotes increased demand and economic desirability.

Neighborhood identification and delineation is the cornerstone of the residential valuation system at the district. Most residential analysis work, in association with the residential valuation process, is neighborhood specific. Neighborhoods are visually inspected to verify delineations based on observable aspects of homogeneity. Neighborhood delineation is periodically reviewed to determine if further neighborhood specification is warranted. Whereas neighborhoods involve similar properties in the same location, a neighborhood group is simply defined as similar neighborhoods in similar locations. Each residential neighborhood is assigned and coded to a neighborhood group based on observable aspects of homogeneity between the areas. Neighborhood grouping is highly beneficial in cost-derived areas of limited or no sales and in direct sales comparison analysis. Defining comparable neighborhood groups serves to increase the available market data by linking comparable properties outside a given neighborhood. Sales ratio analysis, discussed below, is performed at the market area, sub-market area, and/or neighborhood areas, and in soft sale areas on a comparable neighborhood group basis.

The residential appraisal section evaluates all residential properties during the biennial sales ratio study. Problem market areas identified by the study are scheduled for review.

Field inspections are scheduled for properties identified through various other sources including but not limited to; the informal appeals and appraisal review process, building permits, owner request, sales information verification and annual canvas of one third of all residential properties in the district.

Exterior field inspections are performed on properties identified through various sources including but not limited to; informal appeals and appraisal review process, building permits, owner request, sales information verification and annual canvas of one third of all residential properties in the district.

Residential Neighborhood Hierarchy

Neighborhoods define an area of complimentary land uses in which all properties are similarly influenced by the four forces affecting property value: environmental (physical), governmental, social, and economic forces. The area of the neighborhood will contain complimentary land uses. The three types of boundaries are natural, political, and manmade.
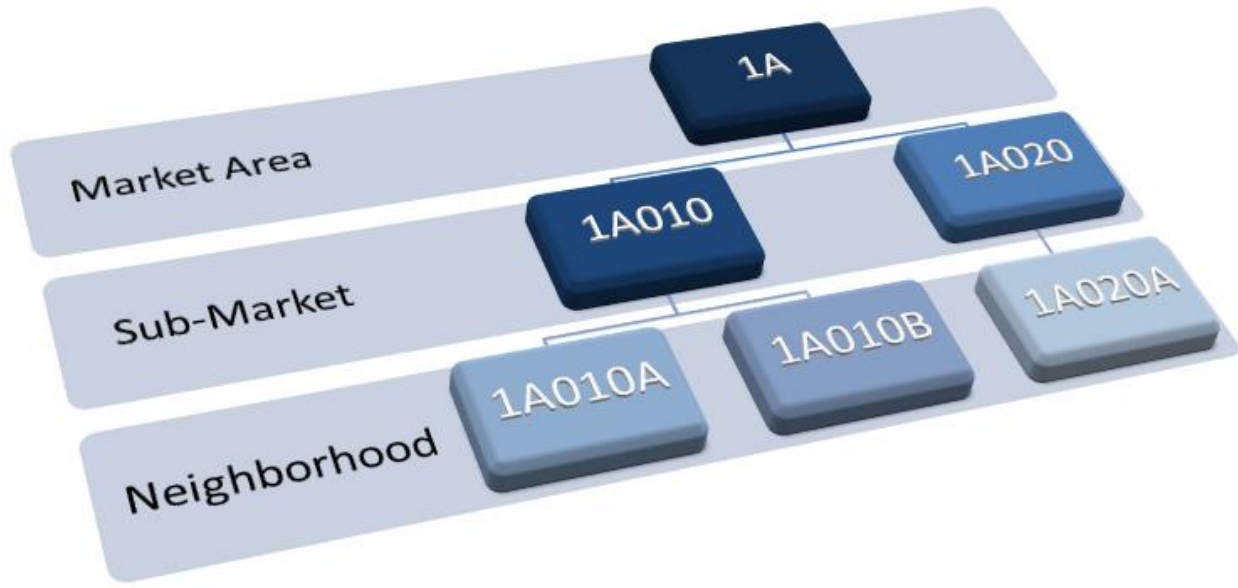
Market Areas define a group of appraisal sites for which the market factors are similar. These similarities then assist with fair & equitable valuation utilizing the various models in the CAMA system.

Sub-Market Areas are appraisal sites that can be assigned to a market area. Sub Market areas exist within a market area and define a group of appraisal sites within that market area that are more similar to each other than other appraisal sites in a market area. These similarities then assist with fair & equitable valuation utilizing the various models in the CAMA system.

Neighborhood Areas define a group of appraisal sites that are more similar to each other than other appraisal sites within the same market and sub market areas. These similarities then assist with fair & equitable valuation utilizing the various models in the CAMA system.

Market Areas, Sub-Market Areas, & Neighborhood Areas are assigned to every residential property and may be viewed graphically on District maps.

Highest and Best Use Analysis

The highest and best use of property is the most reasonable and probable use that supports the highest present value as of the date of the appraisal. The highest and best use must be physically possible, legally permissible, financially feasible, and productive to its maximum. The highest and best use of residential property is generally its current use. This is due in part to the fact that residential development, in many areas, through use of deed restrictions and zoning, precludes other land uses. Residential valuation undertakes reassessment of highest and best use in transition areas and areas of mixed residential and commercial use. In transition areas with ongoing socio-economic and cultural changes, the residential and commercial appraisal staff reviews the existing

residential property use and makes a determination regarding highest and best use. Once the conclusion is made that the highest and best use remains residential, further highest and best use analysis is done to decide the type of residential use on a neighborhood basis. As an example, it may be determined in a transition area that older, non-remodeled homes are not the most productive or profitable use, and the highest and best use of such property is to demolish the old homes and construct new dwellings. In areas of mixed residential and commercial use, the appraiser reviews properties on a periodic basis to determine if changes in the real estate market require reassignment of the highest and best use of a select category of properties.

In November 2009, the Texas constitution was amended to limit the analysis of highest and best use on a residence homestead. If a residential property is homesteaded, appraisers are to appraise the property in its current use and disregard the properties highest and best use or the value associated with highest and best use. This change became effective on 01/1/2010.

VALUATION METHODS & TECHNIQUES

Model Specification and Calibration

Cost Schedules

The district's residential cost schedules are derived from Wayne Moore's Precision Cost Tables (developed from Craftsman rates a nationally recognized cost estimator) and utilize a Floor Stratified Cost Model, which are reviewed and adjusted periodically to reflect the local market.

Possible adjustments for factors that may inhibit value are also in table form and are applied uniformly to any properties affected.

The District considers all three approaches to value and recognizes the cost approach as an acceptable approach. Generally, for residential property, the district considers the market approach a more viable and accurate indicator and utilizes the market approach, in conjunction with the cost approach, to arrive at a final estimate of market value.

Income Models

The income approach to value may be utilized for those real properties that are typically viewed as income producing, when sufficient income data is available and where comparable sales are not present. In the current residential market, the income approach is not generally used.

Sales Information

A sales file for the storage of snapshot sales data for vacant and improved properties at the time of sale is maintained for residential real property. Residential improved and vacant sales are collected from a variety of sources, including: district survey letters sent to buyers and sellers, field discovery,

protest hearings, owner documentation, sales vendors, builders, realtors and brokers. The following chart identifies the historic and projected numbers of sales that are received and processed annually by the residential research staff.

	2017	2018	2019	2020	2021
Total Sales	27,792	27,881	27,491	26,291	27,000 Projected

A system of type, source, validity and verification codes has been established to define salient facts related to a property's purchase or transfer and to help determine relevant market sale price information. The effect of time as an influence on price can be considered by paired sales analysis and applied in the ratio study to the sales as indicated within each neighborhood area. Neighborhood sales reports are generated as an analytical tool for the residential staff in the development and estimation of market price ranges and property component value estimates. Abstraction and allocation of property components based on sales of similar property is an important analytical tool to interpret market sales under the cost and market approaches to value. These analytical tools help determine and estimate the effects of change, with regard to price, as indicated by sale prices for similar property within the current market.

Multiple sales of the same property are considered and analyzed for any indication of price change attributed to a time change or influence and monthly time adjustments are developed. Property characteristics, financing, and conditions of sale may be compared for each property sold in the pairing of property to isolate only the time factor as an influence on price.

