



# **2024 Mass Appraisal Report**

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# 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 2024 mass appraisal efforts by Tarrant Appraisal District result in an estimate of value for all real property and tangible personal 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 2024 mass appraisal activities and subsequent mass appraisal report are completed in accordance with the 2024 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](http://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 accurate and 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. Exterior on-site 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 commercial property or business owners.
- Sales data is collected, confirmed, screened and adjusted in accordance with IAAO standards. In the absence of such validation, sales data and other related financial 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.
- The jurisdictional exception rule of USPAP may apply to portions of the appraisal district mass appraisal assignments where Texas law differs from USPAP Standard 5. For

example, Texas Property Tax Code Chapter 23.01(h) requires TAD appraisers to consider generally accepted appraisal methods and techniques. USPAP Standard 5 refers to recognized methods and techniques. Other jurisdictional exceptions will be noted in the body of this report, where applicable.



# **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, 2024, 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 August 29, 2024.

## **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 2024 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 2024. 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 purposes 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 or when other property interests are specified by Texas laws.

# 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. While a property inspection is not required by USPAP Standard 5, appraisal districts in Texas rely on advice from the International Association of Assessing Officers (IAAO) for the frequency and definition of a property inspection, which may include a personal on-site inspection or a desk review that includes credible third-party information and aerial photography.

Article VIII, Section 1 of the Texas Constitution 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. Additional legislation, enacted in 2005, also requires each appraisal district board of directors to adopt a biennial reappraisal plan per Tax Code Section 6.05. The TAD board of directors adopted the 2023-2024 reappraisal plan in August 2022 and this plan serves as a detailed description of the scope of work for the 2024 mass appraisal of real and tangible personal property in Tarrant County.

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

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.

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.

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

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.

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;

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

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 2024 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**

## 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 654,000 residential parcels, and 47,300 vacant residential 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 2024 and 2025 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 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.

<b>Year</b>	<b>New Construction</b>	<b>Other</b>	<b>Grand Total</b>
2018	7,770	12,144	19,914
2019	7,468	16,116	23,584
2020	8,599	18,357	26,956
2021	8,235	18,677	26,912
2022	6,911	18,746	25,657
2023	6,435	14,713	21,148
2024	6,000	15,000	21,000 (projected)

**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.

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.

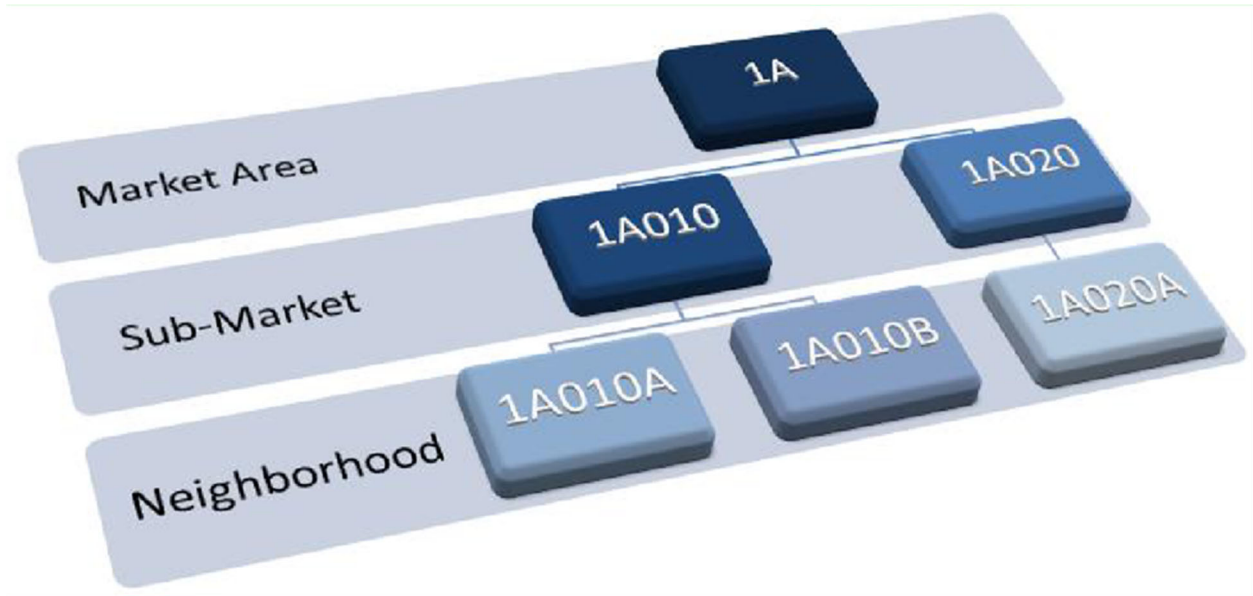
The residential appraisal section evaluates all residential properties during the biennial sales ratio study. Problem market areas identified by the study are scheduled for review.

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.

	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>
Total Sales	27,765	27,364	29,242	28,800	24,530	21,771	22,000 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:

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

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:

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

the sum of:

10 percent of the appraised value of the property for the preceding tax year;

the appraised value of the property for the preceding tax year; and

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 2024, this included approximately 12,500 vacant parcels, 32,000 improved parcels and 16,500 commercial land and improved properties with a property tax-exempt status. Commercial real property types generally include multi-family, office, retail, warehouse/manufacturing and various other categories of business-related facilities. Exempt commercial properties may include schools and government buildings, worship centers and other community facilities as defined by Chapter 11 of the tax code. The staff appraisers also value all commercial and rural land parcels. In general terms, the commercial appraisal staff is responsible for establishing market value on any real property for which the highest and best use is determined to be non-residential.

Tarrant Appraisal District uses a computer assisted mass system (CAMA) known as Aumentum, for the purpose of storing, retrieving, analyzing data, creating mass appraisal valuation models 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 BC, 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, based on the determination of a non-residential highest and best use. 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. A jurisdictional exception occurs if the property is a residence homestead. The tax code requires the market value to be determined on the basis of the property's value as a residence homestead, regardless of the market highest & best use determination. The property data and valuation methods for this exception are maintained in the residential system and are subject to 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 determine the market value the fee simple interest of properties according to statute. However, the effect of easements, restrictions, encumbrances, leases, contracts or special appraisal provisions in the tax code are considered on an individual basis, as is the appraisal 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 and commercial research and reporting. Each division is staffed with a manager, appraisers and an appraisal support staff. Each division manager reports to the Director of Commercial Appraisal. A separate litigation division is also managed 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 support staff and one support 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 2023 building permit or a 2024 reappraisal assignment.

### Research Division

The research division consists of a manager, six appraisers and two support staff. This section is primarily responsible for collecting, processing, and maintaining sale and income information that is used in the valuation process. After the information is processed and verified, applicable sale and income data is entered into the CAMA system 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 the data is uploaded to appraisal maps which are maintained by the TAD Geographic Information System (GIS) staff.

The research division is responsible for updating and maintaining the commercial classification manual. This process includes the periodic review and calibration of cost data that is contained and accessed within the CAMA system. The research staff is also responsible for monitoring new or revised appraisal guidelines or legislation to stay proficient with current tax code requirements 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 textbooks and software, periodicals and journals, comptroller's reports and various resources to assist in 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. This team also monitors properties located within designated Tax Increment Financing (TIF) areas and properties subject to abatement agreements. 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, Gaylord Texan Resort and Facebook Data Center.

## **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 calibration of 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 and used to test depreciation tables. Property owners generally provide the actual cost 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 or use. 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 the last inspection, extent of that inspection, and commercial appraiser code are listed in the CAMA 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 2024, the commercial appraisal staff worked 6,473 building permits. The commercial appraisal division reappraisal work plan allows for an on-site, physical inspection of every property at least once every four years and a desk review are completed every year for improved appraisal sites.

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 individually in Aumentum 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 2,465 valid sales with a 2021 through 2023 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 quickly put into the digital imaging system. In 2024, the research department received about 2,500 income and expense statements. The data is analyzed and processed into the CAMA 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 are made available on TAD.org shortly thereafter. Land sales are identified and recorded on digital CAD maps. Sale and income information is 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 that tracks market activity. 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 statutes. 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. A 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 to 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 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 new or amended delineations are required. See the index for a list of commercial neighborhood codes and descriptions.

## 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. A proper highest and best use analysis ensures 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 in 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 the CAMA system. 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 five 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 noting the physical condition and functional utility ratings on the property data characteristics. 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 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 in 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, the application of the various rates and multipliers must be based on a thorough analysis of the market.

