Spectrum Technology Platform

Version 9.0

Geocoding Guide for United States

Contents

Geocode US Address

Geocode US Address takes an address and returns latitude/longitude coordinates. Geocode US Address also standardizes and validates addresses using data from the U.S. Postal Service.

Geocode US Address can also geocode intersections. Instead of entering a mailing address, you can enter and intersection such as "Pearl St. and 28th" and obtain the coordinates of the intersection.

Geocode US Address is part of the Enterprise Geocoding Module. For more information on the Enterprise Geocoding Module, including a listing of other components included with it, see **What is the Enterprise Geocoding Module?**.

In this section:

Input

Geocode US Address takes an address as input. To obtain the best performance with Geocode US Address and the most possible matches, your input address should be as complete as possible and free of misspellings and incomplete information. Input addresses should be as close to USPS standards as possible for the highest match rate. For information on USPS standards, see the USPS website **http://www.usps.com** .

NAVTEQ data is available for United States. For NAVTEQ data, note the following:

Data © 2013 NAVTEQ North America, LLC

Input addresses should contain a street address line and a lastline, or a single line with both address and lastline elements. This helps Geocode US Address accurately identify an area in which to search for a match candidate, based on the city, state, and ZIP Code.

Geocode US Address also accepts a street address line with individual city, state, and ZIP Code lines instead of a last line. You should only use this type of input if you are confident that the input address is free of misspellings and incomplete information.

If you are using Geocode US Address for address standardization, input addresses must have at least a street name, and either a city and state or a ZIP Code to obtain a match. If you are using Geocode US Address to obtain geocoding information, input addresses only need to contain a ZIP + 4 Code to receive geocoding information.

The following table provides information on the format and layout of Geocode US Address input.

Table 1: Geocode US Address Input Data

Field Name	Format	Description
AddressLine1	String	The first address line or a street intersection.
		To specify a street intersection, use and, &, at, or @. For example, PEARL & 28th. Geocode US Address does not match intersections when processing in CASS mode.
		You may enter an address range instead of an individual address number. For example, 10-12 FRONT ST. For additional information, see **Address Range Matching** on page 8.
AddressLine2	String	The second address line or a street intersection.
		To specify a street intersection, use and, &, at, or @. For example, PEARL & 28th.L Geocode US Address does not match intersections when processing in CASS mode.
AddressLine3	String	Third address line.
AddressLine4	String	Fourth address line.
AddressLine5	String	Fifth address line.
AddressLine6	String	Sixth address line.
City	String	The name of the municipality, such as a city or town.
		Note: If there is any data in the input fields AddressLine3, AddressLine4, AddressLine5, or AddressLine6,

Field Name	Format	Description
		Geocode US Address will ignore data in the City input field.
FirmName	String	The name of a business. Geocode US Address attempts to match the input firm name to the recognized firm names in the USPS data for a higher quality match. If the firm name is not in the USPS data, Geocode US Address ignores the firm name when matching and returns the firm name with the output.
LastLine	String	The last line of an address containing the city, state, and ZIP Code.
PostalCode	String	The 5-digit ZIP Code or the 9-digit ZIP + 4 code.
		Note: If there is any data in the input fields AddressLine3, AddressLine4, AddressLine5, or AddressLine6, Geocode US Address will ignore data in the PostalCode input field.
StateProvince	String	The name or abbreviation of the state.
		Note: If there is any data in the input fields AddressLine3, AddressLine4, AddressLine5, or AddressLine6, Geocode US Address will ignore data in the StateProvince input field.

How Geocode US Address Processes Addresses

Geocode US Address processes addresses in the following order:

1. Parses the address elements.

Geocode US Address parses input address data into single elements. Parsing occurs on data in the order in which you load the data. Even if a valid address is missing an element, Geocode US Address can find a match. Some elements, such as predirectionals, may not be critical elements of some addresses. By comparing an address as input against all known addresses in a search area, Geocode US Address can usually determine if any of these elements are missing or incorrect.

2. Finds possible matches within the search area.

Geocode US Address uses the last line elements of an address to determine a search area. You can specify if you want the search area based on a finance area or on an area defined by the city, state, and ZIP Code. (A Finance Area is a collection of ZIP Codes within a contiguous geographic region.) If the city and state are not in the ZIP Code, Geocode US Address performs separate searches for the ZIP Code and city.

After Geocode US Address has determined the search area, it tries to match the elements from the street address line to the records in the standardized data files and does the following:

- Checks input address ranges for missing or misplaced hyphens, and alpha-numeric ranges for proper sequence.
- Searches for any misspellings and standard abbreviations. For example, the Geocode US Address can recognize Mane for Main and KC for Kansas City.
- Searches for any alias matches to the USPS and Spatial data (TIGER and TomTom). For example, Geocode US Address recognizes that in Boulder, CO Highway 36 is know as 28th Street.
- Searches for any USPS recognized firm names for additional match verification.
- Searches for street intersection matches. Matching to an intersection is extremely useful when you are using address matching to obtain a geocode.

- Searches for addresses lines that contain a house number and unit number as the same element. For example, Geocode US Address recognizes the input 4750-200 Walnut Street and performs recombination to output 4750 WALNUT ST STE 200.

    Note: The USPS does not consider intersections valid addresses for postal delivery. Therefore, the Geocode US Address does not match intersections when processing in CASS mode.

3. Scores each possible match against the parsed input.

    Geocode US Address compares each element in the input address to the corresponding element in the match candidates, and assigns a confidence level. Geocode US Address weighs the confidence level for all of the elements within a match candidate, and assigns a final score to the sum.

    Note: Geocode US Address uses a penalty scoring system. If an element does not exactly match an element in the match candidate, the Geocode US Address adds a penalty to the score of the match candidate. Therefore, scores with lower numbers are better matches.

4. Determines the match.

    Geocode US Address prioritizes each match candidate based on the assigned confidence score and returns as a match the candidate that has the lowest score.

    The match mode you choose determines the range that Geocode US Address allows for a match. Geocode US Address only returns a match if the score of the target address falls within the range designated by the selected match mode.

    In some cases, more than one match candidate may have the lowest score. In this instance, Geocode US Address cannot determine on its own which record is correct, and returns a status indicating multiple matches.

    Note: If you have enabled Delivery Point Validation (DPV) processing, Geocode US Address automatically attempts to resolve multiple matches using DPV.

    Along with a standardized address, Geocode US Address also returns the following:

    - Geocode—Longitude and latitude for the address
    - Match code—Information about the match of the input address to the reference data
    - Location code—Precision level of a geocode
    - Parity—The side of the street on which the match resides.

    Geocode US Address does not return parity when processing in relaxed mode. For more information on Geocode US Address output, see **Output** on page 19.

Address Range Matching

Some business locations are identified by address ranges. For example, a shopping plaza could be addressed as 10-12 Front St. This is how business mail is typically addressed to such a business location. These address ranges can be geocoded to the interpolated mid-point of the range.

Address ranges are different from hyphenated (dashed) addresses that occur in some metropolitan areas. For example, a hyphenated address in Queens County (New York City) could be 243-20 147 Ave. This represents a single residence (rather than an address range) and is geocoded as a single address. If a hyphenated address returns as an exact match, Geocode US Address does not attempt to obtain an address range match.

Address range matching is not available in Exact or CASS modes, since an address range is not an actual, mailable USPS® address. The following fields are not returned by address range geocoding:

- ZIP + 4® (in multiple segment cases)
- Delivery point
- Check digit
- Carrier route
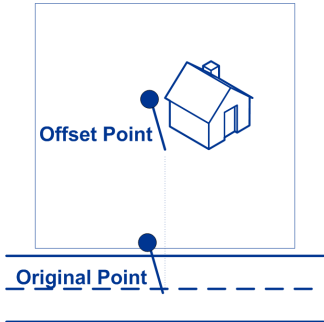- Record type
- Multi-unit
- Default flag

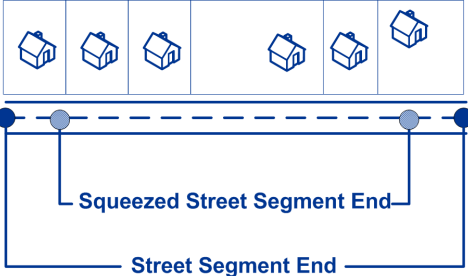Address range matching works within the following guidelines:

- There must be two numbers separated by a hyphen.
- The first number must be lower than the second number.
- Both numbers must be of the same parity (odd or even) unless the address range itself has mixed odd and even addresses.
- Numbers can be on the same street segment or can be on two different segments. The segments do not have to be contiguous.
- If both numbers are on the same street segment, the geocoded point is interpolated to the approximate mid-point of the range.
- If the numbers are on two different segments, the geocoded point is based on the last valid house number of the first segment. The ZIP Code and FIPS Code are based on the first segment.
- In all cases, odd/even parity is evaluated to place the point on the correct side of the street.

Options
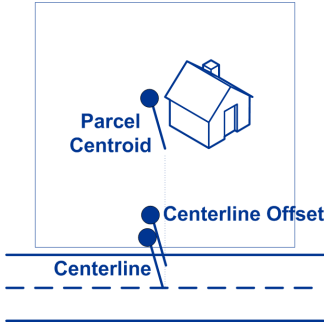
Geocoding Options

Table 2: Geocode US Address Geocoding Options

Option Name	Description
Database	The name of the database resource that contains the data to use in the search process. Use the database name specified in the Management Console's Database Resources tool. For more information, see the *Spectrum™ Technology Platform Administration Guide*.
Offset	Specifies the offset distance from the street segments, in feet. The range is 0 to 5280. The default value is 50. The offset distance is used in street-level geocoding to prevent the geocode from being in the middle of a street. It compensates for the fact that street-level geocoding returns a latitude and longitude point in the center of the street where the address is located. Since the building represented by an address is not on the street itself, you do not want the geocode for an address to be a point on the street. Instead, you want the geocode to represent the location of the building which sits next to the street. For example, an offset of 50 feet means that the geocode will represent a point 50 feet back from the center of the street. The distance is calculated perpendicular to the portion of the street segment for the address. Offset is also used to prevent addresses across the street from each other from being given the same point. The following diagram shows an offset point in relation to the original point.

Option Name	Description
	Street coordinates are accurate to 10,000ths of a degree and interpolated points are accurate to the millionths of a degree.
Squeeze	Specifies the distance, in feet, to move the street segment end points toward the middle of the segment. Squeeze is used in street-level matching. Use the squeeze setting to prevent address points from residing in an intersection or too close to the end of a street.
	The range is 0 to 2147483647. The default value is 50.
	The following diagram compares the end points of a street to squeezed end points.

Squeezing the street segment endpoints affects street-level matching by reducing the length of a street segment, thereby reducing the spacing between address points along the segment. For example, if the length of a street segment is 1,000 feet and there are 10 addresses along the segent, street-level matching would result in each address being spaced 100 feet apart (1,000 ÷ 10). If you were to set a squeeze value of 100 feet, moving each street segment endpoint 100 feet torward the center of the street segment, the length of the street segment would be reduced to 800 feet (reduced by 100 feet on each end). Street-level matching would then result in addresses beging spaced 80 feet apart (800 ÷ 10).

Option Name	Description	
Latitude/Longitude format	Specifies the format of the latitude/longitude returned by Geocode US Address.	
	Decimal	The latitude/longitude is returned in decimal format (default). For example: 90.000000-180.000000
	Integer	The latitude/longitude is returned in integer format. For example: 90000000-180000000
Centroid preference	Determines the type of centroids returned by Geocode US Address. A centroid is the center of an area. The centroid coordinates are the average of the sets of coordinates that describe the area.	
	No Centroids	Do not return centroids. If an address-level geocode cannot be determined, do not attempt to determine a centroid.
	Return ZIP Code centroids	Return ZIP Code centroids only. If you select this option, address-level geocodes will not be returned.
	Fallback centroids	Attempt to determine a centroid when an address-level geocode cannot be determined. The centroid options are described below.
Street centroid	Specifies whether to attempt to return a street centroid when an address-level geocode cannot be determined. To determine a street centroid, Geocode US	

Option Name	Description
	Address searches the input ZIP Code or city for the closest match. If Geocode US Address is able to locate the street, it returns a geocode along the matched street segment.
	For example, if the input address is 5000 Walnut Street, Boulder 80301, and there is no 5000 Walnut Street, Geocode US Address searches for the closest match to that address within the ZIP Code 80301. If there were no input ZIP Code, Geocode US Address would search for the closest match to the input address within Boulder.
	If the input address is Walnut Street, Boulder 80301, since there is no house number, Geocode US Address searches for the street within the input ZIP Code.
	Street centroid geocodes are indicated by value in the LocationCode output field that begins with "C". For more information, see **Street Centroid Location Codes** on page 86.
	Note: This option is not available if you set **Match mode** to CASS.
ZIP Code centroid	Specifies whether to attempt to return a ZIP Code centroid when an address-level geocode cannot be determined.
	ZIP Code centroid geocodes are indicated by value in the LocationCode output field that begins with "Z". For more information, see **ZIP + 4 Centroid Location Codes** on page 87.
	Note: This option is not available if you set **Match mode** to CASS.
Geographic centroid	Specifies whether to attempt to return a city, county, or state centroid when an address-level geocode cannot be determined. The geocoder returns the most precise geographic centroid that it can based on the input. For example, if the input contains a valid city and state, a city centroid would be returned.
	Note: There are approximately 300 major cities that can be geocoded to a city centroid level even if a valid state is not provided in the input.
	Geographic centroid geocodes are indicated by value in the LocationCode output field that begins with "G". For more information, see **Geographic Centroid Location Codes** on page 91.
	Note: This option is not available if you set **Match mode** to CASS.
Return coordinates in	Determines the North American Datum to use when geocoding datum on the input value. Datum is the mathematical model of the Earth used to calculate the coordinates on any map, chart, or survey system.
	NAD27 This datum does not include the Alaskan Islands or Hawaii. Latitudes and longitudes that are surveyed in the NAD27 system are valid only in reference to NAD27 and are not valid for maps outside the U.S.
	NAD83 This datum is earth-centered and defined with satellite and terrestrial data. NAD83 is compatible with the World Geodetic System 1984 (WGS84), which is the terrestrial reference frame associated with the NAVSTAR Global Positioning System (GPS) used extensively for navigation and surveying. This is the default setting.