Section 23.013 of the Property Tax Code addresses the "Market Data Comparison Method of Appraisal". During the 2009 Legislative session, Section 23.013 subsection (b) was added to specify that sales used in the market data comparable method should occur within 24 months of the appraisal date, unless too few sales occurred to produce a representative sample for a certain type of property. Subsection (c) was added to require appraisal districts to appropriately adjust comparable sales for changes in the market value of the sales based on the sale date and subsection (d) includes a list of property characteristics to be considered in determining comparability between a sale and a subject property. These changes became effective on January 1, 2010.

Statistical Analysis Of Modeled Values

The residential department performs statistical analysis annually to evaluate whether values are equitable and consistent with the market. Ratio studies are conducted on residential neighborhoods in the district to judge the two primary aspects of mass appraisal, accuracy and uniformity of value. Appraisal statistics of central tendency and dispersion generated from sales ratios are available for each neighborhood and are summarized by year. These summary statistics including, but not limited

to, the weighted mean, median, standard deviation, coefficient of variation, and coefficient of dispersion provide a tool by which to determine both the level and uniformity of appraised value on a neighborhood basis. The level of appraised values is determined by the mean, weighted mean, and/or median to develop an adjustment factor for individual properties within a neighborhood. Review of the standard deviation, coefficient of variation, and coefficient of dispersion discerns appraisal uniformity within and between neighborhoods.

Residential management and staff, through the sales ratio analysis process, review neighborhoods annually. The first phase involves neighborhood ratio studies that compare the recent sales prices of neighborhood properties to the appraised values of these sold properties. This set of ratio studies affords the reviewer an excellent means of judging the present level of appraised value and uniformity of the sales. Based on the sales ratio statistics and designated parameters for a valuation update, a preliminary decision is made as to whether the value level in a neighborhood needs to be updated in an upcoming reappraisal, or whether the level of appraised value is acceptable. The residential department performs statistical analysis annually to evaluate whether estimated values are equitable and consistent with the market.

Reconciliation and Valuation

Neighborhood, or market adjustment, factors are developed from statistics provided from ratio studies and are used to ensure that estimated values are consistent with the market. The district's approach to the valuation of residential properties is a cost-market approach. This approach accounts for neighborhood market influences not particularly specified in a purely cost model. The following equation denotes the hybrid model used:

$$MV = LV + LCM [RCN\text{-}D]$$

A detailed calculation of the hybrid model is located in the residential appraisal manual. Market adjustments will be applied uniformly within neighborhoods to account for location variances.

Statistical analysis of current appraised values of a neighborhood or market area, as compared with recent sales in the same or similar neighborhood or market area, determines the appropriate market adjustment for a neighborhood. The CAMA system aids with the study and determination of market trends and to develop appropriate market adjustments.

A routine valuation review of all properties as outlined in the discussion of ratio studies and market analysis is conducted. Previous values resulting from protest hearings, informal negotiation, arbitration, or litigation are individually reviewed to determine if the value remains appropriate for the current year.

Once the residential appraisal staff is satisfied with the level and uniformity of value for each neighborhood and/or market area, the estimates of value are prepared for a notice of proposed value.

SPECIAL APPRAISAL PROVISIONS

Appraisal of Residential Homesteads

Article VIII, Sec. 1 (i) of the Texas constitution allows the legislature to limit the annual percentage increase in the appraised value of residence homestead to 10% under certain conditions. This limitation is commonly referred to as a homestead capped value. Sec.23.23 of the Tax Code implements the cap on increases in value. The limited value begins in the second year the property qualifies for a residential homestead exemption. The appraised value of a qualified residence homestead will be the lesser of:

(1) the market value of the property for the most recent tax year that the market value was determined by the appraisal office; or

(2) the sum of:
(A) 10 percent of the appraised value of the property for the preceding tax year;
(B) the appraised value of the property for the preceding tax year; and
(C) the market value of all new improvements to the property

Since TAD is on an annual reappraisal cycle, the limited appraised value must be recomputed annually. The appraised value of a homestead may increase 10% annually or until the appraised value is equal to the market value. If a limited homestead property sells, the cap automatically expires as of January 1st of the year following the sale of the property and the property is appraised at its market value. The market value of a limited homestead is maintained, as well as the limited appraised value.

Residential Inventory

Section 23.12 of the Texas Property Tax Code provides the definition of market value for inventory. Inventory includes residential real property that has never been occupied as a residence and is held for sale in the ordinary course of trade or business, provided that the residential real property remains unoccupied, is not leased or rented, and produces no income.

Residential inventory is appraised at market value. The market value of residential inventory is the price at which it would sell as a unit to a purchaser who would continue the business. The residential appraisal staff applies the same generally accepted appraisal techniques to determine the market value of residential real property inventory.

Agricultural Appraisal

The Texas Constitution permits certain kinds of agricultural land to be appraised for tax purposes at a productivity value, rather than at market value. This special appraisal value is based solely on the land's capacity to produce agricultural products. Property qualifying for agricultural appraisal will have a substantial reduction in taxes, based on the difference in special agricultural appraisal and the market value of the property. Property taxes are deferred until a change of use of the property occurs. At the time of use change, taxes are recaptured for up to three previous years, based on the difference in what was paid based on agricultural appraisal and what would have been paid based on the market value of the property. Procedures for implementing this appraisal are based on the guidelines published in the Manual for the Appraisal of Agricultural Land, printed April 1990. A copy may be obtained from the State Comptroller of Public Accounts.

Application Process

The State Property Tax Code requires an application before land is considered for agricultural valuation. The deadline for filing a timely application is before May 1. Late agricultural valuation applications may be filed up to the time the appraisal roll is certified, however a penalty is imposed for late filing. After an application is filed, the property is inspected to determine its qualification.

Three criteria must be met when determining qualification.

Use - Land must be currently devoted principally to agricultural use.

Degree of Intensity - The agricultural use must be to the degree of intensity generally accepted in the area.

History of Use - The land, outside the city limits, must have been devoted principally to agricultural use for five (5) of the preceding seven (7) years. Land located within an incorporated city or town must have been devoted principally to agricultural use continuously for the preceding five (5) years.

When the land's use qualifications have been reviewed, one of three actions will be taken.

Application is Denied – Property owner is notified by certified mail and given 30 days to appeal the decision to the Appraisal Review Board.

Application is Approved - Property owner is notified of the decision and the productivity land appraised value. Once approved, the property remains valued as a special agricultural use until a change of use occurs, or the ownership changes. If the property's use remains unchanged and only ownership has changed, the new owner is notified and is required to timely apply for special agricultural valuation.

Disapprove the Application and Request More Information - The application is disapproved and the applicant is allowed thirty days to provide additional information, otherwise the application is

denied. When requested information is provided, it is added to data already collected to arrive at a final decision.

PERFORMANCE TESTS

Sales Ratio Studies

The primary analytical tool used by the residential appraisal staff to measure and improve performance is the sales ratio analysis. The district ensures that the appraised values produced meet the standards of accuracy in several ways. Overall, sales ratios are generated for each neighborhood to allow the residential appraisal staff to review general market trends within their area of responsibility, and provide an indication of market change over a specified period. The neighborhood descriptive statistic is reviewed for each neighborhood being updated for the current tax year. Finally, other sales ratios statistics are produced. Residential appraisers may use sales up to two years prior to January 1st of the appraisal year to obtain a statistically valid sample.

Pilot Studies

Pilot studies will be used on new or revised mass appraisal models. The models will be tested on randomly selected market areas. Sales ratio studies will be used to test the models. Models not performing satisfactorily will be refined and retested.

Management Review Process

Once the proposed value estimates are finalized, the appraisal managers review the sales ratios by neighborhood and present pertinent valuation data, such as weighted sales ratio and pricing trends to the Director of Residential Appraisal and the Chief Appraiser for final review and approval. This review includes comparison of level of value between related neighborhoods within and across jurisdiction lines. The primary objective of this review is to ensure that the proposed values have met preset appraisal guidelines appropriate for the tax year in question.

Commercial Valuation Process

Identification of Properties Appraised

The Commercial (real property) Appraisal Department is responsible for the valuation of all commercial real property, including land and improvements, located within the boundaries of the Tarrant Appraisal District's jurisdiction. For 2021, this included approximately 11,618 vacant parcels, 31,080 improved parcels and 17,345 commercial properties with a 100% tax-exempt status. Commercial real property types generally include multi-family, office, retail, warehouse/manufacturing and various other categories of business-related facilities. The staff appraisers also value all commercial and rural land parcels. In general terms, the commercial appraisal staff is responsible for the establishing market value on any real property for which the highest and best use is determined to be non-residential.