The 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 requires 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 model contains 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 percentage. 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 CAMA income application. The appraiser reviews the data, indicates 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 comp sales 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 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 the 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 CAMA 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.

## 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 weigh 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 sum 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 ample sales to provide necessary representativeness, independent appraisals can be used as indicators for market value. This is 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 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 property 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 ensure 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 2024, there were approximately 65,100 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 2024, there were approximately 1,100,000 mineral accounts.

## **Appraisal Resources**

Personnel – The BPP department consists of a department director, an appraisal manager, three appraisal supervisors, an appraisal staff, a support service supervisor and a support service 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 as well.

### Leased Asset/Special Property at Multiple Locations Account

The primary source of discovery for these accounts are 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 all, with special attention to those 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

The Tarrant County Tax Assessor-Collector's office assists a great deal in notifying dealers of their filing requirements. Additionally, TAD's perpetual account tracking system ensures dealers without a current declaration on file can be 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 management. 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:

$$\text{PVF} = \text{INDEX FACTOR} \times \text{PERCENT GOOD FACTOR}$$

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 x 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 RECONCILIATION**

### **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 can be 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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## **CERTIFICATION OF 2024 MASS APPRAISAL REPORT**

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. Property characteristics data upon which the appraisals are based is assumed to be accurate and correct to the extent and means that they can be verified by the appraisal staff. Exterior on-site, personal inspections of the properties appraised were performed as staff resources and time allowed. Interior inspections of properties were limited to TAD hours of business and subject to the availability and cooperation of commercial property or business owners.
3. 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. TAD mass appraisals are impartial and completed without bias or personal interest. All TAD appraisers are registered and certificated as Property Tax Professionals, and subject to licensing requirements established by Texas laws and rules, administered by the Texas Department of Licensing and Regulations (TDLR).
4. The district's completed results for the 2024 MAP review will soon be available on the webpage for the Property Tax Assistance Division (PTAD) of the Texas Comptroller. The results of the 2023 Property Value Study from PTAD are already accessible.

### **Certification Statement:**

"I, Joe Don Bobbitt, 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."



Joe Don Bobbitt      Date: August 29, 2024  
Executive Director / Chief Appraiser

# APPENDIX A – KEY RESOURCES PROVIDING MASS APPRAISAL ASSISTANCE

## ADMINISTRATION

JOE DON BOBBITT	EXECUTIVE DIRECTOR / CHIEF APPRAISER
WILLIAM DURHAM	DEPUTY CHIEF APPRAISER
BRAD PATRICK	DIRECTOR OF ADMINISTRATION
VICKI WILLKIE	MANAGER OF ARB OPERATIONS

## RESIDENTIAL

ERIC WATKINS	DIRECTOR OF RESIDENTIAL APPRAISAL
BRANDON CANARD	RESEARCH & VALUATION MANAGER
BRYAN McKISSICK	RESIDENTIAL DIVISION MANAGER
VICTOR GUADALUPE	DATA COLLECTION SUPERVISOR
BRANDON HALLER	DATA COLLECTION SUPERVISOR
COREY MYLIUS	QUALITY & SUPPORT SUPERVISOR

## COMMERCIAL

WILLIAM DURHAM	DIRECTOR OF COMMERCIAL APPRAISAL
WILLIE BRAND	COMPLEX PROPERTY MANAGER
MISSY McALLISTER-KERR	RESEARCH & REPORTING MANAGER
RANDY REID	LITIGATION MANAGER
CASEY EARLE	REGIONAL APPRAISAL MANAGER
TERRY SPRADLIN	REGIONAL APPRAISAL MANAGER

## BPP, UTILITY & MINERALS

ROBERT EVANS	DIRECTOR OF BPP APPRAISAL
STEVE McKEEHAN	APPRAISAL MANAGER
JIMMY THOMAS	APPRAISAL SUPERVISOR
CLINT RANDOLPH	APPRAISAL SUPERVISOR
WENDY WOLFGANG	APPRAISAL SUPERVISOR

## SUPPORT SERVICES

DONNA PERLICK	DIRECTOR OF SUPPORT SERVICES
PRECIOUS BOWERS	SUPPORT SERVICES MANAGER
DEBBIE BRANCH	EXEMPTION SUPERVISOR
TRACY LYONS	DEED RECORDS SUPERVISOR
DAMIANA REYES	CUSTOMER SERVICE SUPERVISOR

## INFORMATION SERVICES

BRIAN LIPKA	DIRECTOR OF INFORMATION SERVICES
STEVE OAKES	ENTERPRISE APPLICATIONS MANAGER
DON MORRIS	WEB SOLUTIONS MANAGER
MICHAEL RUSSELL	ASSISTANT TO IS DIRECTOR/BUSINESS MGR

BLAKE WALKER

IT ENGINEERING & OPERATIONS MGR

## **APPENDIX B - COMPTROLLER'S STATE USE CLASSIFICATION CODES WITH TAD DELINEATIONS**

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	1A020M	1B030L	1C010D
1A010AA	1A020N	1B030M	1C010E
1A010B	1A020O	1B030N	1C010F
1A010BB	1A020P	1B030O	1C010G
1A010C	1A020Q	1B070A	1C010H
1A010CC	1A030A	1B070B	1C010I
1A010D	1A030B	1B070C	1C010J
1A010E	1A030C	1B070D	1C010K
1A010F	1A030D	1B070E	1C010L
1A010G	1A030F	1B070F	1C010M
1A010H	1A030G	1B070G	1C010N
1A010I	1A030H	1B2001	1C010O
1A010J	1A030I	1B2002	1C010P
1A010K	1A030J	1B200A	1C010Q
1A010M	1A030K	1B200B	1C010R
1A010N	1A030L	1B200C	1C010S
1A010O	1A030M	1B200D	1C010T
1A010P	1A030N	1B200E	1C010U
1A010Q	1A030P	1B200F	1C041A
1A010R	1A030Q	1B200G	1C041B
1A010S	1A030R	1B200H	1C041C
1A010T	1A030S	1B200I	1C041D
1A010U	1A030T	1B200J	1C041E
1A010V	1A030U	1B200K	1C041F
1A010W	1A030V	1B200L	1C041G
1A010X	1A030Y	1B200M	1C041H
1A010Y	1B010A	1B200N	1C041I
1A010Z	1B010B	1B200P	1C041J
1A020A	1B010C	1B200Q	1C200A
1A020B	1B030A	1B200R	1C200B
1A020C	1B030B	1B200S	1C200C
1A020D	1B030C	1B200T	1C200D
1A020E	1B030D	1B200U	1C200E
1A020F	1B030E	1B200W	1C200F
1A020G	1B030F	1B200X	1C200G
1A020H	1B030G	1B200Y	1C200H
1A020I	1B030H	1B200Z	1C200I
1A020J	1B030I	1C010A	1C200J
1A020K	1B030J	1C010B	1C200K
1A020L	1B030K	1C010C	1C200L

1C200M	1E030J	1H040D	1H080M
1C200N	1E030K	1H040E	1L010A
1C200O	1E030L	1H040F	1L010B
1C200P	1F100A	1H040G	1L010C
1C200Q	1F100B	1H040H	1L010D
1C210A	1F100C	1H040I	1L010E
1C210B	1F100D	1H040J	1L010F
1C210E	1F100E	1H040K	1L010G
1C210F	1F100F	1H040L	1L010H
1C210G	1F100G	1H040M	1L010I
1C210H	1F100H	1H040N	1L010J
1C210I	1F100I	1H040O	1L010K
1C210J	1F100J	1H040P	1L010L
1C210L	1F100K	1H040Q	1L010M
1C220A	1F100L	1H040R	1L010N
1C220B	1F200A	1H040S	1L010O
1C220C	1F200B	1H040T	1L020B
1C220D	1F200C	1H040U	1L020C
1C220E	1F200D	1H040V	1L020D
1C220F	1F200E	1H040W	1L020E
1C220G	1F200G	1H040X	1L020F
1C220H	1F200H	1H050A	1L020G
1C220I	1F200I	1H050B	1L020H
1C220J	1F200J	1H050C	1L030A
1C220K	1F200K	1H050D	1L030B
1C220L	1F200L	1H050E	1L030C
1C250A	1H010A	1H050F	1L030D
1C250B	1H010B	1H050G	1L030E
1C250C	1H020A	1H050H	1L030F
1C250D	1H020B	1H050I	1L030G
1C250E	1H020C	1H050J	1L030H
1C250F	1H020D	1H050K	1L030I
1E010A	1H020E	1H080A	1L030J
1E010B	1H030B	1H080B	1L030K
1E010C	1H030C	1H080C	1L030L
1E030A	1H030D	1H080D	1L030M
1E030B	1H030F	1H080E	1L030N
1E030C	1H030G	1H080F	1L030P
1E030D	1H030H	1H080G	1L030Q
1E030E	1H030I	1H080H	1L030R
1E030F	1H030J	1H080I	1L030T
1E030G	1H040A	1H080J	1L040A
1E030H	1H040B	1H080K	1L040B
1E030I	1H040C	1H080L	1L040C