Option Name	Description
Centerline offset	The offset distance, in feet, used to calculate the street centerline coordinates. The default is 0.
	If you specify a value other than 0, Geocode US Address calculates the street centerline coordinates by offsetting the centerline point by the distance you specify in the direction of the parcel centroid.
	In an interpolated match, the centerline offset cannot be greater than the distance from the centerline to the interpolated address point. If you specify a centerline offset distance that is greater than this distance, the offset will be limited to the distance to the interpolated point. In effect, the centerline coordinates would be the same as the coordinates for the interpolated point.
Determine elevation	Specifies whether Geocode US Address returns the elevation of the address. Elevation is the distance above or below sea level of a given location. The elevation is returned in the **Elevation** output field, which is part of the Latitude/Longitude output group.
	Note: This option requires that you have licensed and installed the Centrus Premium Points database. Elevation data is not available for all addresses. See the coverage map included with the points database.
Address point interpolation	Specifies whether to perform address point interpolation when an exact match for the address cannot be found in the geocoding database. Address point interpolation is a patented process that results in a more accurate interpolated point. It improves upon regular street segment interpolation by using point data in the interpolation process, as opposed to using street segments alone.
	Note: Address point interpolation is only available when using a point-level geocoding database. It is not available when using point addresses in an auxiliary file.
	The following illustration shows how address point interpolation works. In the example, the input house number is 71. The geocoding database contains address points for 67 and 77. The street segment has a range of 11 to 501. With address point interpolation, Geocode US Address performs the interpolation for the input house number 71 using the points of 67 and 77. Without address point interpolation, Geocode US Address performs the interpolation with the street segment end points of 11 and 501, resulting in a far less accurate result.

Option Name	Description
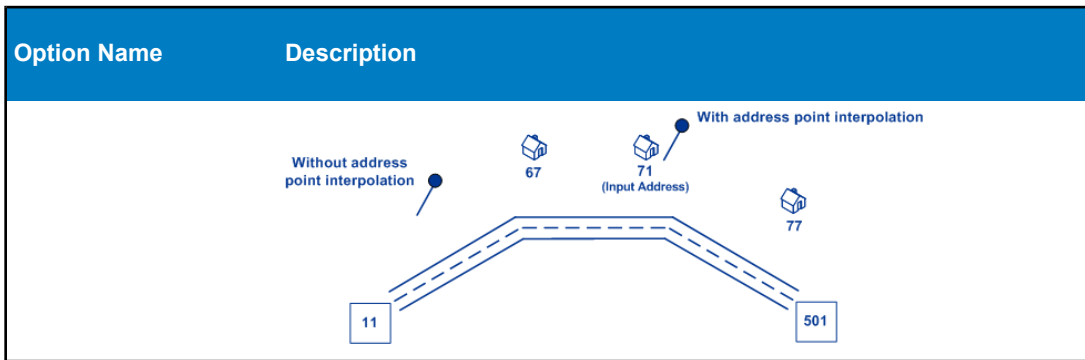
Matching Options

Table 3: Geocode US Address Matching Options

Option Name	Description	
Address preference	Determines which address to use when more than one address is present in the address block.	
	Prefer 2nd line	Uses the second line entered (default). You must select this value if you select CASS in the **Match mode** field.
	Prefer P.O. Box	Uses the P.O Box.
	Prefer Street Address	Uses the street address.
Firm name search	Specifies whether Geocode US Address should use firm name matching logic to enhance address matching. Firm matching logic matches a business name in the input to recognized business names. The input firm name does not need to be spelled correctly to obtain a match. Geocode US Address uses a soundex algorithm to match the firm name. A suite or unit number is not required to make the match.	
	Note: This type of match is not available when processing in CASS mode.	
	One of the following:	
	Never attempt	Do not use firm matching (default). Note that Geocode US Address may correct the firm name even if you specify **Never attempt** if it can find a match using the address line data.
	Attempt if address line matching fails	Use firm matching only if a match cannot be determined using address matching.
	Always attempt	Always attempt to match using firm name matching. If firm name matching fails, attempt to match using address matching.
Perform first letter search	Specifies whether to look for the correct first letter of a street name if the first letter is missing or incorrect. If enabled, Geocode US Address searches through the alphabet looking for the correct first letter to complete the street address.	
	Note: This option is not available if the match mode is set to exact.	

Option Name	Description
	This example includes an incorrect first letter:
	Input: 4750 nalnut boulder co 80301 Output: 4750 Walnut St Boulder CO 80301-2532
	This example excludes a first letter:
	Input: 4750 alnut boulder co 80301 Output: 4750 Walnut St Boulder CO 80301-2532
	This example includes an extra first letter:
	Input: 4750 wwalnut boulder co 80301 Output: 4750 Walnut St Boulder CO 80301-2532
Perform building search	Specifies whether Geocode US Address attempts to obtain a street address when the input address contains a building name with no suite or unit number.
	When this option is disabled, Geocode US Address is able to match to building names only if there is a unit number in the input. For example, if the building search option were disabled and you entered this input:
	5001 Chrysler Bldg New York, NY 10174
	Geocode US Address would successfully return the street address:
	405 Lexington Ave RM 5001 New York, NY 10174-5002
	With this option enabled, Geocode US Address is also able to obtain a street address when only a building name with no unit number is provided. For example, if you enable this option and provide this address:
	Chrysler Bldg New York, NY 10174
	You will get the street address:
	405 Lexington Ave New York, NY 10174-00
	Note: This type of match is not available when processing in CASS mode.
Determine Assessor's Parcel Number	Specifies whether Geocode US Address should determine the address's APN (assessor's parcel number). The APN is an ID number assigned to a property by the local property tax authority. The APN is returned in the **APN** output field, which is part of the Census output group.
	Note: This option requires that you have licensed and installed the Cenrus Enhanced Points or Centrus Premium Points database. APN data is not available for all addresses. See the coverage map included with the points database.
Perform Delivery Point Validation (DPV)	Specifies whether Geocode US Address should process addresses using Delivery Point Validation (DPV). DPV is a United States Postal Service (USPS) technology that validates the accuracy of address

Option Name	Description
	information down to the physical delivery point. You must have licensed the optional DPV processing option to use this feature. You must also install the DPV database.
	If you use DPV, Geocode US Address automatically resolves multiple matches.
	False-positive addresses, also known as seed records, are addresses the USPS monitors to ensure users are not attempting to create a mailing list from the DPV data. If Geocode US Address matches an address in your input data to a false-positive address, you receive a message indicating you have encountered a false-positive address. Processing continues to the end of your job, but DPV processing is not available for this job and subsequent jobs until you have reported the false-positive address encounter to technical support and have received a new security key.
Perform LACS/Link conversion	Specifies whether Geocode US Address should process addresses using LACS^{Link}.
	If you use LACS^{Link}, be sure to choose to choose `Postal Data` and `Qualifiers` in the **Include data** field so that the fields USLACS, USLACS.ReturnCode, and LACSADDRESS are included in the output.
	For more information, see **Locatable Address Conversion System (LACS)**.
Prefer ZIP Code over city	Specifies whether to prefer candidates that match the input ZIP over candidates that match to input city.
	Note: This option is not available when processing in CASS mode.
	For example, consider this input address:
	301 BRYANT ST SAN FRANCISCO CA 94301
	Without this option enabled, the best match would be the one that matches the input city name:
	301 BRYANT ST SAN FRANCISCO CA 94107-4167
	With this option enabled, the best match would be the one that matches the input ZIP Code:
	301 BRYANT ST PALO ALTO CA 94301-1408
Do not return candidates	Select this option if you want to have only the best match returned. If the match attempt results in an ambiguous match no addresses are returned. If the match attempt results in a match to a single address, just that address is returned.
	Note: The best match is not necessarily a high-quality match. You should always check the values in the output fields MatchCode and LocationCode to determine the quality of the match.

Option Name	Description
Return ambiguous matches	Select this option to return the list of possible matches when Geocode US Address finds more than one possible match for the input address and cannot identify a single best match.
Return all candidates	Select this option to return candidate addresses whenever the match attempt produces candidates. If you enable this option, the geocoder will return candidates both when the input address matches to a single address and when the input address matches multiple addresses.
	This option differs from **Return ambiguous matches** in that the **Return ambiguous matches** option does not return candidates if the input address matches to a single address.
Close matches only	If you specify choose **Return all candidates** you can choose to return just those candidates that are considered to be a close match. The criteria used to determine whether a candidate is a close match are those you specify in the Match mode option.
	Note: A close match does not necessarily indicate a high-quality match. You should always check the values in the output fields MatchCode and LocationCode to determine the quality of the match.
Match mode	Determines the leniency used to find a match. One of the following:
	Custom Allows you to select the specific criteria to use when matching the input address to an address in the postal database.
	Exact Requires a very tight match. This is a restrictive mode that generates the fewest number of match candidates to search, which decreases the time to obtain a match. When using this mode, ensure that your input address list is very clean; free of misspellings and incomplete addresses.
	Close Requires a moderately confident match. Generates a moderate number of match candidates.
	Relaxed Default. This is the loosest match mode and generates the most match candidates, which increases the processing time and results in more multiple matches. Use this mode if your address list may contain misspellings and incomplete addresses. This is the only mode that does not respect the street parity for an address match.
	CASS Imposes additional rules to ensure compliance with the USPS regulations for CASS. The purpose of this mode is to create a list of mailable addresses. This mode generates a large number of match candidates. This mode deviates from the other modes in its processing. This mode does not perform intersection, building name, or spatial alias (TIGER and TomTom street name alias) matches. It also does not match to candidates from data sources that do not have USPS equivalent records. This mode recognizes and parses two unit numbers on the same address line, for example a building and unit number.

Option Name	Description
All input	Specifies whether candidates must match all non-blank input fields. For example, if an input address contains a city and postal code, then candidates for this address must match the city and postal code.
House number	Specifies whether candidates must match the house number. If the input house number is not within a range from the street, Geocode US Address selects the nearest range on the street which has the same parity (even or odd house number) as the input address number. Geocode US Address returns one or more of the closest matches inside this range that preserves street parity. This requires Geocode US Address to change the house number. The new house number is equal to one of the range's endpoints, possibly plus or minus one to preserve street parity. **Note:** Even when this option is disabled and an inexact match on the house number is found, Geocode US Address still returns an error code. When this option is disabled and no exact matching house number is found, a match code of either E029 (no matching range, single street segment found), or E030 (no matching range, multiple street segment) is returned. Geocode US Address does not change the house number on the output address. In order to access the inexact address number candidates, you must enable the **Keep multiple matches** option. If there are inexact house number candidates returned, the corresponding match codes begin with the letter 'H' indicating that the house number was not matched. Additionally, even when one or more exact candidates are found, inexact matches to the house number are still on the list of possible candidates, and these can be differentiated from the others by their Hxx match codes. For more information on match codes, see **Geocoding Match Codes** on page 93.
Street	Specifies whether candidates must match the street name.
City	Specifies whether candidates must match the city. If you do not require exact matches on city, the geocoder searches on the street address matched to the particular postal code, and considers other cities that do not match the name, but do match the postal code.
State/Province	Specifies whether candidates must match the state.
Postal code	Specifies whether candidates must match the postal code. If you do not require exact match on postal codes, the geocoder searches a wider area for a match. While this results in slower performance, the match rate is higher because the request does not need to match exactly when it compares match candidates.

Difference Between Match Criteria for U.S. and Non-U.S. Geocoding

The "must match criteria" used in the custom match mode of Geocode US Address work differently than the "close match criteria" in non-U.S. geocoders. For Geocode US Address, the custom match criteria specify which address elements must match the reference database in order for the match to be returned as a candidate. All candidates returned by Geocode US Address will match the elements you specify

as long as those elements are available in the reference database. However, in non-U.S. geocoders, the "close match" criteria are used to determine which candidates are close matches and which are non-close matches. Non U.S. geocoders can return both close candidates and non-close candidates, depending on whether you enable the **Close matches only** option. In summary, the "must match" criteria used by Geocode US Address automatically limit the candidates returned, whereas the "close match criteria" used by non-U.S. geocoders do not limit the candidates returned.

Output Format

The following table lists the Geocode US Address options that control the format of the output.

Table 4: Geocode US Address Output Format Options

Option Name	Description
Casing	Specifies the casing of the output data. One of the following:
	Mixed — The output in mixed case (default). For example: 123 Main St Mytown FL 12345
	Upper — The output in upper case. For example: 123 MAIN ST MYTOWN FL 12345
Output formatted on fail	Specifies whether Geocode US Address normalizes an addresses that fail to match, and addresses that are unchanged. Normalization formats an address to the USPS guidelines without validating the address.
Output postal code separator	Specifies whether Geocode US Address should include the dash in full postal code output.
Return descriptions in output	Specifies whether Geocode US Address provides an additional description field as output. These fields provide the text equivalent to a field represented by a code. For example, LocationCode returns a code that indicates the accuracy (quality) of the assigned geocode. LocationCode.Description provides the description for the code returned.

Output Data

The following table shows the Geocode US Address options that control which data Geocode US Address returns in the output.