In 2014, Tarrant Appraisal District implemented a new computer assisted appraisal system known as Aumentum for the purpose of storing, retrieving, analyzing data and executing the three recognized approaches to value.

Commercial appraisal assignments are kept delineated from residential assignments based on classification code guidelines, established by the Comptroller's Property Tax Assistance Division. Generally, the commercial staff handles parcels with a state class code of B1, C1C, C2C, EC (rural improvements), F1, F2, J or X . (See Addendum for state class code guidelines). Residential properties located in areas of transition to commercial, or interim-use properties, are also valued by the commercial division. If the interim-use property does not have a residential homestead exemption, the property data and valuation models, for these accounts, are maintained by the commercial division. Otherwise, the records are maintained in the residential system, for purposes of calculating the 10% limitation on increases to the appraised value for a property with a general residential homestead exemption. A description of these state codes is provided in the appendix.

Commercial appraisers are required to value the fee simple interest of properties according to statute. However, the affect of easements, restrictions, encumbrances, leases, contracts or special appraisal provisions are considered on an individual basis, as is the appraisement of any non- exempt taxable fractional interests in real property (i.e. certain multi-family housing projects). Fractional interests or partial holdings of real property are appraised in fee simple for the whole property and divided programmatically based on their prorated interests.

Appraisal Resources

Personnel - The real property portion of the commercial appraisal department is organized into three separate divisions or areas of responsibilities. The three divisions include commercial appraisal, complex properties/abatements and commercial research. Each division is staffed with a manager,

appraisers and a clerical support staff.   Each division manager reports to the Director of Commercial Appraisal. A separate litigation division also resides within the commercial department structure.

Commercial Appraisal Division

The commercial appraisal division is comprised of two workgroups or teams. Each team is comprised of one manager and eight appraisers. In addition, six clerks and one clerical supervisor are assigned to support all three divisions in the commercial department.

- Commercial improved property is categorized according to major property types including multi family, office, retail, industrial/manufacturing and various other categories of business-related uses. The commercial appraisal staff is responsible for the data maintenance and annual valuation of general commercial improved property and commercial and rural (non-residential) vacant land parcels. One appraisal team handles the reappraisal of land, the valuation of industrial and office-related property categories and the completion of split/plat workflow assignments generated from records changes. The other team is responsible for valuation of multi-family and retail-related property categories and performs all office and field review of parcels associated with a 2021 building permit. Both appraisal managers and key staff also handle the review, preparation and presentation of Arbitration cases

- **Research Division**

The research division consists of a manager, six appraisers and two clerks. This section is primarily responsible for collecting, processing, and maintaining sales and income information that is used in the valuation process.   After the information is processed and verified, the sales and income information is entered into and stored in database tables. The database tables are integrated within the valuation models. The information is easily accessible for the appraisers to use in the sale model building and calibration process, edit process, informal discussions, and appraisal review board hearings. Land sales data is processed and posted to appraisal maps which are also accessible through the TAD Geographic Information System (GIS) application.

The research division is responsible for updating and maintaining the commercial classification manual. This process includes the periodic review and calibration of cost data contained in the CAMA system. The research staff is also responsible for monitoring and implementing new or revised appraisal methods and techniques in order to stay proficient with current appraisal technique and maintain compliance with USPAP Standard Six. An extensive online resource library is maintained and includes commercial real estate and financial publications, published survey data, on-line appraisal data sources, appraisal educational textbooks and software, periodicals and journals, comptroller's reports and various other resources to assist the appraisal process.

- **Complex Properties Division**

  The complex properties division consists of a manager and three appraisers. This section is responsible for valuing complex and unique properties. The complex and unique properties consist of golf courses, utilities, railroads, high-rise downtown office buildings, regional and local airports, shopping malls, lifestyle centers, hospitals, and possessory interest properties. Special properties also monitor properties located within designated Tax Increment Financing (TIF) areas. The higher profile complex properties that have a tremendous impact on the North Texas economy include AT&T Stadium, Globe Life Field, Hurricane Harbor, Six Flags, DFW Airport, American Airlines, General Motors, and Gaylord Texan Resort.

DATA COLLECTION / VALIDATION

Data Collection/Appraisal Manuals

A common set of data characteristics for each commercial property in Tarrant County is collected in the field and data entered in Aumentum. This property-specific data drives the three approaches to value. Additional required data includes verified sales of vacant land and improved properties and the pertinent data obtained from each (sales price levels, capitalization rates, income multipliers, equity dividend rates, marketing period, etc.). Other data used by the appraiser includes sale listings, fee appraisals, actual income and expense data (typically obtained through the hearings process), actual contract rental data, leasing information (commissions, tenant finish, length of terms, etc.), and actual construction cost data. In addition to the actual data obtained from specific properties, market data publications and published market surveys are also reviewed to provide additional support for market trends.

The Commercial Appraisal Classification Manual is the main resource used for data collection and documentation of physical property characteristics. The commercial manual is used to establish uniform procedures for the correct listing of real property by field appraisers. This manual is continually updated, providing a uniform system of listing the multitude of field data elements necessary to describe commercial real properties. All commercial properties located in TAD's jurisdiction are coded or described according to the manual and the three approaches to value are structured and calibrated based on this coding system. The field appraisers use the manuals during their initial training and as a guide in the field inspection of properties. Most of the data collection options are represented in Aumentum through a series of drop-down selection lists. Field data lists, codes and table rates are reviewed periodically for update as needed.

The commercial manual also provides the framework for the commercial cost model. The Aumentum CAMA system is integrated with a Marshall & Swift Valuation Platform or MVP and is used by the appraisal staff to calculate dependable building cost estimates for all types of commercial properties.

Actual construction cost data is also collected and analyzed. Property owners generally provide this data during the appeals process.

Standardized codes are developed and used to describe commercial property at both the parcel and the economic unit level. For example, one key characteristic of a property, at the parcel level, is building class. This is similar to the Marshall and Swift component called "occupancy class". An appraisal site, however, may be comprised of multiple building classes. An appraisal site is coded using a site class description that reflects the predominant economic use for the entire property.

Field Review

The date of last inspection, extent of that inspection, and commercial appraiser code are listed in the Aumentum system. If a property owner disputes the District's records concerning this data in a protest hearing, the record may be corrected based on the credibility of the evidence provided. Typically, a new field check is then requested to verify this evidence for the current year's valuation or for the next year's valuation. In addition, if a building permit is filed for a particular property indicating a change in characteristics, that property is added to a permit work file. In 2021, the commercial appraisal staff worked 4,241 building permits. The commercial appraisal division reappraisal work plan allows for a physical inspection of every property at least once every four years.

Commercial appraisers are somewhat limited in the time available to field review all commercial properties of a specific use type. However, a major effort is made by appraisers to field review as many properties as possible or economic areas experiencing large numbers of remodels, renovations, or retrofits, changes in occupancy levels or rental rates, new leasing activity, new construction, or wide variations in sale prices. Additionally, the appraisers frequently field review subjective data items such as building class, quality of construction, condition, and physical, functional and economic obsolescence factors contributing significantly to the market value of the property. In some cases, field reviews are warranted when sharp changes in occupancy or rental rate levels occur between building classes or in rapidly changing economic areas. With preliminary estimates of value in these targeted areas, the appraisers test computer assisted values against their own appraisal judgment. While in the field, the appraisers physically inspect and photograph sold and unsold properties for comparability and consistency of values.

Sales Data

Commercial sales data is collected, verified and processed by the commercial research staff. A standardized workflow procedure is followed to track and accurately process the documents. The sale data items are preliminarily reviewed and verified to determine reliability of the content and the source. Some preliminary sale information is then entered in the Aumentum sales tracking system, using the Tarrant County deed filing's instrument number as a key field.   After entry into the tracking system, the staff then assembles and records detailed information about each sold property. The sale detail includes capturing a "picture" of each appraisal site and parcel as of the date of the sale. Physical, geographic and financial data is documented and entered in the Aumentum sale entry record. A final quality control review of the written and entered data occurs and the sales data is then released to the appraisers and to the public for the purpose of mass appraisal valuation. Sales can be viewed in Aumentum individually, in the data entry module, or as part of a model-driven sales summary grid in the sales comparison module. The paper documentation for all processed sale and income information is

maintained in the TAD imaging system. The research department processed 690 valid sales with a 2020 or 2021 deed date.