1L040D	1L060S	1L080J	1L110F
1L040E	1L060T	1L080K	1L110G
1L040F	1L060U	1L080M	1L110H
1L040G	1L060V	1L080N	1L110I
1L040H	1L060W	1L080O	1L1201
1L040I	1L060X	1L080P	1L120A
1L040J	1L060Y	1L080Q	1L120B
1L040K	1L060Z	1L1001	1L120C
1L040L	1L0701	1L1002	1L120D
1L040M	1L0702	1L1003	1L120E
1L040N	1L070A	1L1005	1L120F
1L040O	1L070B	1L1006	1L120G
1L040P	1L070C	1L1007	1L120H
1L040Q	1L070D	1L100A	1L120I
1L040R	1L070E	1L100B	1L120J
1L040S	1L070F	1L100C	1L120K
1L040T	1L070G	1L100D	1L120L
1L050A	1L070H	1L100E	1L120M
1L050B	1L070I	1L100F	1L120P
1L0601	1L070J	1L100G	1L120Q
1L0602	1L070K	1L100H	1L120R
1L0603	1L070L	1L100I	1L120S
1L0604	1L070M	1L100J	1L120U
1L0605	1L070N	1L100K	1L120V
1L0606	1L070P	1L100L	1L120W
1L0607	1L070Q	1L100M	1L120X
1L0608	1L070R	1L100N	1L1301
1L060A	1L070S	1L100O	1L1302
1L060B	1L070T	1L100P	1L1303
1L060C	1L070U	1L100Q	1L1304
1L060D	1L070V	1L100R	1L130A
1L060E	1L070W	1L100S	1L130B
1L060F	1L070X	1L100T	1L130C
1L060G	1L070Y	1L100U	1L130D
1L060H	1L070Z	1L100V	1L130E
1L060I	1L080A	1L100W	1L130F
1L060J	1L080B	1L100X	1L130G
1L060K	1L080C	1L100Y	1L130H
1L060L	1L080D	1L100Z	1L130I
1L060M	1L080E	1L110A	1L130J
1L060N	1L080F	1L110B	1L130K
1L060P	1L080G	1L110C	1L130L
1L060Q	1L080H	1L110D	1L130M
1L060R	1L080I	1L110E	1L130N

1L130P	1L160G	1M020A	1M070E
1L130Q	1L160H	1M020B	1M070F
1L130R	1L160I	1M020C	1M070G
1L130S	1L160J	1M020D	1M070H
1L130T	1L160K	1M020E	1M070I
1L130U	1L160L	1M020F	1M070J
1L130V	1L160M	1M020G	1M070K
1L130W	1L160N	1M020H	1M070L
1L130X	1L160O	1M020I	1M070M
1L130Y	1L160P	1M020J	1M070N
1L130Z	1M0101	1M020K	1M070O
1L140A	1M0102	1M020L	1M070P
1L140B	1M0104	1M020M	1M070Q
1L140C	1M0105	1M020N	1M070R
1L140D	1M0106	1M020P	1M070S
1L140E	1M0107	1M020Q	1M070T
1L140F	1M0108	1M020R	1M070U
1L140G	1M0109	1M020S	1M080A
1L140H	1M010A	1M020T	1M080B
1L140I	1M010AA	1M050A	1M080D
1L140J	1M010B	1M050B	1M080E
1L140K	1M010C	1M050C	1M080F
1L140L	1M010D	1M050D	1M080G
1L140M	1M010E	1M050E	1M080H
1L140N	1M010F	1M050F	1M080I
1L140O	1M010G	1M050G	1M080J
1L140P	1M010H	1M050H	1M080K
1L150A	1M010I	1M050I	1M080L
1L150B	1M010J	1M050J	1M080M
1L150C	1M010K	1M050K	1M080N
1L150D	1M010L	1M050L	1M080O
1L150E	1M010M	1M050M	1M080P
1L150F	1M010N	1M050N	1M080Q
1L150G	1M010O	1M060A	1M080S
1L150H	1M010P	1M060B	1M080T
1L150I	1M010Q	1M060C	1M080U
1L150J	1M010R	1M060D	1M080V
1L150K	1M010S	1M060E	1M090B
1L160A	1M010T	1M060F	1M090C
1L160B	1M010U	1M060G	1M090D
1L160C	1M010V	1M070A	1M090E
1L160D	1M010X	1M070B	1M090G
1L160E	1M010Y	1M070C	1M090H
1L160F	1M010Z	1M070D	1M090J



1M090K	1M500X	1S0102	1S0200
1M100A	1M500Y	1S010A	1S020P
1M100B	1M500Z	1S010B	1S020Q
1M100C	1M600A	1S010C	1S020R
1M100D	1M600B	1S010D	1S020S
1M100E	1M600C	1S010E	1S020T
1M200A	1M600D	1S010F	1S020U
1M200B	1M600E	1S010G	1S020V
1M200D	1M600F	1S010H	1S020W
1M200E	1M600G	1S010I	1S020X
1M200F	1M600H	1S010J	1S020Y
1M200G	1M600J	1S010K	1S020Z
1M300A	1M600M	1S010L	1S030A
1M300B	1M800A	1S010M	1S030B
1M300C	1M800B	1S010N	1S030C
1M300D	1M800C	1S010O	1S030D
1M5001	1M800D	1S010P	1S030E
1M5002	1M800E	1S010Q	1S030F
1M5003	1M800F	1S010R	1S030G
1M5004	1M800G	1S010S	1S030H
1M5005	1M800H	1S010T	1S030I
1M500A	1M800I	1S010U	1S030J
1M500B	1M800J	1S010V	1S030K
1M500C	1M800K	1S010W	1S040A
1M500D	1M800L	1S010X	1S040B
1M500E	1M800M	1S010Y	1S040C
1M500F	1M800N	1S010Z	1S040D
1M500G	1M800P	1S0201	1S040E
1M500H	1M900A	1S0202	1S040F
1M500I	1M900B	1S0203	1S040G
1M500J	1M900C	1S020A	1S040H
1M500K	1M900D	1S020B	1S040I
1M500L	1M900E	1S020C	1S040J
1M500M	1M900F	1S020D	1S040K
1M500N	1M900G	1S020E	1S040L
1M500O	1M900H	1S020F	1S040M
1M500P	1M900I	1S020G	1S040N
1M500Q	1M900J	1S020H	1S040O
1M500R	1M900K	1S020I	1S040P
1M500S	1M900L	1S020J	1S040Q
1M500T	1M900M	1S020K	1S040R
1M500U	1M900N	1S020L	1S040S
1M500V	1M900P	1S020M	1S040T
1M500W	1S0101	1S020N	1S040U