Table 5: Geocode US Address Output Data Options

Option Name	Description
Include data	Specifies optional data to include in the output. Note that Geocode US Address always returns the default data listed in **Default Output** on page 26. The data you select here is returned with the default output data. • Auxiliary • Block Address

Option Name	Description
	• Census • Centerline Projection • DPV (The DPV field group is disabled unless you select **Perform Delivery Point Validation (DPV)** on the **Configuration Options** tab.) • Geoconfidence • Latitude/Longitude • Parsed Elements • Postal Data • Qualifiers • Range • Segment For a description of the fields in each output group, see **Output** on page 19. If you do not want all of the fields in a particular category returned, do not select the check box, and list only those fields you want returned in Include extra fields.
Include extra fields	Specifies the individual output fields you want returned. List fields with a pipe (|) between each field. You can use this option instead of the Include data option to limit the output to those fields that are important to your data needs. By default, these are the address fields returned: AddressLine1|LastLine|Longitude|Latitude|MatchCode|LocationCode For a list of all the fields included in each data field, see **Output** on page 19.

Output

Geocode US Address always returns a default set of output fields that contain the latitude/longitude, standardized address, and result indicators. For information on these fields, see **Default Output** on page 26. You can also choose to include the following optional categories of output data:

Note: If you are using the API, the output returned is in the DataTable class. For information on the DataTable class, see the "API Fundamentals" section of the *Spectrum™ Technology Platform API Guide*.

Auxiliary

Auxiliary data output fields contain information on the an auxiliary file match. For more information on using an auxiliary file, see **Auxiliary File Overview** on page 72. Geocode US Address only returns values when matching against an auxiliary file. To include segment data fields in the output, select the **Auxiliary** check box under Include data.

Table 6: Auxiliary Data Output Fields

Field Name	Description
AuxiliaryData	The user data field in an auxiliary file match.

Field Name	Description
	Note: Geocode US Address does not process this information. It simply includes the user data contained in the auxiliary file.
MCDCode	The Minor Civil Division (MCD) code. A Minor Civil Division is a subdivision of a county, such as a township. There are Minor Civil Divisions in 28 states, the District of Columbia, Puerto Rico, and Island Areas. Minor Civil Divisions are defined by U.S. Census Bureau.
MCDName	The Minor Civil Division (MCD) name. A Minor Civil Division is a subdivision of a county, such as a township. There are Minor Civil Divisions in 28 states, the District of Columbia, Puerto Rico, and Island Areas. Minor Civil Divisions are defined by U.S. Census Bureau.

Block Address

Block data output fields contain extraneous information from the input address that Geocode US Address could not process. To include block data in the output, select the **Block Data** check box under Include data.

If there are any empty lines in the input fields AddressLine1 through AddressLine6, Geocode US Address moves the output lines to the first empty BlockLine output field, eliminating the blank lines. For example:

Input Field	Input Data	Output Field	Output Data
		AddressLine1	4750 Walnut St Ste 200
		LastLine	Boulder, CO 80301-2532
AddressLine1	Pitney Bowes	BlockLine1	Pitney Bowes
AddressLine2	4750 Walnut	BlockLine2	
AddressLine3 Data.AddressLine3		BlockLine3	
AddressLine4	Ste 200	BlockLine4	Dept ABC **Note:** Moved up one line from the input AddressLine5.
AddressLine5	Dept ABC	BlockLine5	
AddressLine6 Data.AddressLine6	80301	BlockLine6	

Table 7: Block Data Output Fields

Field Name	Description
BlockLine1	Returns input address information Geocode US Address could not process.

Field Name	Description
BlockLine2	Returns input address information Geocode US Address could not process.
BlockLine3	Returns input address information Geocode US Address could not process.
BlockLine4	Returns input address information Geocode US Address could not process.
BlockLine5	Returns input address information Geocode US Address could not process.
BlockLine6	Returns input address information Geocode US Address could not process.

Census

Census output fields contain U.S. Census information about the address. To include census data in the output, select the **Census** check box under Include data.

Table 8: Census Data Output Fields

Field Name	Description
APN	The assessor's parcel number of the property. The assessor's parcel number is an ID number assigned to a property by the local property tax authority.
BlockSuffix	The block suffix for the Census block in which the address is located. A block suffix is a single character assigned to subsections of U.S. Census blocks that are split by a higher-level boundary, such as a municipal boundary. A block suffix is either "A" or "B". For information about U.S. Census block suffixes, see the *Geographic Areas Reference Manual*, available at the U.S. Census Bureau website: **www.census.gov/geo/www/garm.html** Block suffixes are only available if you are using Centrus Enhanced data.
CBSACode	The code for the Core Based Statistical Area (CBSA) in which the address is located. A CBSA is a collective term that refers to both metropolitan and micropolitan areas. A metropolitan area has a population of more than 50,000, and a micropolitan area has a population between 10,000 and 49,999. For more information, see *Metropolitan and Micropolitan Statistical Areas* section of the U.S. Census Bureau website: **www.census.gov/population/www/metroareas/metroarea.html**
CBSADivisionCode	The code of the Core Based Statistical Area (CBSA) division in which the address is located. A CBSA division is a metropolitan statistical area with a population of at least 2.5 million that has been subdivided to form smaller groupings

Field Name	Description
	of counties referred to as "metropolitan divisions." For more information, see *Metropolitan and Micropolitan Statistical Areas* section of the U.S. Census Bureau website:
	www.census.gov/population/www/metroareas/metroarea.html
CBSADivisionName	The name of the Core Based Statistical Area (CBSA) division in which the address is located.
	A CBSA division is a metropolitan statistical area with a population of at least 2.5 million that has been subdivided to form smaller groupings of counties referred to as "metropolitan divisions." For more information, see *Metropolitan and Micropolitan Statistical Areas* section of the U.S. Census Bureau website:
	www.census.gov/population/www/metroareas/metroarea.html
	The CBSA division name is only returned if you enable the **Return descriptions** in output option on the **Output Format** tab.
CBSAMetro	Indicates whether the core based statistical area (CBSA) in which the address is located is a metropolitan area or a micropolitan area. One of the following:
	Y — Yes, the address is located in a metropolitan statistical area. Metropolitan areas have a population greater than 50,000.
	N — No, the address is not located in a metropolitan area. It is located in a micropolitan area. Micropolitan areas have a population between 10,000 and 49,999.
	null — There is no data available to determine whether the address is in a metropolitan or micropolitan area.
	A CBSA is a collective term that refers to both metropolitan and micropolitan areas. A metropolitan area has a population of more than 50,000, and a micropolitan area has a population between 10,000 and 49,999. For more information, see *Metropolitan and Micropolitan Statistical Areas* section of the U.S. Census Bureau website:
	www.census.gov/population/www/metroareas/metroarea.html
CBSAName	The name of the core based statistical area (CBSA) in which the address is located. The CBSA division name is only returned if you enable the **Return descriptions** in output option on the **Output Format** tab.
	A CBSA is a collective term that refers to both metropolitan and micropolitan areas. A metropolitan area has a population of more than 50,000, and a micropolitan area has a population between 10,000 and 49,999. For more information, see *Metropolitan and Micropolitan Statistical Areas* section of the U.S. Census Bureau website:
	www.census.gov/population/www/metroareas/metroarea.html
CensusBlockID	The 15-digit identification number of the census block in which the address is located. Census blocks are the smallest geographic area for which the Bureau of the Census collects and tabulates decennial census data. Census blocks are formed by streets, roads, railroads, streams and other bodies of water, other visible physical and cultural features, and the legal boundaries shown on Census Bureau maps. For more

Field Name	Description
	information about U.S. Census blocks, see the *Geographic Areas Reference Manual*, available at the U.S. Census Bureau website:
	www.census.gov/geo/www/garm.html
	The Census block ID is in the format:
	`ssccctttttgbbb`
	Where:
	ss — The two-digit state FIPS code.
	ccc — The three-digit county FIPS code.
	tttttt — The six-digit Census tract FIPS code.
	g — The single-digit block group FIPS code.
	bbb — The block FIPS code.
	Note: Geocode US Address does not return a period for the Centrus tract FIPS code. This may deviate from the industry standard.
CensusTract	The six-digit ID of the Census tract in which the address is located. Census tracts are small, relatively permanent geographic entities within counties (or the statistical equivalents of counties). Generally, census tracts have between 2,500 and 8,000 residents and boundaries that follow visible features. For more information about U.S. Census tracts, see the *Geographic Areas Reference Manual*, available at the U.S. Census Bureau website: **www.census.gov/geo/www/garm.html**
CSACode	Denotes the code for a geographic entity that consists of 2 or more adjacent CBSAs with employment interchange measures of at least 15.
CSAName	The name of the combined statistical area (CSA) in which the address is located.
	A CSA is a combination of two or more adjacent Core Based Statistical Areas (CBSAs) with a high employment interchange measure. The employment interchange measure is the sum of the percentage of employed residents of the smaller entity who work in the larger entity and the percentage of the employment in the smaller entity that is accounted for by workers who reside in the larger entity. Pairs of CBSAs with employment interchange measures of at least 25% combine automatically. Pairs of CBSAs with employment interchange measures of at least 15%, but less than 25%, may combine if local opinion in both areas favors combination.
	The CSA name is only returned if you enable the **Return descriptions in output** option on the **Output Format** tab.
USCountyName	The name of the county or parish in which the address is located. The county/parish name is only returned if you enable the **Return descriptions** in output option on the **Output Format** tab.
USFIPSCountyNumber	The three-digit FIPS county code of the county in which the address is located.
USFIPSStateCode	The two-digit FIPS state code of the state in which the address is located.

Field Name	Description
USFIPSStateCountyCode	The five-digit FIPS code for the state and county in which the address is located.

Centerline Projection

Centerline projection output fields contain information specific to a centerline match. To include centerline projection fields in the output, select the **Centerline Projection** check box under Include data.

Table 9: Centerline Projection Output Fields

Field Name	Description
CenterlineBearing	The compass direction, in decimal degrees, from the point data match to the street centerline match. The compass direction is measured clockwise from 0 degrees north. For example, if the centerline match is directly north of the point match, the centerline bearing would be 0.
CenterlineBlockLeft	The Census FIPS Code that indicates the address is on the left side of the street.
CenterlineBlockRight	The Census FIPS Code that indicates the address is on the right side of the street.
CenterlineBlockSuffixLeft	The block suffix of the block on the left side of the street. A block suffix is a single character assigned to subsections of U.S. Census blocks that are split by a higher-level boundary, such as a municipal boundary. A block suffix is either "A" or "B". For information about U.S. Census block suffixes, see the *Geographic Areas Reference Manual*, available at the U.S. Census Bureau website: **www.census.gov/geo/www/garm.html** Block suffixes are only available if you are using Centrus Enhanced data.
CenterlineBlockSuffixRight	The block suffix of the block on the right side of the street. A block suffix is a single character assigned to subsections of U.S. Census blocks that are split by a higher-level boundary, such as a municipal boundary. A block suffix is either "A" or "B". For information about U.S. Census block suffixes, see the *Geographic Areas Reference Manual*, available at the U.S. Census Bureau website: **www.census.gov/geo/www/garm.html** Block suffixes are only available if you are using Centrus Enhanced data.
CenterlineDataCode	Indicates the data used to obtain a centerline match for the address. One of the following:

0	USPS data in either the Centrus Enhanced, Centrus TomTom, or Centrus NAVTEQ database.
1	TIGER data in the Centrus Enhanced database.
2	TomTom data in the Centrus TomTom database.

Field Name	Description
	6 NAVTEQ data in the Centrus NAVTEQ database.
	7 TomTom point-level data in the Centrus TomTom Points database.
	8 Point-level data from the Centrus Points database.
	9 Auxiliary file data.
	For more information about these databases, see **Enterprise Geocoding Databases**
CenterlineDirection	Indicates the order of numbers on a segment for a centerline match.
	F Forward
	R Reversed
	B Both
	U Undetermined
CenterlineDistance	Distance, in feet, from the point-level match to the centerline match.
CenterlineHouseNumberHigh	The highest address number in the range of addresses on the street segment. For example, if the address range for the street segment is 1000 to 2000, the CenterlineHouseNumberHigh would be 2000.
CenterlineHouseNumberLow	The lowest address number in the range of addresses on the street segment. For example, if the address range for the street segment is 1000 to 2000, the CenterlineHouseNumberLow would be 1000.
CenterlineIsAlias	Three characters indicating that Geocode US Address located a centerline match by an index alias. The first is an N for normal street match or A for alias match (including buildings, aliases, firms, etc.). The next two characters are:
	01 Basic index (normal address match)
	02 USPS street name alias index
	03 USPS building index
	04 USPS firm name index
	05 Statewide intersection alias match (when using the Usw.gsi or Use.gsi file)
	06 Spatial data street name alias (when using, the Us_pw.gsi, Us_pe.gsi, Us_psw.gsi, or Us_pse.gsi file is required)
	07 Alternate index (when using Zip9.gsu, Zip9e.gsu, and Zip9w.gsu)
	08 LACS^{Link}
CenterlineLatitude	A seven-digit number in degrees and calculated to four decimal places for a centerline match. This field is only returned if**Determine street centerline coordinates** is checked.
CenterlineLeadingDirectional	The street directional that precedes the street name for a centerline match. For example, the N in 138 N Main Street.

Field Name	Description
CenterlineLongitude	7-digit number in degrees and calculated to 4 decimal places (in the format specified) for a centerline match. This field is only returned if**Determine street centerline coordinates** is checked.
CenterlineParity	Indicates which side of the street has odd numbers for a centerline match. **L** The left side of the street has odd numbers. **R** The right side of the street has odd numbers. **B** Both sides of the street have odd numbers. **U** Undetermined.
CenterlineRoadClass	The type of road for a centerline match: **1** Major **2** Minor
CenterlineSegmentCode	The unique 10-digit street segment ID assigned by the street network data provider.
CenterlineStreetName	The name of the street.
CenterlineStreetSuffix	The street type of the matched centerline location. For example, AVE in "Washington AVE".
CenterlineTrailingDirectional	The street directional that follows the street name. For example, the N in 456 Washington AVE N.

