

## **Activity Center 2023 Methodology**

### **Summary:**

Activity Centers, as defined within this document, are areas with various levels of activity, where activity is measured by density of employment, businesses, office/retail buildings, office/retail space, multi-family units, and K-12 school enrollment. This methodology combines and classifies those levels of activity at the parcel level, into a 4-level hierarchy of Low, Medium, High, Very High.

### **Methodology:**

Individual variable scores are based upon the concentration, or density of the variable as it exists in any one location, with respect to the region. Scores are produced via a Geographic Information System (GIS) method called kernel density. This method creates a grid of 100'x100' cells across the region, where the value assigned to each grid cell is the density value of an input set of point features within 1/8 of a mile of that cell. Where the concentration/density of points is high, values are higher, and where there is little or no concentration of points, values are lower. This method is applied to the address-level point features of business locations weighted by employment, business locations, office and retail buildings, office and retail buildings weighted by total space, multi-family buildings weighted by units and K-12 school locations weighed by enrollment. Each set of raster values is then reclassified into a 9-point integer scale based upon the Jenks natural breaks\* method, and spatially joined to the parcel layer by taking the average of the integer density grid scores that intersect it. For example, if a parcel is intersected by 3 density grid cells, with scores of 2, 4, 6, the parcel would be assigned a score of 4. Parcels with a land use of single family, right-of-way, utility, agricultural, or vacant are eliminated from the scoring process. Cemeteries are also excluded where the local jurisdictional land use code is specific enough to determine.

Once all densities have been spatially joined to the parcel features, an overall activity score for each parcel is calculated by summing the density scores for each of the 6 layers, weighting the employment points so they have equal value to the other business-related layers of businesses, office/retail buildings and office/retail space. Using the variables defined for this methodology, the calculation would be  $\text{Businesses} + \text{Office/Retail Buildings} + \text{Office/Retail Space} + \text{Multi-Family Units} + \text{K-12 School Enrollment} + (\text{Employment} * 3)$ . The overall activity score is then classified into a 4-level hierarchy based upon the following:

- Parcels with a score below 10 are dropped from consideration – these include parcels that scored a 1 on all variables or scored a 2 on only one of the five unweighted variables.
- Low (10-16) – Any score between 10 and the equivalent of scoring a 2 on all variables.
- Medium (17-24) – Any score between 17 and the equivalent of scoring a 3 on all variables.
- High (25-32) – Any score between 25 and the equivalent of scoring a 4 on all variables.
- Very High (33-55) – Any score above the equivalent of scoring a 4 on all variables.

\* [http://wiki.gis.com/wiki/index.php/Jenks\\_Natural\\_Breaks\\_Classification](http://wiki.gis.com/wiki/index.php/Jenks_Natural_Breaks_Classification)

The **Jenks Natural Breaks Classification** (or *Optimization*) system is a data classification method designed to optimize the arrangement of a set of values into "natural" classes. A Natural class is the most optimal class range found "naturally" in a data set. A class range is composed of items with similar characteristics that form a "natural" group within a data set.

Cartographers and map makers can utilize the Jenks method to identify logical break points in a data set by grouping similar values that "minimize differences between data values in the same class and maximize the differences between classes." The features are divided into classes whose boundaries are set where there are relatively big jumps in the data values.

#### **Data Sources:**

- Businesses and Local Employment – Data Axle (December 2021)
- Office/Retail Buildings, Office/Retail Space, and Multi-Family Units – the CoStar (June 2023)
- K-12 School Enrollment – MARC (2023-2024 school year)
- Parcel Land Use - MARC (2023 9-county jurisdiction parcels)

#### **Data Limitations:**

- Data does not necessarily reflect exact or current conditions
- Business location is approximate
- Local employment is self-reported
- Parcel land use relies on assumed validity and completeness of jurisdictional data