1S040V	1X110D	1X200D	2D100F
1S040W	1X110E	1X200E	2D100G
1S040X	1X110F	1X200F	2D100H
1S040Y	1X110G	1X200G	2D100I
1S040Z	1X110H	1X200H	2D100K
1X010A	1X110I	1X200I	2D100L
1X010B	1X110J	1X200J	2D100M
1X010C	1X110K	220-Common	2D100N
1X010D	1X110L	Area	2D100O
1X020A	1X110M	220-MHImpOnly	2D101A
1X020B	1X110N	220-Nominal	2D101B
1X020C	1X110O	Value	2D101C
1X020D	1X120A	2A100A	2D101D
1X020E	1X120B	2A100B	2L101A
1X020F	1X120C	2A100C	2L101B
1X020G	1X120D	2A200A	2M100A
1X020H	1X120E	2A200B	2M100B
1X020I	1X120F	2A200C	2M100C
1X020J	1X120G	2A200D	2M100D
1X020K	1X120H	2A200E	2M100E
1X020L	1X120I	2A200F	2M100F
1X020M	1X130A	2A300A	2M100G
1X020N	1X130B	2C010A	2M110A
1X030A	1X130C	2C010B	2M110B
1X030B	1X130D	2C010C	2M110C
1X030C	1X130E	2C020A	2M110D
1X030D	1X130F	2C020B	2M110E
1X030E	1X130G	2C020C	2M110F
1X030F	1X130H	2C020D	2M110G
1X030G	1X130I	2C020E	2M110I
1X040A	1X130J	2C020F	2M200A
1X040B	1X130K	2C020G	2M200B
1X040C	1X130L	2C020H	2M200C
1X040D	1X130M	2C020J	2M200D
1X050B	1X130N	2C020K	2M200E
1X050C	1X130P	2C030C	2M200F
1X050E	1X130Q	2C030D	2M200G
1X050F	1X130R	2C030E	2M200H
1X050G	1X130S	2C030F	2M200I
1X050I	1X130T	2D100A	2M200J
1X050J	1X130U	2D100B	2M210A
1X110A	1X200A	2D100C	2M210B
1X110B	1X200B	2D100D	2M210C
1X110C	1X200C	2D100E	2M210D

2M210E	2N020O	2N040T	2N200H
2N0103	2N020P	2N040U	2N200I
2N0104	2N020Q	2N040V	2N200J
2N0106	2N030A	2N040W	2N3002
2N0107	2N030B	2N040X	2N3003
2N0108	2N030C	2N040Y	2N3004
2N0109	2N030D	2N040Z	2N3005
2N010A	2N030E	2N1001	2N3006
2N010AA	2N030F	2N1002	2N3007
2N010B	2N030H	2N1003	2N300A
2N010BB	2N030I	2N1004	2N300A1
2N010C	2N030J	2N1005	2N300B
2N010D	2N030K	2N100A	2N300C
2N010E	2N030L	2N100B	2N300D
2N010F	2N030M	2N100C	2N300E
2N010I	2N0401	2N100D	2N300F
2N010J	2N0402	2N100E	2N300G
2N010K	2N0403	2N100F	2N300H
2N010L	2N0404	2N100G	2N300I
2N010N	2N0405	2N100H	2N300J
2N010O	2N0406	2N100I	2N300K
2N010P	2N0407	2N100J	2N300L
2N010Q	2N0408	2N100K	2N300M
2N010R	2N0409	2N100L	2N300N
2N010S	2N040A	2N100M	2N300O
2N010T	2N040AA	2N100N	2N300P
2N010U	2N040B	2N100O	2N300Q
2N010V	2N040C	2N100P	2N300R
2N010W	2N040D	2N100Q	2N300S
2N010X	2N040E	2N100R	2N300T
2N020A	2N040F	2N100S	2N300U
2N020B	2N040G	2N100T	2N300V
2N020C	2N040H	2N100U	2N300W
2N020D	2N040I	2N100V	2N300X
2N020E	2N040J	2N100W	2N300Y
2N020F	2N040K	2N100X	2N300Z
2N020G	2N040L	2N100Y	2N4001
2N020H	2N040M	2N100Z	2N4002
2N020I	2N040N	2N200B	2N4003
2N020J	2N040O	2N200C	2N4004
2N020K	2N040P	2N200D	2N4005
2N020L	2N040Q	2N200E	2N4006
2N020M	2N040R	2N200F	2N4007
2N020N	2N040S	2N200G	2N4008

2N4009	2W3001	2Y100J	2Y200Z
2N400A	2W3002	2Y100K	2Y300B
2N400B	2W3003	2Y100L	2Y300C
2N400C	2W3004	2Y100M	2Y300D
2N400D	2W300A	2Y100N	2Y300E
2N400E	2W300B	2Y100O	2Y300F
2N400F	2W300C	2Y100P	2Y300G
2N400G	2W300D	2Y100Q	2Y300H
2N400H	2W300E	2Y100R	2Y300I
2N400I	2W300F	2Y100S	2Y300J
2N400J	2W300G	2Y100T	2Y300L
2N400K	2W300H	2Y100U	2Y300M
2N400L	2W300I	2Y100V	2Y300N
2N400M	2W300J	2Y100W	2Y300P
2N400N	2W300K	2Y100X	2Y300Q
2N400O	2W300L	2Y100Y	2Z200A
2N400P	2W300M	2Y100Z	2Z200B
2N400Q	2W300N	2Y2001	2Z200C
2N400R	2W300O	2Y2002	2Z200D
2N400S	2W300P	2Y200A	2Z200E
2N400T	2W300Q	2Y200B	2Z200F
2N400U	2W300R	2Y200C	2Z200G
2N400V	2W300S	2Y200D	2Z200H
2N400W	2W300T	2Y200E	2Z200I
2N400X	2W300U	2Y200F	2Z200J
2N400Y	2W300V	2Y200G	2Z201A
2N400Z	2W300W	2Y200H	2Z201B
2W100A	2W300X	2Y200I	2Z201C
2W100B	2W300Y	2Y200J	2Z201D
2W100C	2Y1001	2Y200K	2Z201G
2W100E	2Y1002	2Y200L	2Z201H
2W100I	2Y1003	2Y200M	2Z201I
2W100L	2Y1005	2Y200N	2Z201J
2W100N	2Y1007	2Y200O	2Z201K
2W100P	2Y1008	2Y200P	2Z201L
2W100Q	2Y100A	2Y200Q	2Z201M
2W100R	2Y100B	2Y200R	2Z201N
2W100T	2Y100C	2Y200S	2Z201O
2W100U	2Y100D	2Y200T	2Z201Q
2W100V	2Y100E	2Y200U	2Z201R
2W100W	2Y100F	2Y200V	2Z300A
2W200A	2Y100G	2Y200W	2Z300B
2W200B	2Y100H	2Y200X	2Z300C
2W200C	2Y100I	2Y200Y	2Z300D

2Z300E	3B020J	3B040Q	3C030I
2Z300F	3B020K	3B040S	3C030J
2Z300G	3B020L	3B040T	3C030K
2Z300H	3B020N	3B040U	3C030L
2Z300I	3B020O	3B040V	3C030M
2Z300J	3B020P	3B040W	3C030N
2Z300K	3B020Q	3C010A	3C030O
2Z300N	3B020R	3C010B	3C030P
2Z300O	3B020S	3C010C	3C030Q
2Z300P	3B020T	3C010D	3C031A
2Z500A	3B020U	3C010F	3C031B
2Z500B	3B030A	3C010G	3C031C
2Z500C	3B030B	3C010H	3C031D
2Z500D	3B030C	3C010I	3C031E
2Z500E	3B030D	3C010J	3C031F
2Z500F	3B030E	3C010K	3C031G
2Z500G	3B030F	3C020A	3C031H
2Z500H	3B030G	3C020B	3C031I
2Z500I	3B030H	3C020C	3C031J
3B010A	3B030I	3C020D	3C031K
3B010B	3B030J	3C020E	3C031L
3B010C	3B030K	3C020F	3C031M
3B010D	3B030L	3C020G	3C031P
3B010E	3B030M	3C020H	3C031Q
3B010F	3B030N	3C020I	3C031R
3B010G	3B030O	3C020J	3C031S
3B010H	3B030P	3C020K	3C031T
3B010I	3B030Q	3C020L	3C031U
3B010J	3B030R	3C020M	3C031V
3B010K	3B040A	3C020N	3C031W
3B010L	3B040B	3C020O	3C040A
3B010M	3B040C	3C020P	3C040B
3B010N	3B040D	3C020R	3C040C
3B010O	3B040E	3C020S	3C040D
3B010R	3B040F	3C020V	3C040E
3B020A	3B040H	3C020W	3C040F
3B020B	3B040I	3C030A	3C040G
3B020C	3B040J	3C030B	3C040H
3B020D	3B040K	3C030C	3C040I
3B020E	3B040L	3C030D	3C040J
3B020F	3B040M	3C030E	3C040K
3B020G	3B040N	3C030F	3C040L
3B020H	3B040O	3C030G	3C040M
3B020I	3B040P	3C030H	3C040N