Default Output

Geocode US Address always returns fields that contain the latitude/longitude, standardized address, and result indicators. Result indicators describe how well Geocode US Address matched the input address to a known address and assigned a location. They also describes the overall status of a match attempt.

Table 10: Default Output Fields

Field Name	Description
AddressLine1	The first line of the address. For example: **1 Global View** Troy, NY 12180-8371
AddressLine2	The second line of the address. For example: 4200 Parliament Pl **STE 600** Lanham, MD 20706-1882
City	The municipality name.

Field Name	Description

Confidence	Indicates the confidence in the output provided, from 0 to 100. The higher the score, the higher the probability that the match is correct. If the match is exact, the confidence score is 100. For all other matches, Geocode US Address calculates the confidence score by subtracting values from 100 as follows:
	
	• If Geocode US Address changed the state to obtain a match:
	  • Added the state -3.75
	  • No state -7.5
	
	• If Geocode US Address changed the city to obtain a match:
	  • Added city -2.5
	  • No city -5.0
	
	• If Geocode US Address change the house number to obtain a match:
	  • Added house number -3.75
	  • No house number -7.5
	
	• If Geocode US Address changed the street name to obtain a match:
	  • Added street name -3.75
	  • No street name -7.5
	
	• If Geocode US Address changed the trailing directional to obtain a match:
	  • Added trailing directional -1.25
	  • No trailing directional -2.5
	
	• If Geocode US Address changed the leading directional to obtain a match:
	  • Added leading directional -1.25
	  • No leading directional -2.5
	
	• If Geocode US Address changed the street suffix to obtain a match:
	  • Added street suffix -1.25
	  • No street suffix -2.5
	
	• If Geocode US Address changed the postal code to obtain a match: -11.25
	
	If you have enabled the option to return centroids, the confidence value indicates the type of centroid returned:
	
	• 60 for a street centroid
	• 50 for a postal code centroid
	• 35 for a city centroid
	• 30 for a county centroid
	• 25 for a state centroid

Country	The name of the country. Since Geocode US Address only works for U.S. locations, this field will always contain **United States of America**.
FirmName	The name of the business if the address is a business address.

Field Name	Description
LastLine	The complete last address line (city, state, and postal code).
Latitude	Seven-digit number in degrees and calculated to four decimal places (in the format specified).
LocationCode	A value indicating the accuracy (quality) of the assigned geocode.
	For more information, see **Address Location Codes** on page 80.
Longitude	Seven-digit number in degrees and calculated to four decimal places (in the format specified).
MatchCode	Indicates the portions of the address that matched to the directory file.
	For more information, see **Geocoding Match Codes** on page 93.
PostalCode	Nine-digit ZIP Code with or without a hyphen.
PostalCode.AddOn	Four-digit ZIP Code extension
PostalCode.Base	Five-digit ZIP Code.
ProcessedBy	The underlying software that processed the request. EnterpriseGeocoding for Geocode US Address.
StateProvince	Two-character state abbreviation.
Status	Reports the success or failure of the match attempt
	null Success
	F Failure
Status.Code	If Geocode US Address could not process the address, this field will show the reason.
	• Internal System Error • No Geocode Found • Insufficient Input Data
Status.Description	If Geocode US Address could not process the address, this field will show a description of the failure.
	Problem + explanation Returned when Status.Code = Internal System Error.
	Geocoding Failed Returned when Status.code = No Geocode Found.
	No location returned Returned when Status.code = No Geocode Found.
StreetDataType	The data set Geocode US Address attempted to match against.
StreetSide	Indicates the side of the street the range occupies. One of the following:
	L The range occupies the left side of the street.
	R The range occupies the right side of the street.
	B The range occupies both sides of the street.
	U Undetermined.

Field Name	Description
USUrbanName	Urbanization name. Used for addresses in Puerto Rico.

DPV

DPV data output fields contain information about a match made using DPV data. Geocode US Address only returns values when matching against DPV data. To include DPV data in the output, select the **DPV Data** check box under Include data.

Table 11: DPV Data Output Fields

Field Name	Description
CMRA	Indicates whether the address is for a Commercial Mail Receiving Agent (CMRA). A CMRA is a private company that rents out mailboxes. A customer of a commercial mail receiving agency can receive mail and other deliveries at the street address of the CMRA rather than the customer's own street address. Depending on the agreement between the customer and the CMRA, the CMRA can forward the mail to the customer or hold it for pickup.
	Y Yes, the address is a CMRA.
	N No, the address is not a CMRA.
	null DPV data is not available. DPV data is required to determine if an address is a CMRA.
DPV	Indicates whether the address is confirmed to be a deliverable address by USPS Delivery Point Validation (DPV).
	N Nothing confirmed
	Y Everything confirmed (ZIP+4, primary, and secondary)
	S ZIP+4 and primary (house number) confirmed
	D ZIP+4 and primary (house number) confirmed and a default match
	U Non-matched input address to USPS ZIP+4 data, or DPV data not loaded
DPVFootnote	Contains detailed information about the address. The DPV footnote codes are combined together consecutively.
	DPV footnotes include the following:
	• FOOTNOTE1 provides information about matched DPV records.
	• **AA**—ZIP+4 matched record
	• **A1**—Failure to match a ZIP+4 record
	• **null**—Address not presented to hash table or DPV data not loaded
	• FOOTNOTE2 provides information about matched DPV records.
	• **BB**—All DPV categories matched
	• **CC**—Matched primary/house number, where the secondary/unit number did not match (present but invalid)

Field Name	Description
	• **M1**—Missing primary/house number
	• **M3**—Invalid primary/house number
	• **N1**—Matched primary/house number, with a missing highrise secondary number
	• **P1**—Missing PS, RR, or HC Box number
	• **P3**—Invalid PS, RR or HC Box number
	• **F1**—All military addresses
	• **G1**—All general delivery addresses
	• **U1**—All unique ZIP Code addresses
	• **null**—Address not presented to hash table or DPV data not loaded
	• FOOTNOTE3 provides information about matched DPV records.
	• **R1**—Matched CMRA, without a present secondary/unit number
	• **RR**—Matched CMRA
	• **null**—Address not presented to hash table or DPV data not loaded
	Note: A unique ZIP Code is a ZIP Code assigned to a company, agency, or entity with sufficient mail volume to receive its own ZIP Code.

Geoconfidence

Geoconfidence data output fields contain information about the type of geoconfidence polygon returned. To include geoconfidence fields in the output, select the **Geo Confidence** check box under **Include data**.

Field Name Response Element	Description	
GeoConfidenceCode	The value returned in this field indicates which geoconfidence surface type has been returned.	
	Possible values are:	
	INTERSECTION	A geocode point for the intersection of two streets.
	ADDRESS	An array of street segment points representing the street segment where the address is located.
	POINT	If the geocoder was able to match the address using point data, the point geometry where the address is located.
	POSTAL1	A geocode point for the ZIP centroid.
	POSTAL2	An array of points for all street segments in the ZIP + 2 in which the address is located.

Field Name Response Element		Description
	POSTAL3	An array of points for street segments in the ZIP + 4 in which the address is located.
	ERROR	An error has occurred.
StreetSegmentPoints		An array of latitude/longitude values that represent the street segment points.
		Note: This field contains values only if the `GeoConfidenceCode` field returns a value of `ADDRESS`, `POSTAL2`, or `POSTAL3`.
GeoConfidenceCentroidLatitude		The latitude of the centroid of the geoconfidence polygon.
GeoConfidenceCentroidLongitude		The longitude of the centroid of the geoconfidence polygon.

Latitude/Longitude

The latitude/longitude output fields contain the geographic coordinates of the address. To include latitude/longitude output fields in the output, select the **Latitude/Longitude** check box under Include data.

Table 12: Latitude/Longitude Output Fields

Field Name	Description
Elevation	The location's elevation in feet above or below sea level.
Latitude	The latitude of the address. The latitude is a seven-digit number in degrees, calculated to six decimal places.
Longitude	The longitude of the address. The longitude is a seven-digit number in degrees, calculated to six decimal places.

Parsed Elements

The parsed elements output fields contain standard address information as individual units, such as street suffixes (for example AVE, ST, or RD) and leading directionals (for example N and SE). To include parsed elements in the output, select the **Parsed Elements** check box under Include data.

Table 13: Parsed Elements Output Fields

Field Name	Description
ApartmentLabel	The type of unit, such as apartment, suite, or lot.

Field Name	Description
ApartmentLabel2	The type of unit, such as apartment, suite, or lot, for addresses that contain two units, such as: 123 E Main St APT 3, 4th **Floor** .
ApartmentNumber	Apartment number. For example: 123 E Main St APT **3**
ApartmentNumber2	Secondary apartment number. For example: 123 E Main St APT 3, **4th Floor**
CrossStreetLeadingDirectional[1]	Leading directional, for example: 123 **E** Main St Apt 3
CrossStreetName	Name of cross street.
CrossStreetSuffix[1]	Street suffix, for example: 123 E Main **St** Apt 3
CrossStreetTrailingDirectional[1]	Trailing directional, for example: 123 Pennsylvania Ave **NW**
HouseNumber	Building number for the address.
HouseNumber2	If an address consists of a range of house numbers, this field contains the second house number. The HouseNumber field contains the first number. For example, given this address: 5-7 Maple Ave. The HouseNumber field would contain "5" and the HouseNumber2 field would contain "7".
LeadingDirectional	Leading directional, for example: 123 **E** Main St Apt 3
PrivateMailbox	Private mailbox. Not returned for multiline input.
PrivateMailbox.Designator	Private mailbox description. Not returned for multiline input.
RRHC	Rural Route/Highway Contract portion of the address.
StreetName	Street name.
StreetSuffix	The street type of the matched location. For example, AVE for Avenue.
TrailingDirectional	Street directional that follows the street name. For example, the N in 456 Washington N.

Postal Data

Postal data output fields contain detailed postal information for the address, such as the preferred city name and the US carrier route. To include postal data fields in the output, select the **Postal Data** check box under Include data.

Table 14: Postal Data Output Fields

Field Name	Description
CityPreferredName	The USPS® preferred city name for the ZIP Code of the address.

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[1] Geocode US Address only returns Cross street outputs if you entered an intersection as an address. For example, entering Pearl and 28th, Boulder, CO returns cross street information. Entering 2800 Pearl, Boulder, CO does NOT return cross street information.

Field Name	Description
CityShortName	The USPS®-approved abbreviation for the city, if there is one. The USPS® provides abbreviations for city names that are 14 characters long or longer. City abbreviations are 13 characters or less and can be used when there is limited space on the mailing label. If there is no short city name for the city, then the full city name is returned.
CityStateRecordName	USPS® city state city name.
DeliveryPointCode	Two-digit delivery point bar code.
GovernmentBuilding	Indicates if a building is used by the city, state, or federal government.

	A	City government building
	B	Federal government building
	C	State government building
	D	Firm only
	E	City government building and firm only
	F	Federal government building and firm only
	G	State government building and firm only

The values A, B, C, E, F, and G are valid for Alternate records only. The value D is valid for both base and alternate records.

Field Name	Description
PostalBarCode	Six-digit combination of ZIP+4 Code and the delivery point bar code.
PostalCodeClass	ZIP Classification code.

	null	Standard ZIP Code
	M	Military ZIP Code
	P	ZIP Code has P.O. boxes only
	U	Unique ZIP Code (ZIP Code assigned to a single organization)

Field Name	Description
PostalCodeUnique	Indicates if the ZIP Code is a unique ZIP Code assigned to an individual company or agency.

	Y	Unique ZIP name
	null	No unique ZIP name

Field Name	Description
PostalFacility	USPS City State Name Facility code.

	A	Airport Mail Facility (AMF)
	B	Branch
	C	Community Post Office (CPO)
	D	Area Distribution Center (ADC)
	E	Sectional Center Facility (SCF)
	F	Delivery Distribution Center (DDC)
	G	General Mail Facility (GMF)
	K	Bulk Mail Center (BMC)

Field Name	Description	
	M	Money Order Unit
	N	Non-Postal Community Name, Former Postal Facility, or Place Name
	P	Post Office
	S	Station
	U	Urbanization
USBCCheckDigit	Check-digit for delivery point bar code.	
USCarrierRouteCode	Carrier Route code.	
USCarrierRouteSort	Indicates if the USPS uses a carrier route sort, and what type of sort the USPS allows.	
	A	Automation cart allowed, optional cart merging allowed
	B	Automation cart allowed, no optional cart merging allowed
	C	No automation cart allowed, optional cart merging allowed
	D	No automation cart allowed, no optional cart merging allowed
USCityDelivery	Indicates if has city-delivery carrier routes.	
	Y	Has city-delivery carrier routes
	N	Does not have city-delivery carrier routes.
USLACS	Indicates if LACS^{Link} match occurred.	
	Y	Matched LACS^{Link} record
	N	LACS^{Link} match not found
	F	False-positive LACS^{Link} record
	S	Secondary information (unit number) removed to make a LACS^{Link} match
	null	Records not processed through LACS^{Link}
	For more information, see **Locatable Address Conversion System (LACS)**.	
USLACS.ReturnCode	Indicates LACS^{Link} results.	
	A	Matched LACS^{Link} record
	00	LACS^{Link} match was not found
	09	Matched to highrise default, but noLACS^{Link} conversion
	14	Found LACS^{Link} match, but no LACS^{Link} conversion
	92	Secondary information (unit number) was removed to make a LACS^{Link} match
	null	Records not processed through LACS^{Link}
	For more information, see **Locatable Address Conversion System (LACS)**.	

Field Name	Description
USLOTCode	A combination of the 4-digit Line of Travel (LOT) Code and the ascending (A) or descending (D) indicator.

Qualifiers

Qualifier output fields contain qualification information on the match, such as the location code and the match code. To include postal data fields in the output, select the **Qualifiers** check box under **Include data**.