Income Data

Income and expense data consist of property rent rolls and income statements and is generally provided by property owners during the appeals process. The appraisal staff forwards the data to the research section where it is immediately scanned into image-processing workflow basket. In 2021, the research department received 2,083 income and expense statements. The data is retrieved by appraisers and processed into the Aumentum income and expense tables. The district also subscribes to several real estate publications that provide individual summarized income data within each specified submarket or improved market area. Pertinent income data includes rental rates, asking rental rates, vacancies, tenant reimbursements, operating expenses, capitalization rates, discount rates, lease up projections, and finish out costs.

Around April 15th of each year, the bulk of commercial value notices are mailed, and sales and income data is made available at TAD's customer service area on CD-ROM disks. Land sales are identified and recorded on CAD maps using a mapping software product called ARC-INFO. A full set of land sale maps, in PDF format, are also provided to the customer service area. All sale and income information and land sales maps are also available on the TAD website.

Sources of Data

Closing statements, cost documents, rent rolls and income statements provided by owners during the appeals and ARB process are considered the most reliable sources of property data. Another reliable source of verified sales and income data is the local fee appraiser community. Networking with others in the appraisal profession benefits the overall quality and credible application of the data.

The Tarrant Appraisal District records division receives a copy of the deeds recorded in Tarrant, Dallas, Denton, Johnson, Parker, and Ellis County that convey commercially classed properties located within the TAD jurisdiction. When a deed involving a change in commercial property ownership is entered into the TAD system, commercial survey letters are produced. One letter is mailed to the buyer and one to the seller, in an attempt to obtain the pertinent sale information.   Tarrant Appraisal District also subscribes to CoStar, a private vendor of commercial sale and property data, TREPP, a service that tracks CMBS market activity and to the Multiple Listing Service (MLS). Other sales sources are contacted such as the brokers involved in the sale, property managers, commercial real estate vendors, or other knowledgeable parties.

DATA ANALYSIS

PRELIMINARY ANALYSIS

Prior to beginning of the valuation activities for an appraisal year, appraisal department management completes a thorough review of the results of the preceding year. Goals and objectives are determined and managers establish a plan of action. Budget, calendar issues and resource availability are all considered. Appraisal activities must be coordinated between TAD departments to avoid conflicts and ensure availability of personnel. Appraisal resources, including staff and system needs are evaluated. Appraisal Review Board activity and value changes in the informal appeals process are analyzed. Most importantly, a preliminary internal ratio study is produced to identify any property category or geographic area that may require more research or analysis. The appraisal staff works with the research section to identify priority areas for sales data collection and any necessary enhancements to the standardized appraisal classification manual.

Tarrant Appraisal District also coordinates its discovery and valuation activities with adjoining appraisal districts. Numerous field trips, interviews and data exchanges with adjacent appraisal districts are conducted to ensure compliance with state statues. In addition, Tarrant Appraisal District administration and personnel interact with other assessment officials through professional trade organizations including the International Association of Assessing Officers, Texas Association of Appraisal Districts and its subchapter Texas Metropolitan Association of Appraisal Districts and the Texas Association of Assessing Officers.

Market Analysis

A mass-appraisal market analysis relates directly to economic market forces affecting supply and demand that affect a group of similar or "like" properties. This study involves the relationships between social, economic, environmental, governmental, and site conditions. Appraisers consider such general market data as submarket supply and demand, zoning and code restrictions, municipal services, school district characteristics, crime rate patterns, job growth patterns, income levels, population trends, transportation issues, interest rate levels, investment patterns and a myriad of other factors that influence the local real estate market.

Specific market data is gathered and analyzed including sales of commercial properties, new construction and other permit activity, new leases, lease rates, absorption rates, vacancies, typical property expenses (inclusive of replacement reserves), expense ratio trends, and capitalization rate indicators.

Area Analysis

Data on regional economic forces such as demographic patterns, regional locational factors,

employment and income patterns, general trends in real property prices and rents, interest rates, discount rates, and financing trends, availability of vacant land, and construction trends and costs are collected from private vendors and public sources. Key appraisers and managers analyze the data and meet regularly to discuss how these factors and trends could impact the local real estate market. More detailed analysis is then completed to determine what model recalibration and specification will need to occur during the upcoming valuation cycle.

As part of a continuing education process, appraisers and managers regularly attend local and statewide seminars and workshops that cover these related topics. Appraisers are also required complete a series of appraisal related courses to achieve and maintain knowledge in the application of general and specific data throughout the valuation process.

Neighborhood (Submarket) Analysis

A commercial neighborhood, submarket or economic area is comprised of the land and the commercial properties located within the boundaries of a specifically defined geographic location. A market area consists of a wide variety of both competing and complimentary property types including residential, commercial, industrial and governmental. Market area delineations can be based on man-made, political, or natural boundaries. Submarket analysis involves the examination of how physical, economic, governmental and social forces at the local, national and international level influence or affect property values. The effects of these forces are used to determine the highest and best use for a property, and to select the appropriate sale, income and cost data in the valuation process.

Improved and land market areas are defined for each of the various improved property types (apartment, office, retail, warehouse and special use) based upon a qualitative and quantitative analysis of similar economic or market forces. These include but are not limited to similarities of rental rates, quality of overall buildings or projects (known as building rank by area commercial market experts), date of construction, levels of market activity and competition, supply and demand, submarket stability, city ordinances, availability of infrastructure and other pertinent influences. Economic area identification and delineation by each major property use type is a key component in a mass-appraisal, commercial valuation system. All income and sales comparison valuation models are specific. Economic areas are periodically reviewed to determine if redelineation is required.

Highest and Best Use Analysis

The highest and best use is the most reasonable and probable use that generates the highest present value of the real estate as of the date of valuation. The highest and best use of any given property must be physically possible, legally permissible, financially feasible, and maximally productive. It is that use that will generate the highest net return to the property over a period of time.   For vacant tracts of land within a jurisdiction, the highest and best use is considered speculative but market-oriented and is based on the surrounding land uses in a competing land market area. The appraiser must consider the most probable use that is permitted under local administrative regulations and ordinances. While its current zoning regulation may restrict a property's use, the appraiser may also consider the probability that the zoning could be changed.

For improved properties, highest and best use is evaluated as currently improved and as if the site were still vacant. In many instances, the property's current use is the same as its highest and best use. However, the appraiser may determine that the existing improvements have a transitional use, interim use, nonconforming use, multiple uses, speculative use, excess land, or a different optimum use, if the site were vacant. Improved properties reflect a wide variety of highest and best uses which include, but are not limited to: office, retail, apartment, warehouse, light industrial, special purpose, or interim uses. Proper highest and best use analysis insures that the most accurate estimate of market value can be derived. Market value is also referred to as value in exchange.

Value in use represents the value of a property to a specific user for a specific purpose. An example of value is use is agricultural or productivity value. The Texas Property Tax Code has specific provisions for certain categories of property that require a value based on a specific use. This value is significantly different than market value, which approximates market price under the following assumptions: (i) no coercion of undue influence over the buyer or seller in an attempt to force the purchase or sale, (ii) well-informed buyers and sellers acting in their own best interests, (iii) a reasonable time for the transaction to take place, and (iv) payment in cash or its equivalent.

Highest & Best Use - Appraisal Site Determination

An appraisal site consists of a property or grouping of properties recognized by the market as a single unit. An appraisal site requires common ownership and physical contiguity with natural or geographic boundaries and may contain one or more TAD accounts. In addition, the highest and best use is most probable, and would sell, as one property. A commercial appraiser determines an appraisal site as part of the highest and best use analysis. The appraiser creates an Appraisal site record by identifying the account numbers and other required data as indicated in the commercial classification manual. Commercial appraisers make market value determinations at both the account or "parcel" level and the Appraisal Site or "property" level.

VALUATION METHODS & TECHNIQUES

Model Specification and Calibration

The commercial appraisal system consists of mass appraisal applications of the sales comparison, cost, and income approaches to value. The applications were developed based on economic theory, market analysis, and generally accepted appraisal techniques. Each approach to value represents a specified model or formula that defines property characteristics and their relationships in an effort to arrive at an indication of market value for a given property. The final value is a reconciliation of all three approaches to value.