3C040O	3C100T	3C800A2	3G020N
3C040P	3C100U	3C800B	3G020O
3C040Q	3C100V	3C800C	3G020P
3C040R	3C100W	3C800D	3G020S
3C040S	3C100X	3C800E	3G020T
3C040T	3C100Y	3C800F	3G020U
3C050B	3C100Z	3C800G	3G020V
3C050C	3C500A	3C800H	3G020W
3C050D	3C500B	3C800I	3G020X
3C050E	3C500D	3C800J	3G030B
3C050F	3C500E	3C800L	3G030C
3C050G	3C500G	3C800M	3G030D
3C050H	3C500H	3C800N	3G030F
3C050I	3C500I	3C800O	3G030G
3C050J	3C500J	3C800P	3G030H
3C050K	3C500K	3C800Q	3G030I
3C050M	3C500L	3C800S	3G030J
3C050N	3C500M	3C800T	3G030K
3C050O	3C500N	3C800U	3G030L
3C1001	3C500O	3G010A	3G030M
3C1002	3C500P	3G010B	3G030N
3C1004	3C500Q	3G010F	3G030P
3C1005	3C500R	3G010G	3G030Q
3C1006	3C600A	3G010H	3G050A
3C1007	3C600B	3G010I	3G050B
3C1008	3C600C	3G010J	3G050C
3C1009	3C600E	3G010K	3G050D
3C100C	3C600F	3G010L	3G050E
3C100D	3C600G	3G010M	3G050F
3C100E	3C600H	3G010O	3H010A
3C100F	3C600I	3G010P	3H010B
3C100G	3C600J	3G010R	3H010C
3C100H	3C600K	3G020A	3H010D
3C100I	3C600L	3G020B	3H010E
3C100J	3C700B	3G020C	3H010F
3C100K	3C700C	3G020D	3H010G
3C100L	3C700D	3G020E	3H010H
3C100M	3C700E	3G020F	3H010I
3C100N	3C700F	3G020G	3H010J
3C100O	3C700G	3G020H	3H020A
3C100P	3C700H	3G020I	3H020B
3C100Q	3C700I	3G020J	3H020C
3C100R	3C700L	3G020K	3H020D
3C100S	3C800A	3G020M	3H020E

3H030A	3K100B	3K300N	3K6007
3H030C	3K100C	3K300O	3K6008
3H030D	3K100D	3K300P	3K600A
3H040A	3K100E	3K300Q	3K600B
3H040B	3K100F	3K300R	3K600C
3H040C	3K100G	3K300S	3K600D
3H040D	3K100H	3K300T	3K600E
3H040E	3K200A	3K300U	3K600F
3H040F	3K200B	3K300V	3K600G
3H040G	3K200C	3K300W	3K600H
3H040H	3K200D	3K300X	3K600I
3H040I	3K200E	3K300Y	3K600J
3H040J	3K200F	3K300Z	3K600K
3H040K	3K200G	3K400A	3K600L
3H040L	3K200H	3K400B	3K600M
3H040M	3K200I	3K400C	3K600N
3H040N	3K200J	3K400D	3K600O
3H040P	3K200K	3K400E	3K600P
3H040Q	3K200L	3K400F	3K600Q
3H040R	3K200M	3K400G	3K600R
3H040U	3K200N	3K400I	3K600S
3H040V	3K200O	3K400J	3K600T
3H040W	3K200P	3K400K	3K600U
3H040X	3K200Q	3K400L	3K600V
3H040Y	3K3001	3K500A	3K600W
3H050A	3K3002	3K500B	3K600X
3H050B	3K3003	3K500D	3K600Y
3H050C	3K3004	3K500E	3K600Z
3H050D	3K3005	3K500F	3K700A
3H050E	3K3006	3K500G	3K700B
3H050F	3K3007	3K500H	3K700C
3H050G	3K300A	3K500I	3K700D
3H050H	3K300B	3K500J	3K700E
3H050H2	3K300C	3K500K	3K700F
3H050I	3K300D	3K500L	3K700G
3H050J	3K300E	3K500M	3M010A
3H050K	3K300F	3K500N	3M010B
3H050L	3K300G	3K500O	3M010C
3H050M	3K300H	3K6001	3M010D
3H050N	3K300I	3K6002	3M010E
3H050O	3K300J	3K6003	3M010F
3H050P	3K300K	3K6004	3M010G
3K040O	3K300L	3K6005	3M010H
3K100A	3K300M	3K6006	3M010I

3M010J	3M0306	3M040E	3M120I
3M010K	3M0307	3M040F	3M120J
3M010L	3M0308	3M040G	3M120L
3M010M	3M0309	3M040H	3M120M
3M010N	3M030A	3M040I	3M130B
3M010O	3M030AA	3M040J	3M130C
3M010P	3M030B	3M040K	3M130D
3M010Q	3M030BB	3M040L	3M130E
3M010R	3M030C	3M040M	3M130F
3M010S	3M030D	3M040N	3M130G
3M010T	3M030DD	3M040O	3M130H
3M010U	3M030E	3M040P	3M130I
3M010V	3M030F	3M040Q	3M130K
3M010X	3M030FF	3M040R	3M130L
3M010Y	3M030G	3M040S	3M130M
3M010Z	3M030H	3M040T	3M130O
3M020A	3M030I	3M040U	3M130P
3M020B	3M030J	3M040V	3M130Q
3M020C	3M030K	3M040W	3M130R
3M020D	3M030L	3M040Y	3M200A
3M020E	3M030M	3M040Z	3M200B
3M020F	3M030N	3M100A	3M200C
3M020G	3M030O	3M100B	3M200D
3M020H	3M030P	3M100C	3M200F
3M020I	3M030Q	3M100D	3M200G
3M020J	3M030R	3M100E	3M200H
3M020K	3M030S	3M100F	3M200I
3M020L	3M030T	3M100G	3M200J
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3M020P	3M030V	3M110B	3M200L
3M020Q	3M030W	3M110C	3M200M
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3M020S	3M030Y	3M110F	3M200O
3M020T	3M030Z	3M110G	3M200P
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3M020W	3M0403	3M120A	3M300B
3M020X	3M0404	3M120B	3M300C
3M020Y	3M0405	3M120C	3M300D
3M0301	3M0406	3M120D	3M300E
3M0302	3M040A	3M120E	3M300F
3M0303	3M040B	3M120F	3M300G
3M0304	3M040C	3M120G	3M300H
3M0305	3M040D	3M120H	3M300I



3M300J	3M500N	3S020J	3S040EE
3M300K	3M500O	3S020K	3S040F
3M300L	3M500P	3S020L	3S040FF
3M300M	3M500Q	3S020M	3S040G
3M300N	3M500R	3S020N	3S040GG
3M400A	3M500S	3S020O	3S040H
3M400C	3M500T	3S030A	3S040HH
3M400D	3M500U	3S030B	3S040I
3M400E	3M500V	3S030D	3S040II
3M400F	3M500W	3S030E	3S040J
3M400G	3M500X	3S030F	3S040JJ
3M400H	3M500Y	3S030G	3S040K
3M400J	3M500Z	3S030H	3S040L
3M400K	3M600A	3S030J	3S040M
3M400L	3M600B	3S030K	3S040N
3M400M	3M600C	3S030M	3S040O
3M400N	3M600D	3S030N	3S040P
3M400O	3M600H	3S030O	3S040Q
3M400P	3M600I	3S030P	3S040R
3M400Q	3M600J	3S030Q	3S040S
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3M5004	3M600O	3S030V	3S040VV
3M5005	3S010A	3S030W	3S040W
3M5006	3S010B	3S030X	3S040X
3M5007	3S010C	3S0401	3S040Y
3M5008	3S010D	3S0402	3S040Z
3M5009	3S010E	3S0403	3S100E
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3M500BB	3S010M	3S0407	3S100K
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3M500F	3S020B	3S040AA	3S100O
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3M500I	3S020E	3S040C	3S200C
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3M500K	3S020G	3S040D	3S200E
3M500L	3S020H	3S040DD	3S200F
3M500M	3S020I	3S040E	3S300A