Table 15: Qualifier Output Fields

Field Name	Description
AddressLineResolved	For two-line addresses, indicates which address line was used to obtain the match. One of the following:
	0 The address could not be matched, or the address matched to multiple addresses.
	1 AddressLine1 was used to obtain the match.
	2 AddressLine2 was used to obtain the match.
	3 Both address lines were used in their original order.
	4 Both address lines were used but the order of the lines was switched to obtain the match.
	5 The input address was a one line address.
CountryLevel	The category of postal data available. Always returns A in Geocode US Address—Validates, corrects, and provides missing postal code, city name, state/county name, street address elements, and country name.
DatabaseVersion	USPS publish date, in the format `Month Year`.
EWSMatch	Indicates if Geocode US Address denied a match because of the input address matched an address in the Early Warning System (EWS) data.
	Y The address matched to an address in the EWS data so the match was denied.
	null The address did not match to an address in the EWS data.
ExpirationDate	Date the database expires, in the format `MM/DD/YY`.
Geocoder.MatchCode	Indicates how closely the input address matches the candidate address.
	Note: The match codes returned in this field are different from the match codes described in **Geocoding Match Codes** on page 93. Instead, the match codes returned in this field are taken from a set of match codes that are compatible with all other country geocoders. For more information, see **Result Codes for International Geocoding**.
GeoStanMatchScore	Record matching score (for multimatches only).

Field Name	Description
Intersection	Indicates if Geocode US Address found a cross-street match.
	T True
	F False
IsAlias	Geocode US Address located a match by an index alias. Returns 3 characters. The first is an N for normal street match or A for alias match (including buildings, aliases, firms, etc.). The next 2 characters are:
	01 Basic index (normal address match)
	02 USPS street name alias index
	03 USPS building index
	04 USPS firm name index
	05 Statewide intersection alias match
	06 Spatial data street name alias
	07 Alternate index
	08 LACS[Link]
IsCloseMatch	Indicates whether or not the address was a unique match or if there were candidate addresses.
	Y Yes, the address is a close match. This field always contains "Y" if there is only one match.
	N No, the address is not a close match. The record is a candidate.
LACSAddress	Indicates if Geocode US Address converted an address due to the Locatable Address Conversion System (LACS)
	L Converted
	null Not converted
LocationCode.Description	LocationCode converted to text. Only returned when you set the configuration options to return additional descriptions (verbose).
MatchCode.Description	MatchCode converted to text. Only returned when you set the configuration options to return additional descriptions (verbose).
RecordType	Indicates the record type: • GeneralDelivery • HighRise • FirmRecord • Normal • PostOfficeBox • RRHighwayContract • Geographic (non USPS TIGER match) • Auxiliary (match to an auxiliary file)
RecordType.Default	Indicates type of match that occurred for the record type HighRise or RRHighwayContract:

Field Name	Description
	Y Default match
	N Exact match
	U Not matched
StreetDataCode	Indicates the data used to geocode the address. One of the following:
	0 USPS data in either the Centrus Enhanced, Centrus TomTom, or Centrus NAVTEQ database.
	1 TIGER data in the Centrus Enhanced database.
	2 TomTom data in the Centrus TomTom database.
	6 NAVTEQ data in the Centrus NAVTEQ database.
	7 TomTom point-level data in the Centrus TomTom Points database.
	8 Point-level data from the Centrus Points database.
	9 Auxiliary file data.
	For more information about these databases, see **Enterprise Geocoding Databases**.
StreetDataType	Indicates the data initially used for the match attempt. Note that the output field StreetDataCode shows which data was actually used to obtain the match.
	The data indicated in StreetDataType may be different from that in StreetDataCode if a match cannot be made in the initial match attempt. For example, if a points database is loaded, Geocode US Address will first attempt a match to the point data because this is the most accurate type of match. If a point-level match cannot be made, Geocode US Address will attempt to match to street data. If the match is made using street data, then the SreetDataType would indicate the point-level data and the StreetDataCode would indicate the street data.
	For more information, see **How Geocode US Address Processes Addresses** on page 7.

Range

Range output fields contain information on the street range, such as the high and low unit numbers. To include range data fields in the output, select the **Range** check box under Include data.

Table 16: Range Data Output Fields

Field Name	Description
Alternate	USPS code that specifies whether a record is a base or alternate record.
	B Base record. Base records can represent a range of addresses or an individual address, such as a firm record.
	A Alternate record. Alternate records are individual delivery points.

Field Name	Description
HouseNumberHigh	The highest house number in the range.
HouseNumberLow	The lowest house number in the range.
HouseNumberParity	Indicates if the house number range contains even or odd numbers.
	E Even
	O Odd
	B Both
PostalCodeExtensionHigh	The highest four-digit ZIP Code extension in the range. The ZIP Code extension is the four digits at the end of the ZIP Code. For example: 60510-**1134**.
PostalCodeExtensionLow	The lowest four-digit ZIP Code extension in the range. The ZIP Code extension is the four digits at the end of the ZIP Code. For example: 60510-**1134**.
UnitNumberHigh	The highest unit number in the range.
UnitNumberLow	The lowest unit number in the range.
UnitNumberParity	Indicates if the unit number range contains even or odd numbers.
	E Even
	O Odd
	B Both

Segment

Segment output fields contain information on the street segment identified by the data provider. To include segment data fields in the output, select the **Segment** check box under Include data.

Table 17: Segment Data Output Fields

Field Name	Description
BlockLeft	The Census FIPS Code that indicates the address is on the left side of the street.
BlockRight	The Census FIPS Code that indicates the address is on the right side of the street.
BlockSuffixLeft	The block suffix of the block on the left side of the street.
	A block suffix is a single character assigned to subsections of U.S. Census blocks that are split by a higher-level boundary, such as a municipal boundary. A block suffix is either "A" or "B". For information about U.S. Census block suffixes, see the *Geographic Areas Reference Manual*, available at the U.S. Census Bureau website:
	www.census.gov/geo/www/garm.html
	Block suffixes are only available if you are using Centrus Enhanced data.

Field Name	Description
BlockSuffixRight	The block suffix of the block on the right side of the street.
	A block suffix is a single character assigned to subsections of U.S. Census blocks that are split by a higher-level boundary, such as a municipal boundary. A block suffix is either "A" or "B". For information about U.S. Census block suffixes, see the *Geographic Areas Reference Manual*, available at the U.S. Census Bureau website:
	www.census.gov/geo/www/garm.html
	Block suffixes are only available if you are using Centrus Enhanced data.
RoadClass	The type of road:
	1 Major
	2 Minor
SegmentCode	The unique 10-digit street segment ID assigned by the street network data provider.
SegmentDirection	Indicates the order of numbers on a segment.
	F Forward
	R Reversed
	B Both
	U Undetermined
SegmentHouseNumberHigh	The highest house number in the segment.
SegmentHouseNumberLow	The lowest house number in the segment.
SegmentLength	The length, in feet, of a block segment.
SegmentParity	Indicates which side of the street has odd numbers.
	L Left side of the street
	R Right side of the street
	B Both sides of the street
	U Undetermined
StreetSide.NAVTEQ	Indicates which side of the street the address is located on. The value in this field is determined by using the NAVTEQ reference nodes for the street segment. A street segment represents part of a street. Each segment has a node at each end: the reference node and the non-reference node. The reference node is the node with the lower latitude (southernmost). If the latitudes of both nodes are identical, the reference node is the end node with the lower longitude (westernmost). The street side corresponds to the street sides you would see if you were standing at the reference node and looking at the non-reference node.
	One of the follwoing:
	L The address is on the left side of the street.
	R The address is on the right side of the street.

Field Name	Description
B	The address occupies both sides of the street.
U	The street side is unknown.
null	NAVTEQ data was not used, or segment output data was not selected, or the address did not match a street segment (for example, the address was geocoded to a centroid).

Reports

There is one report available with Geocode US Address: the Geocode US Address Summary Report. To create the report, in Enterprise Designer, drag the **Geocode US Address Summary Report** icon to the canvas. You do not need to draw a connector to the report.

Geocode US Address Summary Report

The Geocode US Address Summary Report contains information about the job, such as the settings, number of records processed, performance statistics, and the database used, as well as detailed information about the geocoding and address matching results. This report contains the following sections.

Address Matching Summary

This section shows the number of records processed and the number of matches obtained.

- **Total Records in File**—The total number of records in the input file used by this job.
- **Records Processed**—The number of input records minus those records that were skipped.
- **Addresses Matched**—The number of addresses that were successfully standardized and validated. This count includes all the Standardized addresses listed under the Matched Address Records section plus those with match codes beginning with G (auxiliary file), T (geographic data only), and X (intersections).
- **Unmatched**—The number of records that could not be validated.

Matched Address Records

This section contains information about the addresses that were successfully matched.

- **Standardized**—The number of addresses that match to USPS-relevant records. These addresses have match codes beginning with A (alias), D (small town), Q (unique ZIP), S (street), and U (rare). Only these types of matches are counted as Standardized.
- **Auxiliary File**—The number of records that were matched to a user-defined file. These records have a MatchCode beginning with G.
- **Intersections**—The number of records that were matched to an intersection. These records have a MatchCode beginning with X.
- **Non-USPS**—The number of records that were matched to non-USPS data.

Unmatched Address Records

This section lists the number of unmatched addressees and the reasons why the addresses were not matched. For information on these codes, see

Standardized Address Quality

This section describes the changes that Geocode US Address made to addresses in order to validate them.

- **Original address unchanged**—None of the address elements were changed to obtain a match.
- **Original last line unchanged**—The last line (city, state, ZIP Code) was unchanged but other elements were changed to obtain a match.
- **Corrected predirectional**—The predirectional of a street name was changed to obtain a match. For example, E MAIN ST changed to W MAIN ST.
- **Corrected street name**—The name of the street was changed to obtain a match. For example, MAIN ST changed to MAINE ST.
- **Corrected street suffix**—The street suffix was changed to obtain a match. For example, MAIN ST changed to MAIN AVE.
- **Corrected postdirectional**—The postdirectional of a street was changed to obtain a match. For example, MAIN ST NW changed to MAIN ST SW.
- **Corrected city name**—The name of the city was corrected to obtain a match. For example, LOS ANGLES changed to LOS ANGELES.
- **Corrected state abbreviation**—The state abbreviation was corrected to obtain a match. For example, ROCHESTER NY changed to ROCHESTER MN.
- **Corrected ZIP Code**—The ZIP Code as corrected to obtain a match. For example: 1071 MAPLE LN BATAVIA IL 49423 Changed to: 1071 MAPLE LN BATAVIA IL 60510
- **Corrected ZIP + 4 add on**—The four digits that appear after the "-" in a ZIP + 4 were corrected to obtain a match. For example, 60510 changed to 60510-1135.

Geocode Matching Levels

This section describes the level of accuracy for the geocodes returned by Geocode US Address.

- **Geocodes Assigned**—The number of records to which Geocode US Address assigned a geocode. This is the cumulative count of the following fields:
- **Address Match**—Address geocodes indicate a geocode made directly to a street network segment (or two segments, in the case of an intersection). Addresses included in this count have a value that begins with A in the **LocationCode** output field.
- **Auxiliary Match**—The geocode was determined using the Auxiliary File. Addresses included in this count have a value that begins with AG in the **LocationCode** output field. For more information, see **Auxiliary Match Details** on page 41.
- **Point Match**—The geocode was determined using a points database, which means the geocode represents the center of a building or parcel. Addresses included in this count have a value that begins with AP in the **LocationCode** output field. For more information, see **Point Matching Details** on page 42.
- **ZIP Centroids Match**—The address could not be matched, so the geocode is the center of the address's ZIP Code. This is the least accurate geocode for a given address. Addresses included in this count have a value that begins with Z in the **LocationCode** output field. For more information, see **ZIP Centroid Matching Details** on page 42.

Auxiliary Match Details

This section describes the level of accuracy for the geocodes returned by Geocode US Address that were obtained from the Auxiliary File. For more information, see **Auxiliary File Overview** on page 72.

These fields are ordered from the most accurate type of geocode to the least.

- **Point**—The geocode represents the center of a building or parcel. Addresses included in this count have a value of AG0 in the **LocationCode** output field.
- **Centerline**—The geocode represents the location of an address along a street segment. Addresses included in this count have a value of AG1 in the **LocationCode** output field.

- **Centerline with unknown street side**—The geocode represents the location of an address along a street segment but the side of the street where the address resides could not be determined. Addresses included in this count have a value of AG2 in the **LocationCode** output field.
- **Midpoint**—The geocode represents the midpoint of the street segment where the address resides. Geocode US Address could not determine where on the street segment the address is located. Addresses included in this count have a value of AG3 in the **LocationCode** output field.

Point Matching Details

This section describes the types of point-level geocodes returned by Geocode US Address. Point-level geocodes represent the center of a parcel or building.

- **Parcel Centroid**—The geocode represents the center of a parcel. Addresses included in this count have a value of AP02 in the **LocationCode** output field.
- **Field-collected GPS**—The geocode is determined using data collected by teams of field verification specialists who drive the roads of selected areas to verify and update the data. Addresses included in this count have a value of AP04 in the **LocationCode** output field.
- **Structure Centroid**—The geocode represents the center of an addressable building footprint. An addressable structure is typically a structure that receives mail or has telephone service. Addresses included in this count have a value of AP05 in the **LocationCode** output field.
- **Manual Frontage Midpoint**—The geocode represents the center of a the parcel's boundary with the street. These points are offset at a specific distance from the street centerline near the center of the side of the parcel that fronts the street segment. Street frontage points estimate address locations more accurately than do interpolated ranges. Addresses included in this count have a value of AP07 in the **LocationCode** output field.
- **Unknown Point-Level Geocode**—The type of geocode is not known.

ZIP Centroid Matching Details

This section describes the types of ZIP Code centroids and census centroids returned by Geocode US Address.