Model calibration involves the process of periodically adjusting the mass appraisal formulas, tables, and schedules to reflect current local market conditions. Three valuation models are utilized in the mass appraisal process; cost, income and sales comparison models. The software developed to create the

valuation models has been specified according to appropriate mass appraisal procedures and techniques. On an annual basis, adjustments or calibrations can be made to reflect new construction procedures, materials and/or costs, new submarket delineation, current sale and rent data, and market capitalization rates, which can vary from year to year. The basic structure of the overall mass appraisal model can be valid over an extended period of time, with recalibration or trending factors utilized for updating the data to the current market conditions. However, at some point, if the adjustment process becomes too involved, the model calibration technique can mandate new model specifications or a revised model structure.

Cost Models/Schedules

The formula for a cost driven valuation model begins with an estimate of replacement cost new (RCN) for all improvements (buildings, fencing, paving etc.) on a parcel of land. Three forms of depreciation are considered and subtracted from the RCN to result in an estimate of value for the improved portion of the real estate. The sales comparison approach is typically the most reliable method to value the underlying land. An overall value is then computed by adding the depreciated value of the improvements to the value of the land.

The cost approach to value is applied to all improved real property utilizing the comparative unit or square foot method. This methodology involves the utilization of national cost data reporting services as well as consideration of actual cost information on comparable properties whenever possible. Cost estimates are made in the Cama System using the integrated MVP platform. Cost models include the derivation of replacement cost new (RCN) of all improvements. These include comparative base rates, per unit adjustments and lump sum adjustments. Time and location modifiers are necessary to adjust cost data to reflect conditions in a specific market and changes in costs over a period of time. Because a national cost service is used as a basis for the cost models, locational modifiers are necessary to adjust these base costs specifically for Tarrant County. The MVP platform provides these modifiers.

Depreciation schedules are contained in the integrated MVP Platform and are based on what is typical for each property type at that specific age. Depreciation schedules have been implemented for what is typical of each major class of commercial property by economic life categories. Schedules have been developed for improvements with 15, 20, 30, 40, 50, 60 and 70 year expected life. The research section, to ensure they are reflective of current market conditions, then tests these schedules, using sales of relatively new properties. The actual and effective ages of improvements are noted in Aumentum. Effective age estimates are based on the utility of the improvements relative to where the improvement lies on the scale of its total economic life and its competitive position in the marketplace. Effective age estimates are based on 5 condition ratings that relate to the level of property maintenance and are described in the Commercial appraisal classification manual.

A depreciation adjustment model can be used if the condition or effective age of a property varies from the norm by appropriately noting the physical condition and functional utility ratings on the property data characteristics. These adjustments are typically applied to a specific property type or location and can be developed via ratio studies or other market analyses. Accuracy in the application of the MVP, condition ratings and integrated depreciation schedules will usually minimize the necessity of this type of

an adjustment factor.

Income Models

The income approach to value is applied to those real properties which are typically viewed by market participants as "income producing", and for which the income methodology is considered a reliable leading value indicator. The first step in the income approach pertains to the estimation of market rent on a per unit basis. This is derived from an analysis of both actual rent data furnished by property owners and from market rent derived from comparable properties. This per unit rental rate multiplied by the number of units or net rentable area results in the estimate of potential gross rent. Actual income data is entered and stored in the Aumentum income module.

A vacancy and collection loss allowance is the next item to consider in the income approach. The projected vacancy and collection loss allowance is established from actual data furnished by property owners and on local market publications. This allowance accounts for periodic fluctuations in occupancy, both above and below an estimated stabilized level. The market derived stabilized vacancy and collection loss allowance is subtracted from the potential gross rent estimate to yield an effective gross rent.

Next a secondary income or service income is calculated as a percentage of stabilized effective gross rent. Secondary income represents parking income, escalations, reimbursements, and other miscellaneous income generated by the operations of real property. The secondary income estimate is derived from actual data collected and available market information. The secondary income estimate is then added to effective gross rent to arrive at an effective gross income.

Allowable expenses and expense ratio estimates are based on a study of the local market, with the assumption of prudent management. An allowance for non-recoverable expenses such as leasing costs and tenant improvements are included in the expenses. A non-recoverable expense represents costs that the owner pays to lease rental space. Different expense ratios are developed for different types of commercial property based on use. For instance, retail properties are most frequently leased on a triple-net basis, whereby the tenant is responsible for his pro-rata share of taxes, insurance and common area maintenance. In comparison, a general office building is most often leased on a base year expense stop. This lease type stipulates that the owner is responsible for all expenses incurred during the first year of the lease. However, any amount in excess of the total per unit expenditure in the first year is the responsibility of the tenant. Under this scenario, if the total operating expense in year one (1) equates to $8.00 per square foot, any increase in expense over $8.00 per square foot throughout the remainder of the lease term would be the responsibility of the tenant. As a result, expense ratios are implemented based on the type of commercial property.

Subtracting the allowable expenses from the effective gross income yields an estimate of net operating income.

Rates and multipliers are used to convert income into an estimate of market value. These include income multipliers, overall capitalization rates, and discount rates. Each of these is used in specific

applications. Rates and multipliers also vary between property types, as well as by location, quality, condition, design, age, and other factors. Therefore, application of the various rates and multipliers must be based on a thorough analysis of the market.

The Aumentum CAMA software provides the ability to perform the direct capitalization valuation approach. This methodology involves the capitalization of a stabilized net operating income as an indication of market value for a specific property. Capitalization rates, both overall (going-in) cap rates for the direct capitalization method and terminal cap rates for discounted cash flow analyses, can be derived from the market. Sales of improved properties from which actual income and expense data are obtained provide a very good indication of what a specific market participant is requiring from an investment at a specific point in time. In addition, overall capitalization rates can be derived from the built-up method (band-of-investment). This method relates to satisfying the market return requirements of both the debt and equity positions of a real estate investment. This information is obtained from real estate and financial publications.

Rent loss concessions are made on specific properties with vacancy problems. A rent loss concession accounts for the impact of lost rental income while the building is moving toward stabilized occupancy. The Aumentum income module has a component that assists the appraiser in estimating typical costs incurred during a lease up period. Market rent, actual occupancy rate, stabilized occupancy rate, absorption period, build out allowances (for first generation space or retrofit/second generation space as appropriate) and leasing expenses are all considered in the calculation. The total adjusted loss from these real property operations is discounted using an acceptable risk rate. The discounted value (inclusive of rent loss due to extraordinary vacancy, build out allowances and leasing commissions) becomes the rent loss or lease up concession and is deducted from the value indication of the property at stabilized occupancy. A variation of this technique allows that for every year that the property's actual occupancy is less than stabilized occupancy a rent loss deduction may be estimated.

The TAD commercial department income approach is highly standardized using the Aumentum mass appraisal-based income modeling application. The process requires extensive analysis of market and actual income data by both the appraisal and research staff. Improved properties are grouped based on similar income and market characteristics.

Prior to the valuation process, several key technical appraisers analyze the actual income data for creating a series of income models. Each income models contain the necessary data to compute an indication of value using the income formula. This data includes gross potential rent rate per square foot, economic vacancy percent, other income per square foot, and an expense rate per square foot and as a percent. This data is then applied in the model portion of the Aumentum income application, to properties that have the same market area, age range and size range, as specified for each specific category of improved property. The cap rate is the variable for each model, as the appraiser must consider the various market and property elements in selecting the appropriate rate for each subject property.

The appraiser completes the income valuation process by selecting either the subject's actual income or the model data as the best market indicators. This data is then imported to the pro forma portion of the

Aumentum income application. The appraiser reviews the data and indicated value and adjusts as necessary, to come up with a final indication of value. This value is carried forward to the value summary screen to be considered in the final value reconciliation process.

Sales Comparison (Market) Approach

The sales comparison approach estimates the market value of a subject property by adjusting the sales prices of comparable properties for differences between the comparables and the subject. Although all three of the approaches to value are based on market data, the Sales Comparison Approach is most frequently referred to as the Market Approach. This approach is utilized not only for estimating land value but also in comparing sales of similarly improved properties to each parcel on the appraisal roll. As previously discussed in the Data Collection / Validation section of this report, pertinent data from actual sales of properties, both vacant and improved, is collected throughout the year in order to obtain relevant information which can be used in all aspects of valuation. Sales of similarly improved properties can provide a basis for the depreciation schedules in the Cost Approach, rates and multipliers used in the Income Approach, and as a direct comparison in the Sales Comparison Approach. Improved sales are also used in internal ratio study analysis, which affords the appraiser an excellent means of judging the current accuracy and uniformity of the appraised values.