3S300B	3T010I	3W020G	3W040A
3S300C	3T010J	3W020H	3W040B
3S300D	3T010L	3W020I	3W040C
3S300E	3T010M	3W020J	3W040D
3S300F	3T020B	3W020K	3W040E
3S300G	3T020E	3W020N	3W040F
3S300H	3T020F	3W020O	3W040G
3S300J	3T020G	3W020P	3W040H
3S300K	3T020H	3W020Q	3W040I
3S300L	3T020I	3W020R	3W040J
3S300M	3T020J	3W020S	3W040K
3S300N	3T020K	3W020T	3W040L
3S300O	3T0301	3W020U	3W040M
3S300P	3T0302	3W020V	3W040N
3S300Q	3T030A	3W020W	3W040O
3S300R	3T030B	3W020X	3W040P
3S300S	3T030C	3W020Y	3W040Q
3S300T	3T030D	3W0301	3W040T
3S300U	3T030E	3W030B	3W040U
3S300V	3T030F	3W030C	3W040W
3S300W	3T030G	3W030D	3W040X
3S300X	3T030H	3W030E	3W040Y
3S400B	3T030I	3W030F	3W040Z
3S400C	3T030J	3W030G	3W200A
3S400D	3T030K	3W030H	3W200B
3S400E	3T030L	3W030I	3X010A
3S400G	3T030M	3W030J	3X010B
3S400H	3T030N	3W030K	3X010C
3S400I	3T030Q	3W030L	3X010D
3S500A	3T030R	3W030M	3X010E
3S500B	3T030S	3W030N	3X010F
3S500C	3T030S1	3W030O	3X010G
3S500D	3T030T	3W030P	3X010H
3S500E	3T030U	3W030Q	3X010I
3S500F	3T030V	3W030R	3X010J
3S500G	3T030W	3W030S	3X010K
3T010A	3T030X	3W030T	3X010L
3T010B	3T030Y	3W030U	3X010M
3T010C	3T030Z	3W030V	3X010N
3T010D	3W020A	3W030Y	3X010O
3T010E	3W020B	3W030Z	3X010P
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3T010G	3W020D	3W0402	3X0201
3T010H	3W020E	3W0403	3X020A

3X020B	3X040A	3X110I	4A400N
3X020C	3X040B	3X110J	4A400O
3X020D	3X040C	3X110L	4A400P
3X020E	3X040D	3X110M	4A400Q
3X020F	3X040E	3X110Q	4A400R
3X020G	3X040F	3X110R	4A400S
3X020H	3X040G	3X110T	4A400T
3X020I	3X040H	3X110U	4A400U
3X020J	3X040I	4A100A	4B010A
3X020K	3X040J	4A100B	4B010B
3X020L	3X040K	4A100C	4B010C
3X020M	3X1001	4A100D	4B010D
3X020N	3X100A	4A100E	4B010E
3X020O	3X100B	4A100F	4B010F
3X020P	3X100C	4A100G	4B010G
3X020Q	3X100D	4A100M	4B010H
3X020R	3X100E	4A100N	4B010I
3X020S	3X100F	4A100P	4B010J
3X020T	3X100G	4A100R	4B010K
3X020U	3X100H	4A100S	4B010L
3X020V	3X100I	4A100U	4B010M
3X020W	3X100J	4A200A	4B011A
3X020X	3X100K	4A200B	4B011B
3X020Y	3X100L	4A200C	4B011C
3X020Z	3X100M	4A200J	4B011E
3X030A	3X100N	4A300A	4B011G
3X030D	3X100O	4A300B	4B011H
3X030E	3X100P	4A300C	4B011J
3X030F	3X100Q	4A300D	4B011K
3X030G	3X100R	4A300E	4B012A
3X030I	3X100S	4A300F	4B012B
3X030K	3X100T	4A300G	4B012C
3X030M	3X100U	4A400A	4B012D
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3X030P	3X100Y	4A400C	4B012F
3X030Q	3X100Z	4A400D	4B012G
3X030R	3X110A	4A400E	4B012H
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3X030V	3X110E	4A400I	4B012L
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3X030X	3X110G	4A400L	4B020A
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4B020C	4C121D	4R004C	4S004C
4B020D	4C121E	4R004D	4S004D
4B020E	4C121F	4R004E	4S004E
4B020F	4C122A	4R010A	4S004F
4B020G	4C122B	4R010B	4S004G
4B020H	4C122C	4R010C	4S004H
4B020I	4C130A	4R010D	4S004I
4B020J	4C130B	4R020A	4S004J
4B020K	4C130C	4R020B	4S004K
4B020L	4C130D	4R020C	4S004L
4B020M	4C130F	4R020D	4S004M
4B020O	4C130G	4R020E	4S004N
4B030A	4C210A	4R030A	4S004O
4B030B	4C210B	4R030G	4S004P
4B030C	4C210C	4R030H	4S004Q
4B030D	4C210D	4R030I	4S004R
4B030E	4D001A	4R030J	4S004S
4B030H	4D001B	4R030K	4S004T
4B030I	4D004A	4R040A	4S004U
4B030J	4D004B	4R040B	4S004V
4B030K	4D004C	4R040C	4S004W
4B030L	4D004D	4R040D	4S004X
4B030M	4D004E	4R040E	4S004Y
4B030N	4D004F	4R040F	4S004Z
4B030O	4D004G	4S001A	4S120B
4B030P	4R002A	4S001B	4S120D
4B030Q	4R002B	4S001C	4S120E
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4B030S	4R002D	4S001E	4S120P
4B030T	4R002E	4S001F	4S120R
4B030U	4R002H	4S002A	4S120S
4B030V	4R003A	4S002B	4S120T
4C010A	4R003B	4S002C	4S121A
4C020A	4R003C	4S002D	4S121B
4C100A	4R003D	4S002E	4S121C
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4C110B	4R003G	4S002H	4S130C
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4C120B	4R003I	4S0041	4S130F
4C120D	4R003J	4S0042	4S130G
4C121A	4R003K	4S0043	4S130H
4C121B	4R004A	4S004A	4S240A
4C121C	4R004B	4S004B	4S240B

4S240C	4T001F	4T050A	4W003L
4S240D	4T001G	4T050B	4W003M
4S240E	4T001H	4T050C	4W003N
4S240F	4T001I	4T050D	4W003O
4S240G	4T001J	4T050E	4W003P
4S240H	4T001K	4T050J	4W003Q
4S240I	4T001L	4T930A	4W003R
4S350A	4T001M	4T930B	4W004A
4S350B	4T001N	4T930C	4W004B
4S350C	4T001O	4T930D	4W004C
4S350D	4T001P	4T930E	4W004D
4S350E	4T001R	4T930F	4W004E
4S350F	4T001S	4T930G	4W004F
4S350G	4T001T	4T930H	4W004G
4S360A	4T001U	4T930I	4W005A
4S360B	4T001X	4T930J	4W005B
4S360C	4T002A	4T930K	A1A0102
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4S360J	4T002H	4T930Q	A1A0108
4S360K	4T002I	4T930R	A1A010A
4S360L	4T010A	4T930X	A1A010B
4S360M	4T010B	4T930Y	A1A010C
4S360N	4T010D	4W001A	A1A010D
4S360P	4T010E	4W001B	A1A010E
4S360Q	4T010F	4W001C	A1A010F
4S360R	4T020A	4W001D	A1A010G
4S360S	4T020B	4W001E	A1A010H
4S410B	4T020D	4W002A	A1A010I
4S410C	4T020E	4W002B	A1A010J
4S410D	4T020G	4W003A	A1A010K
4S410F	4T020H	4W003B	A1A010L
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4S411A	4T021B	4W003D	A1A010N
4S411B	4T021C	4W003E	A1A010O
4S411C	4T021D	4W003F	A1A010P
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4T001B	4T021F	4W003H	A1A010R
4T001C	4T025A	4W003I	A1A010S
4T001D	4T025B	4W003J	A1A010T
4T001E	4T025C	4W003K	A1A010U