- **Location Accuracy**—These fields describe the accuracy of the ZIP Code centroids.
- **ZIP + 4**—The centroid indicates the center of a ZIP + 4 code. This is the most accurate type of ZIP centroid. Addresses included in this count have a value of 9 in the third character of the value in the **LocationCode** output field.
- **ZIP + 2**—The centroid represents the center of a ZIP + 2 code. Addresses included in this count have a value of 7 in the third character of the value in the **LocationCode** output field.
- **ZIP Code**—The centroid represents the center of a five-digit ZIP Code. This is the least accurate type of ZIP centroid. Addresses included in this count have a value of 5 in the third character of the value in the **LocationCode** output field.
- **Census Accuracy**—These fields describe the accuracy of the census centroids.
- **Block Group**—The centroid represents the center of a block group. This is the most accurate type of census centroid. Addresses included in this count have a value of that begins with ZB in the **LocationCode** output field.
- **Census Tract**—The centroid represents the center of a census tract. Addresses included in this count have a value of that begins with ZT in the **LocationCode** output field.
- **County**—The centroid represents the center of a county. This is the least accurate type of census centroid. Addresses included in this count have a value of that begins with ZC in the **LocationCode** output field.

LACS/Link Statistics

This section describes the results of LACS/Link address processing. For information on LACS/Link, see **Locatable Address Conversion System (LACS)**.

- **Records processed by LACS/Link**—Addresses that were processed using LACS/Link.
- **LACS/Link Matched**—Addresses that were matched to addresses in the LACS/Link database.

- **LACS/Link Matched w/ dropped unit info**—Addresses whose secondary address information was removed in order to obtain a LACS^{Link} match.
- **Not LACS/Link Matched**—Addresses that Geocode US Address attempted to match to LACS^{Link} but were not found in the LACS^{Link} database.
- **Not LACS/Link Converted**—The address matched a LACS^{Link} record but was not converted.
- **Not LACS/Link Converted - highrise default**—The address matched a highrise default record but was not converted.
- **Last LACS/Link false positive record**—This is the record number within the input file of the last address to result in a false positive. For example, if the 5th record in the file was a LACS^{Link} false positive, this field would contain "5". For more information on false positives, see **Encountering False Positives** on page 99.

Delivery Point Validation

This section describes the results of DPV address processing. For information on DPV, see **Delivery Point Validation (DPV)**.

- **Records processed by DPV**—The number of addresses that were processed using DPV.
- **DPV Records with ZIP + 4**—Addresses that contained a ZIP + 4 code and were processed by DPV.
- **DPV Confirmed**—The number of addresses that were verified as deliverable addresses.
- **Primary Confirmed, Secondary Missing**—The primary portion of the address (the house number and street) was verified. The address requires a secondary element (for example, a suite or apartment number) to be a deliverable address, and the secondary information was missing from the input address.
- **Primary Confirmed, Secondary Incorrect**—The primary portion of the address (the house number and street) were verified. The address requires a secondary element (for example, a suite or apartment number) to be a deliverable address, and the secondary information in the input address was incorrect.
- **DPV CMRA Confirmed**—Commercial Mail Receiving Agency (CMRA) addresses confirmed by DPV.
- **DPV Not Confirmed**—Addresses that could not be verified as deliverable.
- **USPS Street Records Confirmed**—Street addresses that were confirmed by DPV.
- **USPS General Delivery Records Confirmed**—DPV processing confirmed that the address accepts general delivery mail.
- **Records with confirmed CMRA**—Commercial Mail Receiving Agency (CMRA) addresses that were confirmed with DPV.
- **Records not confirmed CMRA**—Commercial Mail Receiving Agency (CMRA) addresses that could not be confirmed with DPV.
- **DPV False Positive Seed table hits**—Addresses that matched to DPV false positive records. For more information, see **Encountering False Positives** on page 99.

Records with DPV Footnote

This section lists the DPV footnote codes that were returned for the job. For an explanation of the DPV footnote codes, see **DPV** on page 29.

USPS Firm Records

This section describes the results of address validation for firm (business) addresses.

- **Confirmed**—Geocode US Address confirmed that the address is a business address.
- **Confirmed with PMB presented**—Geocode US Address confirmed that the address is a business address, and the business address contains a private mailbox (PMB).
- **Failed primary house number**—Business addresses that contained a primary house number which could not be confirmed.
- **Failed secondary unit number**—Business addresses that contained a secondary unit number which could not be confirmed.

USPS Highrise Records

This section describes the results of DPV processing for highrise addresses.

• **Confirmed**—Highrise addresses that were confirmed by DPV.
• **Confirmed with PMB presented**—Highrise addresses that contain a Private Mailbox (PMB) and were confirmed by DPV.
• **Conf. CMRA with/without PMB**—Highrise addresses that are also CMRA addresses, and that did or did not contain a Private Mailbox (PMB) address element.
• **Failed primary house number**—Highrise addresses that contained a primary house number which could not be confirmed.
• **Failed secondary unit number**—Highrise addresses that contained a secondary unit number which could not be confirmed.

USPS PO Box Records

This section describes the results of DPV processing for PO box addresses.

• **Confirmed**—PO Box addresses that were confirmed by DPV.
• **Failed primary box number**—PO Box addresses that contained a primary box number which could not be confirmed.

USPS Rural Route Records

This section describes the results of DPV processing for rural route addresses.

• **Confirmed**—Rural Route addresses that were confirmed by DPV.
• **Conf. CMRA with/without PMB**—Rural Route addresses that were also CMRA addresses, and that did or did not contain a Private Mailbox (PMB) address element.
• **PMB Presented**—Rural Route addresses that contained a Private Mailbox (PMB) address element.
• **Failed primary house number**—Rural Route addresses that contained a primary house number which could not be validated.

USPS Street Records

This section describes the results of DPV processing for street addresses.

• **Confirmed**—Street addresses that were confirmed by DPV.
• **Confirmed with PMB presented**—Street addresses that contained a Private Mailbox (PMB) and were confirmed by DPV.
• **Conf. CMRA with/without PMB**—Street addresses that were also CMRA addresses, and that did or did not contain a Private Mailbox (PMB) address element.
• **Failed primary house number**—Street addresses that contained a primary house number which could not be confirmed.
• **Failed secondary unit number**—Street addresses that contained a secondary unit number which could not be confirmed.

Reverse APN Lookup

2

Reverse APN Lookup allows you to look up an address using:

- An Assessor's Parcel Number (APN). An APN is an ID number assigned to a piece of land by a county assessor. An APN is unique only within a county.
- A FIPS county code. A Federal Information Processing Standard (FIPS) code is an ID number assigned to a county by the U.S. Federal government.
- A FIPS state code. A FIPS state code is an ID number assigned to each state by the U.S. Federal government.

These three pieces of information, used together, can uniquely identify a specific parcel. You must use all three pieces of information to perform a lookup using Reverse APN Lookup.

Note: Reverse APN Lookup only works for U.S. addresses for which APN data is available. See the coverage map included with the points database for more information.

Reverse APN Lookup is part of the Enterprise Geocoding Module. For more information on the Enterprise Geocoding Module, including a listing of other components included with it, see **What is the Enterprise Geocoding Module?**.

In this section:

Input

Reverse APN Lookup takes an APN, FIPS county code, and FIPS state code as input. The following table provides information on the format and layout of the input.

Table 18: Reverse APN Lookup Input Data

Field Name	Format	Description
APN	String [45]	The assessor's parcel number (APN) for the property you want to look up.
InputKeyValue	String	User-defined data, such as a record ID or source code.
USFIPSCountyNumber	String [5]	The FIPS county code for the county in which the property resides.
USFIPSStateCode	String [2]	The FIPS state code for the state in which the property resides.

Options

The following table lists the options that control Reverse APN Lookup processing.

Table 19: Reverse APN Lookup Options

Option Name	Description
Database	Specifies the database to use to look up the parcel. Use the database name specified in the Management Console's Database Resources tool. For more information, see the *Spectrum™ Technology Platform Administration Guide*.
Latitude and longitude format	Specifies the format for returned latitude/longitude.
	Decimal (90.000000-180.000000) Default.
	Integer (90000000-180000000)
Determine elevation	Specifies whether or not Reverse APN Lookup returns the elevation of the address. Elevation is the distance above or below sea level of a given location. The elevation is returned in the **Elevation** output field, which is part of the Latitude/Longitude output group.
	Note: This option requires that you have licensed and installed the Centrus Premium Points database. Elevation data is not available for all addresses. See the coverage map included with the points database.
Casing	Specifies the casing of the output data. One of the following:

Option Name	Description
	Mixed — The output in mixed case (default). For example: 123 Main St Mytown FL 12345
	Upper — The output in upper case. For example: 123 MAIN ST MYTOWN FL 12345
Return descriptions in output	Specifies whether or not Reverse APN Lookup provides an additional description field as output. This field provides the text equivalent to a field represented by a code. For example, LocationCode returns a code that indicates the accuracy (quality) of the assigned geocode. LocationCode.Description provides the description for the code returned.
Include data	Specifies optional data to include in the output. Note that Reverse APN Lookup always returns the default data listed in **Default Output** on page 48. The data you select here is returned with the default output data. • Census • Latitude/Longitude • Parsed Elements • Qualifiers • Range • Segment For a list of fields included in each record type, see **Output** on page 47. If you do not want all of the fields in a group returned, do not select the group, and instead list only those fields you want returned in **Include extra fields**.
Include extra fields	Indicate the individual output fields you want returned. List fields with a pipe (|) between each field. You can use this field instead of the **Include data** field to limit the output to the specific fields you want. Default list: AddressLine1|LastLine|Longitude|Latitude|MatchCode|LocationCode

Output

Reverse APN Lookup returns the following categories of data:

Census

The Census output fields contain census information from the U.S. 2000 Census. To include census data in the output, select the **Census** check box under Include data.

Table 20: Census Output Fields

Field Name	Description
BlockSuffix	Single character block suffix for split Census blocks. Returns A or B. Only available in Centrus Enhanced data.
CBSACode	Indicates Core Based Statistical Area (CBSA).
CBSADivisionCode	Denotes a subdivision of a CBSA.
CBSADivisionName	Describes a subdivision of a CBSA. Only returned when you set the configuration options to return additional descriptions (verbose).
CBSAMetro	Metropolitan Statistical Area. Valid values include: **Y** Metro statistical area **N** Micro statistical area **null** Data unavailable
CBSAName	Describes CBSA. Only returned when you set the configuration options to return additional descriptions (verbose).
CensusBlockID	The ID of the Census Federal Information Processing Standard (FIPS) code.
CensusTract	Six digits extracted from the CensusBlockID.
CSACode	Denotes the code for a geographic entity that consists of 2 or more adjacent CBSAs with employment interchange measures of at least 15.
CSAName	Describes the name for a geographic entity that consists of 2 or more adjacent CBSAs with employment interchange measures of at least 15. Only returned when you set the configuration options to return additional descriptions (verbose).
USCountyName	Name of the county, including the text "County" or "Parish." Only returned when you set the configuration options to return additional descriptions (verbose).
USFIPSStateCountyCode	Five-digit FIPS code for state and county extracted from the CensusBlockID.

Default Output

Reverse APN Lookup always returns the address, geocode, and result indicators.

Table 21: Default Output Fields

Field Name	Description
AdditionalInputData	Mailstop, attention line, or deliver instructions as included in the input data. This field is always null. **Note:** Reverse APN Lookup does not process this information. It simply includes the information as entered in the input data.
AddressLine1	First line of the address.
AddressLine2	Second line of the address.
APN	The Assessor's Parcel Number that was specified in the input.
City	Municipality name.
Confidence	Indicates the confidence in the output provided. The range is from 0 (zero) to 100, with 0 being no match and 100 being an exact match.
Country	The name of the country. Since Reverse APN Lookup only works for U.S. locations, this field will always contain **United States of America**.
Distance	The distance, in feet, of the dwelling along the segment.
Elevation	The distance in feet above or below sea level of the parcel.
FirmName	Name of the company.
LastLine	Complete last address line (municipality, state, and postal code).
Latitude	Seven-digit number in degrees and calculated to 4 decimal places (in the format specified).
LocationCode	Indicates the accuracy (quality) of the assigned geocode. For more information, see **Address Location Codes** on page 80.
Longitude	Seven-digit number in degrees and calculated to 4 decimal places (in the format specified).
MatchCode	Indicates the portions of the address that matched to the directory file. For more information, see **Geocoding Match Codes** on page 93.
PercentGeocode	The percent along the street segment that matches the geocode. For example, if the returned geocode falls 1/3 along the way of the entire street segment, the percent is 33.000. **Note:** This value is always 0.0 for matches to point-level data and intersections.
PostalCode	Nine-digit ZIP Code with or without a hyphen.
PostalCode.AddOn	Four-digit ZIP Code extension.
PostalCode.Base	Five-digit ZIP Code.
ProcessedBy	The feature code for the stage that processed the request. The value is EnterpriseGeocoding for Reverse APN Lookup.
StateProvince	Two-character state abbreviation.

Field Name	Description		
Status	Reports the success or failure of the match attempt		
	null	Success	
	F	Failure	
Status.Code	Reason for failure:		
	• Internal System Error		
	• No Address Found		
	• Insufficient Input Data		
Status.Description	Description of the problem:		
	Problem + explanation	Returned when Status.Code = Internal System Error.	
	Geocoding Failed	Returned when Status.code = No Address Found)	
	No location returned	Returned when Status.code = No Address Found.	
StreetDataType	The data set that Reverse APN Lookup attempted to match against.		
StreetSide	Indicates the side of the street for the range.		
	LEFT	Left side of the street.	
	RIGHT	Right side of the street.	
	BOTH	Both sides of the street.	
USFIPSCountyNumber	Three-digit FIPS county code specified in the input.		
USFIPSStateCode	Two-digit FIPS state code specified in the input.		
USUrbanName	USPS® urbanization name. Puerto Rican addresses only.		