The commercial department market approach is standardized through the application of the Aumentum mass appraisal-based sales comparison model. The model specification or definition process begins with extensive analysis of market and actual sale data by both the appraisal and research staff. Improved properties are grouped into submarkets or improved market areas based on similar income and market characteristics. Property type, size, location, age and condition are the generally key attributes that identify sale comparability. These characteristics or attributes are reflected in the model definitions. The process of determining the specific attributes and the relationship among the attributes is known as model specification. The appraisers select and define specific criteria that are used to extract a grouping of sales from the commercial database. Each improved sale model has a unique set of selection criteria. Each selection or definition process will produce a set of sale results that can be used to value a similar subject property.

The sales groupings are summarized in sale model results grids. Model calibration involves adjusting the sold properties for any attributes that may differ from the subject property. Standardized adjustments can be developed using paired sale analysis, multiple regression analysis, adaptive estimation process and the cost method. During the valuation process, the commercial appraisal staff reviews the model-driven sale results set for each commercial property and determines which sales are most comparable to the subject. The sales comparison model has the capability to apply appraiser-derived adjustments for differences between the subject and the sales and sales can be weighted for level of comparability. The appraiser reviews the indicated value results for the subject based on the value range, median and average sales prices and indicates a value for the subject in the sales comparison module. This value is carried forward to the Aumentum value summary screen to be considered in the final value reconciliation process.

Final Valuation Schedules

Based on the market data analysis and review discussed previously in the cost, income and sales approaches, the cost, sale and income models are calibrated and finalized. The cost and depreciation calibration results are calculated in Aumentum MVP database tables for utilization on all commercially coded properties in the district. Cost data can be retrieved based on building class. Depreciation information is calculated based on class, condition and effective age. The sale and income model definition criteria are also stored in Aumentum.

Statistical and Capitalization Analysis

Statistical analysis of final values is an essential component of quality control. This methodology represents a comparison of the final value against the standard and provides a concise measurement of the appraisal performance. Statistical comparisons of many different standards are used including sales of similar properties, the previous year's appraised value, audit trails, value change analysis and sales ratio analysis.

Appraisal statistics of central tendency and dispersion generated from sales ratios are available for each property type. These summary statistics including, but not limited to, the weighted mean, standard deviation and coefficient of variation, provide the appraisers an analytical tool by which to determine both the level and uniformity of appraised value of a particular property type. The level of appraised values can be determined by the weighted mean for individual properties within a specific type, and a comparison of weighted means can reflect the general level of appraised value. Review of the standard deviation and the coefficient of variation can discern appraisal uniformity within a specific property type.

The appraisers review every commercial property type annually through the sales ratio analysis process. The first phase involves ratio studies that compare the recent sales prices of properties to the appraised values of the sold properties. This set of ratio studies affords the appraiser an excellent means of judging the present level of appraised value and uniformity of the appraised values. The appraiser, based on the sales ratio statistics and designated parameters for valuation update, makes a preliminary decision as to whether the value level of a particular property type needs to be updated in an upcoming reappraisal, or whether the level of market value is at an acceptable level.

Potential gross rent estimates, occupancy levels, secondary income, allowable expenses (inclusive of non-recoverables and replacement reserves), net operating income and capitalization rate and multipliers are continuously reviewed utilizing frequency distribution methods or other statistical procedures or measures. Income model conclusions are compared to actual information obtained on individual commercial properties during the hearings process as well as information from published sources and area vendors.

variations in sale prices. Additionally, the appraisers frequently field review subjective data items such as building class, quality of construction, condition, and physical, functional and economic obsolescence factors contributing significantly to the market value of the property. In some cases, field reviews are warranted when sharp changes in occupancy or rental rate levels occur between building classes or in

Value Reconciliation

A final value review is completed by the appraisal staff and involves a final reconciliation of the three approaches to value. Each of the three approaches to value is summarized. The appraiser determines if one of the three methods is most appropriate or may weight the results of all three approaches to formulate a final value for each commercial property. If the final value is based on the cost approach, a cost summary report will display the cost detail and percent good for each improved component or taxable object. The land is valued separately, generally using the sales comparison approach. The total property value will result from the total of the depreciated replacement cost for those improvements plus the land value. If the final appraised value is selected based on the reconciliation of more than one approach, then the value is indicated on the Value Correlation screen with each percentage weight applied and calculated to produce a "reconciled value."

Appraisal managers also produce a multitude of edit and audit reports to review the uniformity and accuracy reports of the commercial appraisal values. These reports are generally reviewed by category and show proposed percentage value changes, income and sales model application, new construction status, and overall value ranges. Each parcel is subjected to the value parameters appropriate for its use type. The managers also review methodology for appropriateness to ascertain that it was completed in accordance with USPAP, statutory and district policies. This review is performed after preliminary ratio statistics have been applied. If the ratio statistics are generally acceptable overall, the review process is focused primarily on locating skewed results on an individual basis. Previous values resulting from protest hearings are individually reviewed to determine if the value remains appropriate for the current year based on market conditions.

Once the appraisers and managers are satisfied with the level and uniformity of value for each commercial property, the estimates of value are ready for value notification.   Although the value estimates are determined in a computerized mass appraisal environment, value edits and rework lists enable an individual parcel review of value anomalies before the estimate of value is released for notices.

Statistical Analysis and Performance Testing

The primary tool used to measure mass appraisal performance is the ratio study. A ratio study compares appraised values to market values. In a ratio study, market values (value in exchange) are typically represented by sales prices (i.e. a sales ratio study). Independent, expert appraisals may also be used to represent market values in a ratio study (i.e. an appraisal ratio study). If there are not enough sales to provide necessary representativeness, independent appraisals can be used as indicators for market value. This can be particularly useful for commercial, warehouse or industrial real property for which sales are limited. In addition, appraisal ratio studies can be used for properties statutorily not appraised at market value, but reflect the use-value requirement. An example of this are multi-family housing projects subject to subsidized rent provisions or other governmental guarantees as provided by legislative statutes (affordable housing) or agricultural lands to be appraised on the basis of productivity

or use value.

Tarrant Appraisal District has adopted the policies of the IAAO STANDARD ON RATIO STUDIES, circa April 2013 regarding its ratio study standards and practices. Ratio studies generally have six basic steps: (1) determination of the purpose and objectives, (2) data collection and preparation, (3) comparing appraisal and market data, (4) stratification, (5) statistical analysis, and (6) evaluation and application of the results.

Sales Ratio Studies

Sales ratio studies are an integral part of establishing equitable and accurate market value estimates, and ultimately assessments for this taxing jurisdiction. The primary uses of sale ratio studies include the determination of a need for general reappraisal; prioritizing selected groups of properties types for reappraisal; identification of potential problems with appraisal procedures; assist in market analyses; and recalibration of appraisal models used to derive appraised values during valuation or reappraisal cycles. However, these studies cannot be used to judge the accuracy of an individual property appraised value. The Tarrant Appraisal Review Board may make individual value adjustments based on unequal appraisal (ratio) protest evidence submitted on a case-by-case basis during the hearing process.

Overall sales ratios are generated by use type semi-annually (or more often in specific areas) to allow appraisers to review general market trends in their area of responsibility. In many cases, field checks may be conducted to insure the ratios produced are accurate and the appraised values utilized are based on accurate property data characteristics. These ratio studies aid the appraisers by providing an indication of market activity by economic area or changing market conditions (appreciation or depreciation).

Comparative Appraisal Analysis

The commercial appraiser performs an average unit value comparison in addition to a traditional ratio study. These studies are performed on commercially classed properties by property use type (such as apartment, office, retail and warehouse usage or special use). The goal of this analysis is to compare the appraisal performance of sold and unsold properties. These studies are conducted on substrata such as building class and on properties located within various economic areas. In this way, overall appraisal performance is evaluated geographically, by specific property type to discern whether sold parcels have been selectively appraised. When sold parcels and unsold parcels are appraised equally, the average unit values are similar. These horizontal equity studies are performed prior to annual noticing.

