

Willowbend Corporation

What is geocoding?

Geocoding is a common tool used by business to find their customers and to look at geographic place based information.

Geocoding is the process of graphically plotting geographic locations from data that is stored in tabular format – such as addresses. Geocoding can be used to plot the geographic positions of a set of addresses in a customer database or you can plot Latitude and Longitude points recorded from a GPS unit. Geocoding done from a GPS unit is inherently more accurate, but it is too time consuming for commercial applications.

Geocoding from an address file is less accurate, but because of the speed of operation is almost always used for commercial applications.

Willowbend Corporation can utilize location information from either a GPS recorder or an address file. Willowbend's address geocoding process is proprietary and handles many of the inherent problems in typical commercial geocoders.

How Does Geocoding Address Locations Work?

In order to graphically map address location two files are needed. First, a table that contains the addresses to be mapped is required. Second, a street file that is both tabular and graphic is required. The tabular aspect of the street file is used in the actual geocoding process, while the graphic aspect of the file is used to visually display the line segments as streets.

The street files contain information about the spatial earth location of each street segment from which addresses on that street segment can be located. The street segments contain other information such as street name, street address range, and Zip Code.

The more sophisticated street files contain information designating the type of street being represented (i.e. a major highway versus a residential street), and transportation quality street files contain information regarding speed limits and street connectivity. This information is utilized by routing and route sequencing applications to plot optimal delivery paths.

It is important to note that all files have errors that can make it hard to get a complete listing of addresses mapped. The most difficult issue with errors is missing streets. The second most difficult issue is missing street ranges and incomplete street ranges. Another common issue with street files is street names and street information that does not match the address records information. Willowbend's geocoding processes deal with each of these issues.

When geocoding addresses, the system attempts to match the address information with the street file information. Once a match is made the system determines the location for the address by placing the address in an approximate position on the line segment based on the range of the street segment. For example, if the address is 50 Main St. The geocoder finds Main St and then finds one of the street segments for Main St is from 2 to 100 on the Even side of the street. The geocoder places the address in the middle of the street segment and imputes the longitude and latitude of the address from the street segment at that point. One issue is that the street files typically use "theoretical" ranges. That means that although the range was 2 to 100, the actual addresses on the block may be from 2 to 48. This problem is what creates the "bunching" of addresses on maps. Willowbend's geocoder, when utilizing a CDS address file or a complete placeholder file, modifies the ranges on the street segment to reflect only the actual addresses found on the block – minimizing "bunching".

Willowbend's geocoder uses a postal standardization system to "normalize" the street or that you have a reference file that contains location information about street names, address number ranges, and zip codes.

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Willowbend's geocoder combines spurious breaks in the street files to obtain more accurate locations and adds address ranges where an obviously connecting street with the same street name key is missing address ranges.

It is important to note that Willowbend only utilizes TeleAtlas Transportation quality street files. Other street files, such as TIGER streets files, have serious errors that can make it hard to get a complete listing of addresses mapped.

Placement of points is an important issue to remember when geocoding, as parcels are often not equal sizes and the locations you geocode may be off by a small difference from the actual location that might be determined by a GPS recorder used at the location. This is usually not a problem when you are trying to find the general location of an address, but can be a real problem if you are a city utility trying to mark the entrance to a house.

Willowbend attaches location quality codes to addresses when they are geocoded. The location quality codes are listed below:

Address Location Code Descriptions

Address location codes detail the level of the geocode. An address location code has three characters. The first character is always an "A", indicating that it is an address location. The second character is either an "S" for Street level geocode, or an "X" for an intersection of two streets. The third character is numeric with the following meanings:

0:Best location

1:Street side is unknown. The Census ZIPS Block ID from the left side is assigned, but no offset is assigned. This number is used with intersections (X) only.

2:Address was interpolated onto a TIGER segment that did not contain address ranges initially.

3:Both 1 and 2.

7:Placeholder - single point used for street segment - returned with GDT data only. This type of point is useful to know the general location of a street, but does not give specific street length and other practical information.

Some examples of Address Location Codes are following:

AS0:Address geocode to the Street level at the Best Location. This is the most precise geocode available in any circumstance - address or ZIP+4 level.

AS7:Address geocode to the Street level at the Point street location. (Actual street segment is NOT drawn on the map.)

AX2:Address geocode to the Intersection level because the street side is unknown.

AX3:Address geocode to the Intersection level because street side cannot be determined and address ranges cannot be assigned.

ZIP+4 Centroid Location Code Descriptions

ZIP+4 Centroid location codes indicate the quality of two location attributes - Census ID accuracy and positional accuracy. The first character is always a "Z", indicating that it is a ZIP+4 location. The second character indicates the Census ID accuracy and the third character indicates the type of location. An additional fourth character may be returned which indicates the methodology used to derive the location, but is not used with the Route Xpert Series 2000 system.

The second character in a ZIP+4 location code denotes the Census ID accuracy, as follows:

B:Indicates Census Block Group accuracy (this is the only one used by Route Xpert).

T:Indicates Census Tract accuracy.

C:Indicates unclassified Census accuracy. Normally accurate to the County level.

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The third character in a ZIP+4 location code identifies the positional accuracy level, as follows:

9:Indicates a location based upon a ZIP+4 centroid (9 means it used all nine digits of the ZIP code to determine the location). These are the most accurate centroids and will most frequently be placed on the correct block face.

7:Indicates a location based upon a ZIP+2 centroid (7 means it used all five digits of the ZIP code plus the first two digits of the ZIP+4 to determine the location.) Items with a 7 in their location code are at a point that represents a several block area in urban locations, or a slightly larger range in rural areas.

5:Indicates the location of the Post Office that delivers mail to that address, a 5-digit ZIP code centroid, or a location based upon locale (i.e. city). This level of precision is NOT used with the Route Xpert Series 2000 and will be considered a No Geocode address.

Some examples of these ZIP+4 level codes are as follows:

ZB9:ZIP+4 geocode to the Census Block Group level at the ZIP+4 centroid. This is the most accurate of all ZIP+4 geocodes.

ZT9:ZIP+4 geocode to the Census Tract level at the ZIP+4 centroid corresponding to the Block Group that is considered to be the most likely because it contains the most households in the Tract.