Latitude/Longitude

The latitude/longitude output fields contain the geographic coordinates of the location. To include latitude/longitude output fields in the output, select the **Latitude/Longitude** check box under Include data.

Table 22: Latitude/Longitude Output Fields

Field Name	Description
Latitude	7-digit number in degrees and calculated to 4 decimal places (in the format specified).
Longitude	7-digit number in degrees and calculated to 4 decimal places (in the format specified).

Parsed Elements

The Parsed Elements output fields contain standard address information as individual units, such as street suffixes (AVE) and leading directionals (N and SE). To include parsed elements in the output, select the **Parsed Elements** check box under Include data.

Table 23: Parsed Elements Output Fields

Field Name	Description
ApartmentLabel	Apartment designator (such as STE or APT), for example: 123 E Main St. APT 3
ApartmentLabel2	Secondary apartment designator, for example: 123 E Main St. APT 3, 4th Floor
ApartmentNumber	Apartment number, for example: 123 E Main St. APT 3
ApartmentNumber2	Secondary apartment number, for example: 123 E Main St. APT 3, 4th Floor
City	Municipality name.
CrossStreetLeadingDirectional	Leading directional, for example: 123 E Main St. Apt 3
CrossStreetName[2]	Cross street name, for example: 123 E Main St. Apt 3
CrossStreetSuffix	Cross street suffix, for example: 123 E Main St. Apt 3
CrossStreetTrailingDirectional	Cross street trailing directional, for example: 123 Pennsylvania Ave NW
HouseNumber	Building number, for example: 123 E Main St. Apt 3 **Note:** This is an approximate building number based on the APN, FIPS county code, and FIPS state code provided. This approximate address may not exist or may not accept mail delivery.
LeadingDirectional	Leading directional, for example: 123 E Main St. Apt 3
PrivateMailbox	Private mailbox indicator. Not output for multiline input.
PrivateMailbox.Designator	The type of private mailbox. Possible values include: • Standard • Non-Standard
RRHC	Rural Route/Highway Contract indicator.
StreetName	Street name, for example: 123 E Main St. Apt 3
StreetSuffix	Street suffix, for example: 123 E Main St. Apt 3
TrailingDirectional	Trailing directional, for example: 123 Pennsylvania Ave NW

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[2] Reverse APN Lookup only returns Cross street outputs if you entered an intersection as an address. For example, entering Pearl and 28th, Boulder, CO returns cross street information. Entering 2800 Pearl, Boulder, CO does NOT return cross street information.

Qualifiers

The qualifiers output fields contain qualification information on the match, such as the location code and the match code. To include qualifier output fields in the output, select the **Qualifiers** check box under Include data.

Table 24: Qualifiers Output Fields

Field Name	Description
CountryLevel	The category of postal data available. Always returns A in Reverse APN Lookup—Validates, corrects, and provides missing postal code, city name, state/county name, street address elements, and country name.
DatabaseVersion	USPS publish date, in the format Month Year.
EWSMatch	Indicates if Reverse APN Lookup denied a match because of Early Warning System (EWS) data.
	Y EWS denied a match.
	null EWS did not deny a match.
	For more information on EWS, see **Early Warning System (EWS)**.
ExpirationDate	Date the database expires, in the format MM/DD/YY.
GeoStanMatchScore	Record matching score (for multimatches only).
Intersection	Indicates if Reverse APN Lookup found a cross-street match.
	T True, a cross-street match was found.
	F False, a cross-street match was not found.
IsAlias	Reverse APN Lookup located a matched record by an index alias. Returns 3 characters. The first is an **N** for normal street match or **A** for alias match (including buildings, aliases, firms, etc.). The next 2 characters are:
	01 Basic index (normal address match)
	02 USPS street name alias index
	03 USPS building index
	04 USPS firm name index
	05 Statewide intersection alias match (when using the Usw.gsi or Use.gsi file)
	06 Spatial data street name alias (when using the Us_pw.gsi, Us_pe.gsi, Us_psw.gsi, or Us_pse.gsi file)
	07 Alternate index (when using Zip9.gsu, Zip9e.gsu, and Zip9w.gsu)
	08 LACS[Link]
LACSAddress	Indicates if Reverse APN Lookup converted an address due to the Locatable Address Conversion System (LACS).
	L Converted

Field Name	Description
	null Not converted
	For more information on LACS, see **Locatable Address Conversion System (LACS)**.
LocationCode.Description	LocationCode converted to text. Only returned when you set the configuration options to return additional descriptions (verbose).
MatchCode.Description	MatchCode converted to text. Only returned when you set the configuration options to return additional descriptions (verbose).
RecordType	Indicates the record type: • GeneralDelivery • HighRise • FirmRecord • Normal • PostOfficeBox • RRHighwayContract
RecordType.Default	Indicates type of match that occurred for the record type HighRise or RRHighwayContract: **Y** Default match **N** Exact match **U** Not matched
StreetDataCode	Indicates the data used to obtain a match. **0** USPS data in either the Centrus Enhanced, Centrus TomTom, or Centrus NAVTEQ database. **1** TIGER data in the Centrus Enhanced database. **2** TomTom data in the Cenrus TomTom database. **6** NAVTEQ data in the Centrus NAVTEQ database. **7** TomTom point-level data in the Centrus TomTom Points database. **8** Point-level data from the Centrus Points database. **9** Auxiliary file data

Range

The range output fields contain information on the street range, such as the high and low unit numbers. To include range data fields in the output, select the **Range** check box under Include data.

Table 25: Range Output Fields

Field Name	Description
Alternate	USPS code that specifies whether a record is a base or alternate record.

Field Name	Description
	B Base record. Base records can represent a range of addresses or an individual address, such as a firm record.
	A Alternate record. Alternate records are individual delivery points.
HouseNumberHigh	House number high.
HouseNumberLow	House number low.
HouseNumberParity	Indicates if the house number range contains even or odd numbers. **E** Even **O** Odd **B** Both
PostalCodeExtensionHigh	4-digit ZIP Code extension high.
PostalCodeExtensionLow	4-digit Zip Code extension low.
UnitNumberHigh	Unit number high.
UnitNumberLow	Unit number low.
UnitNumberParity	Indicates if the unit number range contains even or odd numbers. **E** Even **O** Odd **B** Both

Segment

The segment output fields contain information on the street segment identified by the data provider. To include segment data fields in the output, select the **Segment** check box under Include data.

Table 26: Segment Output Fields

Field Name	Description
BlockLeft	Provides the Census FIPS Code that indicates the address is on the left side of the street.
BlockRight	Provides the Census FIPS Code that indicates the address is on the right side of the street.
BlockSuffixLeft	Current left Block suffix for Census 2000 Geography. Returns A or B. Only available in Centrus Enhanced data.
BlockSuffixRight	Current right Block suffix for Census 2000 Geography. Returns A or B. Only available in Centrus Enhanced data.
RoadClass	The type of road: **1** The road is a major road.

Field Name	Description
	2 The road is a minor road.
PointCode	Unique point ID assigned by the data provider. This field is blank if the matched record is not from point-level data.
SegmentCode	Unique 10-digit segment ID assigned by the street network provider.
SegmentDirection	Indicates the order of numbers on a segment.
	F Forward
	R Reversed
	B Both
	U Undetermined
SegmentHouseNumberHigh	A high range number in the segment.
SegmentHouseNumberLow	A low range number in the segment.
SegmentLength	The length, in feet, of a block segment.
SegmentParity	Indicates which side of the street has odd numbers.
	L Left side of the street
	R Right side of the street
	B Both sides of the street
	U Undetermined

Reverse Geocode US Location

Reverse Geocode US Location takes a latitude and longitude point as input and returns the address that is the best match for that point. For example, you could enter the following information:

Longitude: -105239771 Latitude: 40018912 Search Distance: 150 feet

This input would result in the following output:

4750 WALNUT ST BOULDER, CO 80301-2538
MatchCode = NS0
LocCode = AS0
Lon = -105239773
Lat = 40018911
Distances:
Search = 150
Offset = 50
Squeeze = 50
Nearest = 50.0
Pct Geocode = 94.0
SegID = 472881795
PtID = GDT
Block = 080130122032066
County Name = BOULDER COUNTY
DPBC = 50

Note: The address returned is an approximate address based on the latitude and longitude provided. This approximate address may not exist or may not accept mail delivery.

Reverse Geocode US Location is part of the Enterprise Geocoding Module. For more information on the Enterprise Geocoding Module, including a listing of other components included with it, see **What is the Enterprise Geocoding Module?**.

Reverse Geocode US Location processes geocodes in the following order:

1. Reverse Geocode US Location defines a small rectangle based on your input geocode and search distance.
2. Reverse Geocode US Location computes the distance between each street segment and the input location.
3. If one segment is closest, Reverse Geocode US Location finds the offset and interpolated percentage (using the squeeze factor) and the street side. It then computes an approximate house number based on this information.

   If there is more than one segment that is equally close to the input location, a multi-match occurs. Reverse Geocode US Location returns the information for all of the equally close segments so that you can determine which segment is applicable.

4. Reverse Geocode US Location returns the address information, including the segment range, the approximate house number, and the parity of the range along with other standard address information.

Note: Although many of the standard address matching outputs apply to the reverse geocoding option, several outputs are unavailable (such as LACS^{Link} information and unit numbers). Reverse Geocode US Location returns these outputs as blank. Reverse Geocode US Location also has outputs specific to reverse geocode processing, such as specific match codes and the distance from the input location to the matched segment.

To use Reverse Geocode US Location, you need additional data files, called GSX files. There is an option to install these files when you install the geocoding database. The GSX files must be installed the GSX subdirectory of the geocoding database. If you install the Centrus Enhanced Points, Centrus Premium Points, or Centrus TomTom Points database, you must recreate the GSX files. Consult with Pitney Bowes Software Technical Support if you need more information on GSX files.

In this section:

Input

Reverse Geocode US Location takes longitude and latitude information as input. The following table provides information on the format and layout of the input.

Table 27: Reverse Geocode US Location Input Data

Field Name	Format	Description
Latitude	String	Latitude of the point for which you want address information returned. Specify latitude in millionths of decimal degrees.
Longitude	String	Longitude of the point for which you want address information returned. Specify longitude in millionths of decimal degrees.
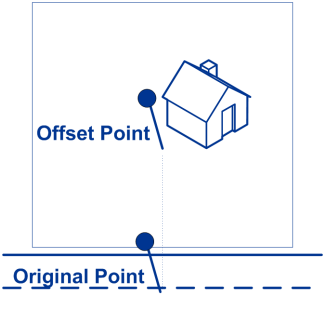
Options

Configuration Options

The following table lists the configuration options for Reverse Geocode US Location.

Table 28: Reverse Geocode US Location Configuration Options

Option	Description
Database	The name of the database that contains the data to use in the search process. Use the database name specified in the Management Console's Database Resources tool. For more information, see the *Spectrum™ Technology Platform Administration Guide*.
Search distance	Specifies the radius, in feet, that Reverse Geocode US Location search for matches. The range is 0 - 5280 feet, with a default value of 150 feet.
Nearest Address	Specifies whether or not Reverse Geocode US Location should find the nearest address to the input geocode. **Note:** You can use this option with the Nearest Intersection option to geocode to both addresses and intersections.
Nearest Unranged	Specifies whether or not Reverse Geocode US Location can match to a street segment that does not have a number range. This option is active when **Nearest Address** is selected. **Note:** If you are using the point-level data option, Reverse Geocode US Location ignores the Nearest Unranged option.
Nearest Intersection	Specifies whether or not Reverse Geocode US Location should find the nearest street intersection to the input geocode.

Option	Description
	Note: You can use this option with the Nearest address option to geocode to both addresses and intersections.
Determine Assessor's Parcel Number	Specifies whether or not Reverse Geocode US Location should determine the address's APN (assessor's parcel number). The APN is an ID number assigned to a property by the local property tax authority. The APN is returned in the **APN** output field, which is part of the Census output group.
	Note: This option requires that you have licensed and installed the Cenrus Enhanced Points or Centrus Premium Points database. APN data is not available for all addresses. See the coverage map included with the points database.
Offset	Specifies the offset distance from the street segments. The range is 0 - 5280 feet, with the default value of 50 feet.
	The offset distance is used in street-level geocoding to prevent the geocode from being in the middle of a street. It compensates for the fact that street-level geocoding returns a latitude and longitude point in the center of the street where the address is located. Since the building represented by an address is not on the street itself, you do not want the geocode for an address to be a point on the street. Instead, you want the geocode to represent the location of the building which sits next to the street. For example, an offset of 50 feet means that the geocode will represent a point 50 feet back from the center of the street. The distance is calculated perpendicular to the portion of the street segment for the address. Offset is also used to prevent addresses across the street from each other from being given the same point. The following diagram shows an offset point in relation to the original point.
	Street coordinates are accurate to 1/10,000th of a degree and interpolated points are accurate to 1/1,000,000th of a degree.
Squeeze	Specifies the distance, in feet, to squeeze the street end points in street-level geocoding. The range is 0 -2147483647 feet, with the default value of 50 feet. The following diagram compares the end points of a street to squeezed end points.

Option	Description
Output Latitude/Longitude format	Specifies the format to use for returned latitude/longitude.
	Decimal — The format is 90.000000-180.000000. Default.
	Integer — The format is 90000000-180000000.
Input Latitude/Longitude format	Specifies the format to use for input latitude/longitude.
	Decimal — The format is 90.000000-180.000000. Default.
	Integer — The format is 90000000-180000000.
Determine elevation	Specifies whether or not Reverse Geocode US Location returns the elevation of the address. Elevation is the distance above or below sea level of a given location. The elevation is returned in the **Elevation** output field, which is part of the Latitude/Longitude output group.
	Note: This option requires that you have licensed and installed the Centrus Premium Points database. Elevation data is not available for all addresses. See the coverage map included with the points database.