A1A010W	A1A030J	A1N010H	A2F010L
A1A010X	A1A030K	A1N010I	A2F010M
A1A010Y	A1A030L	A1N010J	A2K010A
A1A010Z	A1A030M	A1N010K	A2K010B
A1A0201	A1A030N	A1N010L	A2L010A
A1A0202	A1A030P	A1N010M	A2L010B
A1A0203	A1A030R	A1N010P	A2L010C
A1A0204	A1A030S	A1N010Q	A2L010D
A1A020A	A1A030T	A1S0101	A2L010E
A1A020C	A1A030V	A1S0102	A2L010F
A1A020D	A1A030W	A1S010A	A2L010G
A1A020E	A1AO10K1	A1S010B	A2L010H
A1A020F	A1AO10K2	A1S010C	A2L010J
A1A020G	A1AO10K3	A1S010D	A2L010K
A1A020H	A1AO10K6	A1S010E	A2L010L
A1A020I	A1AO10K7	A1S010F	A3B010A
A1A020J	A1AO10K8	A1S010G	A3B010B
A1A020K	A1F010A	A1S010H	A3B010C
A1A020L	A1F010B	A1S010J	A3B010D
A1A020M	A1F010C	A1S010K	A3B010E
A1A020N	A1F010D	A1S010L	A3B010F
A1A020O	A1F010E	A1S010M	A3B010H
A1A020P	A1F010F	A1S010N	A3B010J
A1A020Q	A1F020A	A1S010O	A3C010A
A1A020R	A1F020B	A1S010P	A3C010C
A1A020S	A1F020C	A1S010R	A3C010D
A1A020T	A1F020D	A1S010S	A3C010E
A1A020U	A1F020E	A1S010T	A3C010G
A1A020V	A1F020F	A1S010U	A3C010T
A1A020V1	A1F020H	A1S010V	A3C010V
A1A020W	A1F020J	A1S010W	A3C010W
A1A020W1	A1F020K	A1S010X	A3C020A
A1A020W2	A1F020L	A1S010Y	A3C020A1
A1A020X	A1F020M	A1S010Z	A3F020A
A1A020Y	A1F020N	A2A010A	A3G0102
A1A020Z	A1F020O	A2A010B	A3G010A
A1A030A	A1F020P	A2E010A	A3G010B
A1A030B	A1N010A	A2E010B	A3G010C
A1A030C	A1N010B	A2F010C	A3G010D
A1A030D	A1N010C	A2F010D	A3G010E
A1A030E	A1N010D	A2F010E	A3G010F
A1A030F	A1N010E	A2F010F	A3G010F1
A1A030G	A1N010F	A2F010G	A3G010G
A1A030H	A1N010G	A2F010K	A3G010H

A3G010I	A3K010A	A4C010G	A4R010J
A3G010J	A3K010B	A4C010H	A4R010K
A3G010K	A3K010C	A4C010J	A4R010L
A3G010L	A3K010D	A4C010K	A4R010M
A3G010M	A3K010D1	A4C010L	A4R010M1
A3G010N	A3K010E	A4C020A	A4R010N
A3G010O	A3K010F	A4C020B	A4R010O
A3G010P	A3K010G	A4C020C	A4R010P
A3G010Q	A3K010H	A4C020F	A4R010Q
A3G010R	A3K010I	A4C020G	A4R010R
A3G010S	A3K010K	A4C030A	A4R010S
A3G010T	A3K010L	A4C030B	A4R010T
A3G010U	A3K010M	A4C040A	A4R010U
A3G010V	A3K010O	A4C040B	A4R010V
A3G010W	A3K010P	A4C050A	A4R010V1
A3G010X	A3K010V	A4C050B	A4R010V2
A3G010Y	A3K010W	A4C050C	A4R010W
A3G010Z	A3K010X	A4C050D	A4R010X
A3G020C	A3M020A	A4C050E	A4R010Z
A3G020P	A3M020B	A4C050F	A4S010A
A3G020T	A3M020C	A4C060A	A4S010B
A3G020W	A3M020D	A4C060B	A4S010C
A3H010A	A3M020E	A4C060C	A4S010D
A3H010B	A3M020F	A4C060D	A4S010E
A3H010C	A3M020G	A4C060E	A4S010F
A3H010D	A3M020H	A4D010A	A4S010G
A3H010E	A3M020I	A4D010B	A4S010J
A3H010F	A3M020J	A4D010C	A4S010K
A3H010G	A3M020L	A4D010D	A4S010L
A3H010H	A3M020M	A4D010E	A4S010M
A3H010J	A3M020N	A4D010F	A4S010N
A3H010K	A3M020O	A4D010G	A4S010Q
A3H010L	A3M020P	A4D010H	A4S010R
A3H010M	A3M020R	A4D010J	A4S010S
A3H010N	A3M020S	A4R0101	A4T010B
A3H010P	A3M020T	A4R0102	A4T010C
A3H010Q	A3M020V	A4R010A	A4T010D
A3H010R	A3M020X	A4R010B	A4T010E
A3H010U	A4C010A	A4R010D	A4T010F
A3H010V	A4C010B	A4R010D1	A4T010G
A3H010W	A4C010C	A4R010E	A4T010H
A3H010X	A4C010D	A4R010F	A4T010I
A3H010Y	A4C010E	A4R010G	A4T010J
A3H010Z	A4C010F	A4R010H	A4T010K

A4T010L	M1M01K	M3K01J	M4W06B
A4T010M	M1M01M	M3M02C	M4W06M
A4T010N	M1M01P	M3M02E	M4W06W
A4T010N1	M1M01W	M3M02F	U4001A
A4T010O	M2N01B	M3M02Q	U4001B
A4T010P	M2N01C	M3M02Y	U4001B1
A4T010Q	M2N01F	M4B10B	U4001C
A4T010R	M2N01N	M4B10H	U4001C1
A4T010T	M2N01Z	M4B10L	U4001D
A4W010A	M2S01H	M4C02A	U4001E
A4W010B	M2S01K	M4C02B	U4001F
A4W010C	M2S01P	M4C02C	U4001G
M1A02A	M2W01A	M4D07E	U4001H
M1A02H	M2W01D	M4D07W	U4001J
M1A02N	M2W01E	M4R01A	U4001K
M1A05A	M2W01F	M4R01B	U4001L
M1A05B	M2W01H	M4R01D	U4001M
M1A05C	M2W01L	M4R04A	U4001N
M1A05D	M2W01W	M4R04B	U4001O
M1A05E	M3G01E	M4R04E	U4001P
M1A05W	M3G01F	M4R04T	U4001Q
M1F01A	M3G01K	M4R04W	U4001R
M1F01W	M3G01R	M4S05A	U4002A
M1F02A	M3G01T	M4S05C	U4002B
M1F02B	M3H01A	M4S05D	U4002C
M1F02C	M3H01N	M4S05P	U4002D
M1F02E	M3H01R	M4S05T	U4002E
M1M01A	M3H01S	M4S05U	U4002F
M1M01B	M3K01A	M4T03A	U4002G
M1M01E	M3K01A1	M4T03B	U4002H
M1M01F	M3K01B	M4T03D	U4003A
M1M01H	M3K01F	M4T03O	U4003A1
M1M01I	M3K01I	M4W06A	U4003B



## APPENDIX D - COMMERCIAL NEIGHBORHOOD CODES

Neighborhood Code	Market Area
AH-Alliance Airport	Tarrant County
AH-Arlington Municipal Airport	Tarrant County
AH-Dallas/Fort Worth International Airport	Tarrant County
AH-Grand Prairie Municipal Airport	Tarrant County
AH-Hicks Airfield	Tarrant County
AH-Meacham International Airport	Tarrant County
AH-Northwest Tarrant County General	Tarrant County
AH-South Arlington/Mansfield General	Tarrant County
AH-South Tarrant County General	Tarrant County
AH-Spinks Airport	Tarrant County
AH-West Tarrant County General	Tarrant County
APT-7TH Street	Tarrant County
APT-Alliance	Tarrant County
APT-Azle	Tarrant County
APT-Central Arlington	Tarrant County
APT-Centreport	Tarrant County
APT-Crowley/Burleson	Tarrant County
APT-Downtown/Cultural District	Tarrant County
APT-Eastchase	Tarrant County
APT-Everman	Tarrant County
APT-Fort Worth Northside	Tarrant County
APT-Fossil Creek	Tarrant County
APT-Grapevine/Southlake	Tarrant County
APT-Green Oaks	Tarrant County
APT-GSID	Tarrant County
APT-Haltom City/North Richland Hills	Tarrant County
APT-Haltom City/Richland Hills	Tarrant County
APT-Heritage Trace	Tarrant County
APT-Hospital	Tarrant County
APT-Hurst/Euless	Tarrant County
APT-Hurst/Euless/Bedford	Tarrant County
APT-Keller/Westlake	Tarrant County
APT-Kennedale	Tarrant County
APT-Lake Worth	Tarrant County
APT-Meadowbrook	Tarrant County
APT-Normandale	Tarrant County
APT-North Arlington	Tarrant County
APT-North Fort Worth	Tarrant County
APT-North Richland Hills/Colleyville	Tarrant County