Business Personal Property Valuation Process

Identification of Properties Appraised

The Business Personal Property Department (BPP) of the Tarrant Appraisal District (TAD) is responsible for developing fair and uniform market values for business personal property located within the district. There are four different account types appraised: (1) standard business personal property, (2) leased asset/special property at multiple locations, (3) commercial aircraft, and (4) special inventory. In 2021, there were approximately 64,505 total commercial and industrial personal property accounts. The department also manages mineral interest accounts although the valuation of the accounts is conducted by a third-party appraisal firm. In 2021, there were approximately 1,100,000 mineral accounts.

Appraisal Resources

- **Personnel** – The BPP department consists of a department director, an appraisal manager, a research manager, an appraisal staff, a clerical supervisor and a clerical staff.

DATA COLLECTION/VALIDATION

Data Collection Procedures

A common set of data characteristics for each account in the district is collected primarily in the field by the appraiser workgroups and is entered into the Aumentum system by the clerical staff. These assigned property characteristics direct the CAMA software system to a preliminary account value.

Business personal property data collection procedures are published and distributed to all appraisers involved in the appraisal and valuation process. The appraisal procedures are reviewed and revised to meet the changing requirements of field data collection. The most recent revision of the data collection procedures was for tax year 2018.

Sources of Data

Standard Business Personal Property Account

TAD's property characteristic data was originally received from Tarrant County and the various city/school district records between 1981 and 1982, and where absent, collected through a massive field data collection effort coordinated by the district over a period of time. When revaluation activities permit, district appraisers collect new data via an annual field drive-out. This project results in the discovery of new businesses not revealed through other sources. Various discovery publications such as the Fort Worth Business Press, Texas DOT commercially registered vehicle listing (provided by Infonation Inc.), sales tax permits listings, and local occupancy permits are also used for discovery purposes. Tax assessors, city and local newspapers, business owners, and district residents provide discovery information and other useful facts related to valuation.

Leased Asset/Special Property at Multiple Locations Account

The primary source of discovery for these accounts is owner renditions submitted in either hard copy or electronic format. Field inspections are sometimes used to supplement this information.

Commercial Aircraft

"Air Pac", a private company in Edmond, Oklahoma, consolidates information from the Federal Aviation Administration (FAA) along with local airport/airfield management and provides TAD with a listing of commercial aircraft with situs in this district. Valuation is accomplished by referencing the Aircraft Blue Book Price Guide (Winter Edition) and the Airliner Price Guide to establish 100% market value. Owner renditions are then referred to for any allocation required.

Special Inventory

In coordination with the Tarrant County Tax Assessor/Collector, a copy of the monthly and annual declaration forms for boat, heavy equipment, manufactured housing, and motor vehicle dealers (as defined by Section 23 of the Texas Property Tax Code) are maintained at TAD and used for discovery and valuation of special inventory accounts. Alternate discovery methods may sometimes be used as described in the Standard Business Personal Property Account section.

Office Review

Standard Business Personal Property Account

A BPP valuation program exists in Aumentum's Personal Property Appraisal (PPA) module that identifies accounts in need of review based on a variety of conditions. Property owner renditions, accounts with field or other data changes, accounts with prior hearings, new accounts, and NAICS cost table changes are all considered. The accounts are processed by the valuation program and pass or fail preset tolerance parameters by comparing appraised values to prior year and model values. An appraiser reviews accounts that fail the tolerance parameters.

Leased Asset/Special Property at Multiple Locations Account

Leased Asset/Special Property accounts that have a high volume of vehicles or other assets are loaded programmatically if reported by the property owner electronically. Electronic renditions either emailed or provided via CD or flash drive often require reformatting before they can be loaded to the account. Accounts that render by hard copy are data entered by the BPP clerical staff. After matching and data entry, reports are generated and reviewed by an appraiser. Once proofed, necessary corrections are made, supervisor approval is granted, and the account is sent a value notice.

Commercial Aircraft

The valuation and review process of commercial aircraft accounts are conjoined. These accounts are simultaneously valued/reviewed with rendered data and a third- party market value guide.

Special Inventory

TAD's perpetual account tracking system ensures dealers without a current declaration on file are contacted to advise them of their legal filing requirements and to provide TAD with the most current valuation/review data available.

DATA ANALYSIS

Business Classification Code Analysis

Numeric business classification codes are used as the basis for classification and valuation of business personal property accounts. Business classification code identification and delineation is the cornerstone of the business personal property valuation system in the district. All of the analysis work done in association with the valuation process is specific to the business classification code. There are in excess of 600 business classification codes. Business classification codes are delineated based on

observable aspects of homogeneity. Business classification code delineation is periodically reviewed to determine if further delineation is necessary.

Highest and Best Use Analysis

The highest and best use of property is the reasonable and probable use that supports the highest present value as of the date of the appraisal. The highest and best use must be physically possible, legally permissible, financially feasible, and maximally productive. The highest and best use of business personal property is normally its current use.

VALUATION METHODS & TECHNIQUES

Model Specification and Calibration

Cost Schedules

Cost schedules are developed by business classification code by TAD BPP appraisers under the supervision of valuation analysts. The cost schedules are developed by analyzing cost data from property owner renditions, settlement and waiver of protest documentation, Appraisal Review Board (ARB) hearing evidence, Texas Comptroller schedules, and published cost guides (such as Marshall & Swift Commercial Contents and Inventory software). The cost schedules are reviewed periodically to reflect changing market conditions. TAD schedules are exclusively in a price per square foot format. Documentation for these schedules is archived in the department.

Statistical Analysis

Summary statistics such as the median, weighted mean and standard deviation provide appraisers an analytical tool by which to determine both the level and uniformity of appraised value by business classification code.

Depreciation Schedule and Trending Factors:

Because of a general lack of sales and income data, TAD's primary approach to the valuation of business personal property is the cost approach. The replacement cost new (RCN) is either developed from property owner reported historical cost or from TAD developed valuation models. The trending factors used by TAD in the development of the depreciation schedule are based on published valuation guides. The percent good depreciation factors used by TAD are also based on published valuation guides. The index factors and percent good depreciation factors were used to develop present value factors (PVF), by year of acquisition, as follows:

$$PVF = INDEX\ FACTOR \times PERCENT\ GOOD\ FACTOR$$

The PVF is used as an "express" calculation in the cost approach. The PVF is applied to reported historical cost as follows:

$$MARKET\ VALUE\ ESTIMATE = PVF \times HISTORICAL\ COST$$

A depreciation schedule was then adopted that reflects all of the preceding calculations. This mass appraisal PVF schedule is used to ensure that estimated values are uniform and consistent within the market.

Valuation Models

The two main objectives of the valuation model process are to: (1) analyze and adjust existing business classification models and (2) develop new models for business classifications not previously integrated into Aumentum. The delineated sample is reviewed for accuracy of business classification code, square footage, field data, and original cost information. Models are created and refined using actual original cost data to derive a typical replacement cost new (RCN) per square foot for a specific category of assets. The RCN per square foot is depreciated by the estimated age using the depreciation table adopted for the tax year.

The data sampling process is conducted in the following order: 1) Prioritizing business classification codes for model analysis. 2) Compiling the data and developing the reports. 3) Field checking the selected samples. The models are built and adjusted using internally developed software. The models are then tested against the previous year's data. The typical RCN per square foot (or applicable unit) is determined by a statistical analysis of the available data.

VALUE RECONCILATION

Standard Business Personal Property Account

Valuation models are used in the business personal property valuation program to estimate the value of new and/or existing accounts for which no property owner's rendition has been filed. Model values are also used to establish tolerance parameters for testing the valuation of property for which prior data years' data exist or for which current year rendered information is available. The calculated current year value or the prior year's value is compared to the indicated model value by the valuation program. If the value being tested is within an established acceptable percentage tolerance range of the model value, the account passes that range check and moves to the next valuation step. If the account fails the tolerance

range check, it is flagged for individual review. Allowable tolerance ranges may be adjusted from year to year depending on the analysis of the results of the prior year.

Leased Asset/Special Property at Multiple Locations Account

Leased and multi-location assets are valued using the PVF schedules mentioned above. If the asset to be valued in this category is a vehicle, then NADA published book values are used. Assets, including vehicles, that are not valued directly from a third- party source, are valued by an appraiser using PVF schedules or published guides.

Commercial Aircraft

Valuation is accomplished by referencing the Aircraft Blue Book Price Guide (Winter Edition) and the Airliner Price Guide, which is updated annually. Aircraft that are not valued by this method are valued by an appraiser using PVF schedules.

Special Inventory

Valuation is based upon the annual declaration filed by the property owner indicating the previous year's Texas sales (used as the numerator) and divided by a factor of 12 (the denominator). This establishes a monthly basis consistent with the owner's tax payment requirements. In the absence of an annual declaration, like businesses that have filed declarations are identified and adjusted to the subject property to establish an estimated market value.

PERFORMANCE TESTS

Ratio Studies

Every two years the Property Tax Division of the state comptroller's office conducts a property value study (PVS). The PVS is a ratio study used to gauge appraisal district performance. Results from the PVS play a part in school funding. Rather than a sales ratio study, the personal property PVS is a ratio study using state cost and depreciation schedules to develop comparative personal property values. These values are then compared to TAD's personal property values and ratios are formed.

Internal Testing

TAD can test new or revised cost and depreciation schedules by running the valuation program in a test environment prior to the valuation cycle. This can give appraisers a chance to make additional refinements to the schedules if necessary.

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LIMITING CONDITIONS

The appraised value estimates provided by the district are subject to the following conditions:

1. The appraisals were prepared exclusively for ad valorem tax purposes in accordance with Texas state tax laws. The analysis, opinions and conclusions were developed and this report has been prepared in conformity with the Uniform Standards of Professional Appraisal Practice, Standards 5 and 6, as adopted by the Appraisal Standards Board of the Appraisal Foundation. The District also adheres to IAAO standards as they apply to mass appraisal and conform to Texas laws.

2. The property characteristic data upon which the appraisals are based is assumed accurate and correct. Exterior inspections of the properties appraised were performed as staff resources and time allowed. Interior inspections of properties are limited to TAD hours of business and subject to the availability and cooperation of property owners.

3. Validation of sales transactions was attempted through questionnaires to buyer and seller, telephone survey and field review. In the absence of such confirmation, sales data obtained from vendors was considered reliable.

4. A list of staff providing significant mass appraisal assistance to the person signing this certification is attached to this report. The compensation of appraisal district employees is not contingent upon the development or reporting of a predetermined or prescribed value.

5. The district's 2020 MAP results and the results of the 2021 ratio study will be available upon request from the Property Tax Assistance Division of the Texas Comptroller.

Certification Statement:

"I, Jeffery D. Law, Chief Appraiser for the Tarrant Appraisal District, solemnly swear that I have made or caused to be made a diligent inquiry to ascertain all property in the district subject to appraisal by me, and that I have included in the records all property that I am aware of at an appraised value which, to the best of my knowledge and belief, was determined as required by law."

Jeffery D. Law   Date: December 31, 2021

Executive Director/Chief Appraiser

Appendices

Appendix A - Key Resources Providing Mass Appraisal Assistance

DEPARTMENT	EMPLOYEE	POSITION
	JEFFERY D. LAW	**EXECUTIVE DIRECTOR/CHIEF APPRAISER**
ADMINISTRATION	**JEFF CRAIG**	**DIRECTOR OF ADMINISTRATION**
	VICKI WILLKIE	MANAGER OF ARB OPERATIONS
RESIDENTIAL	**RANDY ARMSTRONG**	**DIRECTOR OF RESIDENTIAL APPRAISAL**
	MELE LANGLOIS	DIVISION MANAGER
	ERIC WATKINS	DIVISION MANAGER
	BRANDON CANARD	DIVISION MANAGER
	BRYAN MCKISSICK	APPRAISAL SUPERVISOR
	VICTOR GUADALUPE	APPRAISAL SUPERVISOR
	RYAN BUKHAIR	APPRAISAL SUPERVISOR
COMMERCIAL	**DAVID LAW**	**DIRECTOR OF COMMERCIAL APPRAISAL**
	WILLIE BRAND	COMMERCIAL/COMPLEX PROPERTIES MANAGER
	DEBBIE CABELLO	RESEARCH AND REPORTING MANAGER
	WILLLIAM F. DURHAM	LITIGATION MANAGER
	ROY SMITH	REGIONAL APPRAISAL MANAGER
	TERRY SPRADLIN	REGIONAL APPRAISAL MANAGER
BPP, UTILITY &, MINERALS	**BRAD PATRICK**	**DIRECTOR OF BPP APPRAISAL**
	STEVE MCKEEHAN	APPRAISAL MANAGER
SUPPORT SERVICES	**DONNA PERLICK**	**DIRECTOR OF SUPPORT SERVICES**
	PRECIOUS BOWERS	SUPPORT SERVICES MANAGER
	DEBBIE BRANCH	EXEMPTIONS SUPERVISOR
	TRACY LYONS	DEED RECORDS SUPERVISOR
	DAMIANA REYES	CUSTOMER SERVICE SUPERVISOR
INFORMATION SERVICES	**CAL WOOD**	**DIRECTOR OF INFORMATION SERVICES**
	STEVEN OAKES	BUSINESS ANALYST & PROGRAMMING MGR.
	DON MORRIS	WEB SOLUTIONS MANAGER
	MICHAEL RUSSELL	SPECIAL ASSISTANT TO THE IS DIRECTOR
	GREG DEAN	IT INFRASTRUCTURE MANAGER
	KARINA DAWSON-PHILPOT	GIS MANAGER

Appendix B - COMPTROLLER'S STATE USE CLASSIFICATION CODES WITH TAD DELINIATIONS

Code	Description
A	Residential Single Family
AC	Single Family Interim Use
B	Multi-Family Residential
BC	Multi-Family Commercial
C1	Vacant Land Residential
C1C	Vacant Land Commercial
C2C	Commercial Land with Improvement Value
D1	Qualified Open Space Land
D2	Farm and Ranch Improvements on Qualified Open Space Land
E	Rural Land (No Ag) and Improvements Residential
EC	Rural Land (No Ag) and Improvements Commercial
F1	Commercial
F1P	Billboards Personal Property
F2	Industrial
G1	Oil, Gas and Mineral Reserve
J1	Commercial Utility Water Systems
J1P	Personal Property Utility Water Systems
J2	Commercial Utility Gas Companies
J2P	Personal Property Utility Gas Companies
J3	Commercial Utility Electric Companies
J3P	Personal Property Utility Electric Companies
J4	Commercial Utility Telephone Companies
J4P	Personal Property Utility Telephone Companies
J5	Commercial Utility Railroads
J5P	Personal Property Utility Railroads
J6	Commercial Utility Pipelines
J6P	Personal Property Utility Pipelines
J7	Commercial Utility Cable Companies
J7P	Personal Property Utility Cable Companies
J8	Commercial Utility Other
J8P	Personal Property Utility Other
L1	Personal Property Tangible Commercial
L2	Personal Property Tangible Industrial
M1	Mobile Home
M2	Personal Property Aircraft
O	Residential Inventory
RO	Real Property Reference Only
ROC	Real Property Reference Only Commercial
S	Personal Property Special Inventory
X	Vacant Right of Way

Appendix C – Residential Neighborhood Codes

1A010A
1A010AA
1A010B
1A010BB
1A010C
1A010CC
1A010D
1A010E
1A010F
1A010G
1A010H
1A010I
1A010J
1A010K
1A010M
1A010N
1A010O
1A010P
1A010Q
1A010R
1A010S
1A010T
1A010U
1A010V
1A010W
1A010X
1A010Y
1A010Z
1A020A
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1A020C
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1A020F
1A020G
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1A030J
1A030K
1A030L
1A030M
1A030N
1A030P
1A030Q
1A030R
1A030S
1A030T
1A030U
1A030V
1A030Y
1B010A
1B010B
1B010C
1B030A
1B030B
1B030C
1B030D
1B030E
1B030F
1B030G
1B030H
1B030I
1B030J
1B030K
1B030L
1B030M
1B030N
1B030O
1B070A
1B070B
1B070C
1B070D
1B070E

1B070F

1B070G

1B2001

1B2002

1B200A

1B200B

1B200C

1B200D

1B200E

1B200F

1B200G

1B200H

1B200I

1B200J

1B200K

1B200L

1B200M

1B200N

1B200P

1B200Q

1B200R

1B200S

1B200T

1B200U

1B200W

1B200X

1B200Y

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1C010A

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1C200A
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1L040O
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1L040S
1L040T
1L050A
1L050B
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1L0602
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1L0604

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1L0607
1L0608
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1L060C
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