APT-Northeast Tarrant County	Tarrant County
APT-Northwest Tarrant County	Tarrant County
APT-Ridgmar	Tarrant County
APT-Seminary	Tarrant County
APT-Senior Living	Tarrant County
APT-South Arlington	Tarrant County
APT-South Arlington/Mansfield	Tarrant County
APT-South Arlington/Mansfield/Kennedale	Tarrant County
APT-South Tarrant County	Tarrant County
APT-Southwest Arlington	Tarrant County
APT-Southwest Fort Worth (Bryant Irvin/Hulen)	Tarrant County
APT-Southwest Tarrant County	Tarrant County
APT-Stop Six	Tarrant County
APT-West Arlington	Tarrant County
APT-West Fort Worth	Tarrant County
APT-White Settlement	Tarrant County
APT-Woodhaven	Tarrant County
Assisted Living General	Tarrant County
Auto Care General	Tarrant County
Auto Sales General	Tarrant County
Bank General	Tarrant County
Bed & Breakfast General	Tarrant County
Car Wash General	Tarrant County
Com Inactive	Tarrant County
Community Facility General	Tarrant County
Convalescent/Nursing Home General	Tarrant County
Country Club General	Tarrant County
Day Care General	Tarrant County
Engineering Research General	Tarrant County
Food Service General	Tarrant County
Funeral Home General	Tarrant County
Hospitals General	Tarrant County
IM-Airport Freeway/Birdville General	Tarrant County
IM-Alliance	Tarrant County
IM-Alliance/Alliance Gateway General	Tarrant County
IM-Arlington South	Tarrant County
IM-Arlington West	Tarrant County
IM-Bailey Industrial	Tarrant County
IM-Carter Industrial	Tarrant County
IM-Cascade Heights	Tarrant County
IM-Centreport	Tarrant County
IM-Centreport/GSID General	Tarrant County
IM-Commerce Business Park	Tarrant County
IM-DFW North	Tarrant County

IM-Downtown/7th Street/Trinity General	Tarrant County
IM-Fossil Creek/Mercantile	Tarrant County
IM-GSID	Tarrant County
IM-Mark IV Parkway	Tarrant County
IM-Mid-Cities (Hurst, Euless, Bedford) General	Tarrant County
IM-Midway	Tarrant County
IM-Newell and Newell	Tarrant County
IM-North Arlington General	Tarrant County
IM-North Fort Worth General	Tarrant County
IM-Northeast Tarrant County General	Tarrant County
IM-Northwest Fort Worth/Northside General	Tarrant County
IM-Northwest Tarrant County General	Tarrant County
IM-Railhead	Tarrant County
IM-Ryan and Pruitt	Tarrant County
IM-Six Flags Business Park	Tarrant County
IM-South Arlington/Mansfield General	Tarrant County
IM-South Fort Worth/Seminary General	Tarrant County
IM-South Tarrant County General	Tarrant County
IM-Southeast Fort Worth General	Tarrant County
IM-Southwest Tarrant County General	Tarrant County
IM-West Fort Worth/Hulen General	Tarrant County
IM-West Tarrant County General	Tarrant County
Mall General	Tarrant County
Marina General	Tarrant County
MED-Alliance Hospital District	Tarrant County
MED-Azle Hospital District	Tarrant County
MED-Central Business District General	Tarrant County
MED-Cityview Hospital District	Tarrant County
MED-East Tarrant County General	Tarrant County
MED-Grapevine/Southlake Hospital District	Tarrant County
MED-Great Southwest Hospital District	Tarrant County
MED-HEB Hospital District	Tarrant County
MED-Historic Fort Worth Hospital District	Tarrant County
MED-I-20/Matlock Hospital District	Tarrant County
MED-Mid-Cities (Hurst, Euless, Bedford) General	Tarrant County
MED-North Arlington General	Tarrant County
MED-North Hills Hospital District	Tarrant County
MED-North Tarrant County General	Tarrant County
MED-Northeast Tarrant County General	Tarrant County
MED-Northwest Tarrant County General	Tarrant County
MED-Randol Mill/I-30 Hospital District	Tarrant County
MED-South Arlington/Grand Prairie/Mansfield General	Tarrant County
MED-South Mansfield Hospital District	Tarrant County
MED-South Tarrant County General	Tarrant County

MED-Southwest Tarrant County General	Tarrant County
MED-West Tarrant County General	Tarrant County
Mixed Use General	Tarrant County
Mobile Home Park General	Tarrant County
Motel/Hotel General	Tarrant County
OFC-Central Business District	Tarrant County
OFC-East Tarrant County	Tarrant County
OFC-Mid-Cities (Hurst, Eules, Bedford)	Tarrant County
OFC-North Arlington	Tarrant County
OFC-North Tarrant County	Tarrant County
OFC-Northeast Tarrant County	Tarrant County
OFC-Northwest Tarrant County	Tarrant County
OFC-South Arlington/Grand Prairie/Mansfield	Tarrant County
OFC-South Tarrant County	Tarrant County
OFC-Southwest Tarrant County	Tarrant County
OFC-West Tarrant County	Tarrant County
Post Office General	Tarrant County
Recreational Facility General	Tarrant County
RET-7th Street	Tarrant County
RET-Alliance Corridor	Tarrant County
RET-Arlington Entertainment District	Tarrant County
RET-Arlington/Centreport General	Tarrant County
RET-Bedford/Eules General	Tarrant County
RET-Burleson Town Center	Tarrant County
RET-Central Business District General	Tarrant County
RET-Cityview/Hulen Mall	Tarrant County
RET-Colleyville Town Square	Tarrant County
RET-Downtown Fort Worth	Tarrant County
RET-Grapevine Mills Mall	Tarrant County
RET-Hurst/Richland Hills General	Tarrant County
RET-Keller	Tarrant County
RET-La Gran Plaza	Tarrant County
RET-Lake Prairie	Tarrant County
RET-Lake Worth	Tarrant County
RET-Mansfield	Tarrant County
RET-North Richland Hills General	Tarrant County
RET-Northeast Fort Worth General	Tarrant County
RET-Northeast Mall	Tarrant County
RET-Northeast Tarrant County General	Tarrant County
RET-Northwest Tarrant County General	Tarrant County
RET-Ridgmar Mall	Tarrant County
RET-Southeast Fort Worth/Everman/Forest Hill General	Tarrant County
RET-Southlake Town Square	Tarrant County
RET-Southwest Tarrant County General	Tarrant County

RET-The Parks/Highlands	Tarrant County
RET-The Villages of Colleyville	Tarrant County
RET-Vinyard Marketplace	Tarrant County
RET-Watauga North	Tarrant County
RET-Westworth Village	Tarrant County
Right Of Way General	Tarrant County
Self Storage General	Tarrant County
Service Station General	Tarrant County
Special General	Tarrant County
Special Panther Island	Tarrant County
Special Panther Island West	Tarrant County
Stockyards	Tarrant County
Tarrant County	
Theater General	Tarrant County
Utility General	Tarrant County
Vacant Unplatted	Tarrant County
Veterinary General	Tarrant County
WH-Airport Freeway/Birdville General	Tarrant County
WH-Alliance	Tarrant County
WH-Alliance/Alliance Gateway General	Tarrant County
WH-Arlington South	Tarrant County
WH-Arlington Tech Centre	Tarrant County
WH-Arlington West	Tarrant County
WH-Bailey Industrial	Tarrant County
WH-Carter Industrial	Tarrant County
WH-Cascade Heights	Tarrant County
WH-Centreport	Tarrant County
WH-Centreport/GSID General	Tarrant County
WH-Commerce Business Park	Tarrant County
WH-DFW North	Tarrant County
WH-Downtown/7th Street/Trinity General	Tarrant County
WH-Fossil Creek/Mercantile	Tarrant County
WH-GSID	Tarrant County
WH-Mark IV Parkway	Tarrant County
WH-Mid-Cities (Hurst, Euleless, Bedford) General	Tarrant County
WH-Midway	Tarrant County
WH-Newell and Newell	Tarrant County
WH-North Arlington General	Tarrant County
WH-North Fort Worth General	Tarrant County
WH-Northeast Tarrant County General	Tarrant County
WH-Northwest Fort Worth/Northside General	Tarrant County
WH-Northwest Tarrant County General	Tarrant County
WH-Railhead	Tarrant County
WH-Riverpark	Tarrant County

WH-Ryan and Pruitt	Tarrant County
WH-Six Flags Business Park	Tarrant County
WH-South Arlington/Mansfield General	Tarrant County
WH-South Fort Worth/Seminary General	Tarrant County
WH-South Tarrant County General	Tarrant County
WH-Southeast Fort Worth General	Tarrant County
WH-Southwest Tarrant County General	Tarrant County
WH-West Fort Worth/Hulen General	Tarrant County
WH-West Tarrant County General	Tarrant County
Worship Center General	Tarrant County