Output Format

The following table lists the options that control the format of the output .

Table 29: Reverse Geocode US Location Output Format Options

Option	Description
Casing	Specifies the casing of the output data. One of the following:
	Mixed — The output in mixed case (default). For example:
	123 Main St Mytown FL 12345
	Upper — The output in upper case. For example:
	123 MAIN ST MYTOWN FL 12345
Return descriptions in output	Specifies whether or not Reverse Geocode US Location provides an additional description field as output. This field provides the text equivalent to a field represented by a code. For example, LocationCode returns a code that indicates the accuracy (quality) of the assigned

Option	Description
	geocode. LocationCode.Description provides the description for the code returned.

Output Data

The following table lists the options that control which data is returned by Reverse Geocode US Location.

Table 30: Reverse Geocode US Location Output Data Options

Option	Description
Include data	Specifies the optional data to include in the output. Note that Reverse Geocode US Location always returns the data listed in **Default Output** on page 64. The data you select here is returned with the default output data. • Census • Latitude/Longitude • Parsed Elements • Qualifiers • Range • Segment For a list of the fields included in each data type, see **Output** on page 62. If you do not want all of the fields in a record type returned, do not select the check box. Instead, list only those fields you want returned in Include extra fields.
Include extra fields	Specifies the individual output fields you want returned. List fields with a pipe (|) between each field. You can use this field instead of the Output Record Type to limit the output to those fields that are important to your data needs. Default list: AddressLine1|LastLine|Longitude|Latitude|MatchCode|LocationCode

Output

Reverse Geocode US Location returns the following categories of data:

- **Census** on page 63
- **Default Output** on page 64
- **Latitude/Longitude** on page 65
- **Parsed Elements** on page 66
- **Qualifiers** on page 66
- **Range** on page 68
- **Segment** on page 69

Note: If you are using the API, the output returned is in the DataTable class. For information on the DataTable class, see the "API Fundamentals" section of the *Spectrum™ Technology Platform API Guide*.

Census

The Census output record type contains census information from the U.S. 2000 Census. To include census data in the output, select the **Census** check box under Output Record Type.

Table 31: Census Output Fields

Field Name	Description
APN	The assessor's parcel number of the property. The assessor's parcel number is an ID number assigned to a property by the local property tax authority.
BlockSuffix	Single character block suffix for split Census blocks. Returns A or B. Only available in Centrus Enhanced data.
CBSACode	Indicates Core Based Statistical Area (CBSA).
CBSADivisionCode	Denotes a subdivision of a CBSA.
CBSADivisionName	Describes a subdivision of a CBSA. Only returned when you set the configuration options to return additional descriptions (verbose).
CBSAMetro	Metropolitan Statistical Area. Valid values include: **Y** — Metro statistical area. **N** — Micro statistical area. **null** — Data unavailable.
CBSAName	Describes CBSA. Only returned when you set the configuration options to return additional descriptions (verbose).
CensusBlockID	The ID of the Census Federal Information Processing Standard (FIPS) code.
CensusTract	6-digits extracted from the CensusBlockID.
CSACode	Denotes the code for a geographic entity that consists of 2 or more adjacent CBSAs with employment interchange measures of at least 15.
CSAName	Describes the name for a geographic entity that consists of 2 or more adjacent CBSAs with employment interchange measures of at least 15. Only returned when you set the configuration options to return additional descriptions (verbose).
USCountyName	Name of the county, including the text "County" or "Parish." Only returned when you set the configuration options to return additional descriptions (verbose).
USFIPSCountyNumber	3-digit FIPS county code extracted from the CensusBlockID.
USFIPSStateCode	2-digit FIPS state code extracted from the CensusBlockID.
USFIPSStateCountyCode	5-digit FIPS code for state and county extracted from the CensusBlockID.

Default Output

Reverse Geocode US Address always includes the following fields in the output.

Table 32: Default Output Fields

Field Name	Description
AdditionalInputData	Mailstop, attention line, or deliver instructions as included in the input data. **Note:** Reverse Geocode US Location does not process this information. It simply includes the information as entered in the input data.
AddressLine1	First line of the address.
AddressLine2	Second line of the address.
City	Municipality name.
Confidence	Indicates the confidence in the output provided. The range is from 0 (zero) to 100, with 0 being no match and 100 being an exact match.
Country	Country name.
Distance	The distance, in feet, of the dwelling along the segment.
Elevation	The location's elevation in feet above or below sea level.
FirmName	Name of the company.
LastLine	Complete last address line (municipality, state, and postal code).
Latitude	7-digit number in degrees and calculated to 4 decimal places (in the format specified).
LocationCode	Indicate the accuracy (quality) of the assigned geocode. For more information, see **Address Location Codes** on page 80.
Longitude	7-digit number in degrees and calculated to 4 decimal places (in the format specified).
MatchCode	Indicates the portions of the address that matched to the directory file. For more information, see **Geocoding Match Codes** on page 93.
PercentGeocode	The percent along the street segment that matches the geocode. For example, if the returned geocode falls 1/3 along the way of the entire street segment, the percent is 33.000. **Note:** This value is always 0.0 for matches to point-level data and intersections.
PostalCode	9-digit ZIP Code with or without a hyphen.
PostalCode.AddOn	4-digit ZIP Code extension.
PostalCode.Base	5-digit ZIP Code.

Field Name	Description
ProcessedBy	The underlying software that processed the request. KGR for Reverse Geocode US Location.
RRHC	Rural Route Highway Contract (RRHC). This field is null if the address not a RRHC.
StateProvince	2-character state abbreviation.
Status	Reports the success or failure of the match attempt **null** — Success **F** — Failure
Status.Code	Reason for failure: • Internal System Error • No Geocode Found • Insufficient Input Data
Status.Description	Description of the problem: **Problem + explanation** — Returned when Status.Code contains "Internal System Error." **Geocoding Failed** — Returned when Status.code contains "No Geocode Found". **No location returned** — Returned when Status.code contains "No Geocode Found."
StreetDataType	The data set that Reverse Geocode US Location attempted to match against.
StreetSide	Indicates the side of the street for the range. **LEFT** — Left side of the street **RIGHT** — Right side of the street **BOTH** — Both sides of the street
USUrbanName	Urbanization name. Puerto Rico addresses only.

Latitude/Longitude

The latitude/longitude output fields contain the geographic coordinates of the location. To include latitude/longitude output fields in the output, select the **Latitude/Longitude** check box under Output Record Type.

Table 33: Latitude/Longitude Output Fields

Field Name	Description
Elevation	The location's elevation in feet above or below sea level.
Latitude	7-digit number in degrees and calculated to 4 decimal places (in the format specified).

Field Name	Description
Longitude	7-digit number in degrees and calculated to 4 decimal places (in the format specified).

Parsed Elements

The Parsed Elements output record type contains standard address information as individual units, such as street suffixes (AVE) and leading directionals (N and SE). To include parsed elements in the output, select the **Parsed Elements** check box under Output Record Type.

Table 34: Parsed Elements Output Fields

Field Name	Description
ApartmentLabel	Unit, such as apartment, suite, or lot.
ApartmentLabel2	Unit, such as apartment, suite, or lot.
ApartmentNumber	Unit number.
ApartmentNumber2	Unit number.
CrossStreetLeadingDirectional	Prefix for cross street.
CrossStreetName	Name of cross street.
CrossStreetSuffix	Cross street suffix.
CrossStreetTrailingDirectional	Postfix for cross street.
HouseNumber	Building number for the matched location.
	Note: This is an approximate building number based on the latitude and longitude provided. This approximate address may not exist or may not accept mail delivery.
LeadingDirectional	Street directional that precedes the street name. For example, the N in 138 N Main Street.
PrivateMailbox	Private mailbox. Not output for multiline input.
PrivateMailbox.Designator	Private mailbox description. Not output for multiline input.
StreetName	Street name.
StreetSuffix	The street type of the matched location. For example, AVE for Avenue.
TrailingDirectional	Street directional that follows the street name. For example, the N in 456 Washington N.

Qualifiers

The qualifiers output record type contains qualification information on the match, such as the location code and the match code. To include latitude/longitude output fields in the output, select the **Qualifiers** check box under Output Record Type.

Table 35: Qualifiers Output Fields

Field Name	Description
CountryLevel	The category of postal data available. Always returns A in Reverse Geocode US Location—Validates, corrects, and provides missing postal code, city name, state/county name, street address elements, and country name.
DatabaseVersion	USPS publish date, in the format Month Year.
EWSMatch	Indicates if Reverse Geocode US Location denied a match because of Early Warning System (EWS) data.
	Y EWS denied a match.
	null EWS did not deny a match.
	For more information on EWS, see **Early Warning System (EWS)**.
ExpirationDate	Date the database expires, in the format MM/DD/YY.
GeoStanMatchScore	Record matching score (for multimatches only).
Intersection	Indicates if Reverse Geocode US Location found a cross-street match.
	T True, a cross-street match was found.
	F False, a cross-street match was not found.
IsAlias	Reverse Geocode US Location located a matched record by an index alias. Returns 3 characters. The first is an **N** for normal street match or **A** for alias match (including buildings, aliases, firms, etc.). The next 2 characters are:
	01 Basic index (normal address match)
	02 USPS street name alias index
	03 USPS building index
	04 USPS firm name index
	05 Statewide intersection alias match (when using the Usw.gsi or Use.gsi file)
	06 Spatial data street name alias (when using, the Us_pw.gsi, Us_pe.gsi, Us_psw.gsi, or Us_pse.gsi file is required)
	07 Alternate index (when using Zip9.gsu, Zip9e.gsu, and Zip9w.gsu)
	08 LACS[Link]
LACSAddress	Indicates if Reverse Geocode US Location converted an address due to the Locatable Address Conversion System (LACS).
	L Converted
	null Not converted.
	For more information on LACS, see **Locatable Address Conversion System (LACS)**.

Field Name	Description
LocationCode.Description	LocationCode converted to text. Only returned when you set the configuration options to return additional descriptions (verbose).
MatchCode.Description	MatchCode converted to text. Only returned when you set the configuration options to return additional descriptions (verbose).
RecordType	Indicates the record type: • GeneralDelivery • HighRise • FirmRecord • Normal • PostOfficeBox • RRHighwayContract
RecordType.Default	Indicates type of match that occurred for the record type HighRise or RRHighwayContract: **Y** Default match. **N** Exact match. **U** Not matched.
StreetDataCode	Indicates the data used to obtain a match. **0** USPS data in either the Centrus Enhanced, Centrus TomTom, or Centrus NAVTEQ database. **1** TIGER data in the Centrus Enhanced database. **2** TomTom data in the Centrus TomTom database. **6** NAVTEQ data in the Centrus NAVTEQ database. **7** TomTom point-level data in the Centrus TomTom Points database. **8** Point-level data from the Centrus Points database. **9** Auxiliary file data.
StreetDataType	Indicates the data first used to attempt a match.

Range

The range output record type contains information on the street range, such as the high and low unit numbers. To include range data fields in the output, select the **Range** check box under Output Record Type.

Table 36: Range Output Fields

Field Name	Description
Alternate	USPS code that specifies whether a record is a base or alternate record. **B** Base record. Base records can represent a range of addresses or an individual address, such as a firm record.

Field Name	Description
	A Alternate record. Alternate records are individual delivery points.
HouseNumberHigh	House number high.
HouseNumberLow	House number low.
HouseNumberParity	Indicates if the house number range contains even or odd numbers.
	E Even
	O Odd
	B Both
PostalCodeExtensionHigh	4-digit ZIP Code extension high.
PostalCodeExtensionLow	4-digit Zip Code extension low.
UnitNumberHigh	Unit number high.
UnitNumberLow	Unit number low.
UnitNumberParity	Indicates if the unit number range contains even or odd numbers.
	E Even
	O Odd
	B Both

Segment

The segment output record type contains information on the street segment identified by the data provider. To include segment data fields in the output, select the **Segment** check box under Output Record Type.

Table 37: Segment Output Fields

Field Name	Description
BlockLeft	Provides the Census FIPS Code that indicates the address is on the left side of the street.
BlockRight	Provides the Census FIPS Code that indicates the address is on the right side of the street.
BlockSuffixLeft	Current left Block suffix for Census 2000 Geography. Returns A or B. Only available in Centrus Enhanced data.
BlockSuffixRight	Current right Block suffix for Census 2000 Geography. Returns A or B. Only available in Centrus Enhanced data.
RoadClass	The type of road:
	1 Major
	2 Minor
SegmentCode	Unique 10-digit segment ID assigned by the street network provider.

Field Name	Description	
SegmentDirection	Indicates the order of numbers on a segment.	
	F	Forward
	R	Reversed
	B	Both
	U	Undetermined
SegmentHouseNumberHigh	A high range number in the segment.	
SegmentHouseNumberLow	A low range number in the segment.	
SegmentLength	The length, in feet, of a block segment.	
SegmentParity	Indicates which side of the street has odd numbers.	
	L	Left side of the street
	R	Right side of the street
	B	Both sides of the street
	U	Undetermined

Geocode US Address Auxiliary Files

4

In this section:

Auxiliary File Overview

Use auxiliary files to match against special data that is not included in the Geocode US Address database.

The Geocode US Address database is updated regularly to incorporate changes made by the USPS and third-party data vendors. You may have newer information that has not yet been incorporated. Auxiliary files provide a way for you to process your input records against a file that includes these changes.

Note: Reverse Geocode US Address does not support auxiliary files.

There are two types of auxiliary file records:

• **Street Records**—Contains a range of one or more addresses on a street. For required fields, see **Auxiliary File Layout** on page 74. A street record must not have secondary address information mailstops, Private mail boxes (PMBs), and PO Boxes.
• **Landmark Records**—Represents a single site. For required fields, see **Auxiliary File Layout** on page 74. A landmark record must not have street type abbreviations, predirectional and postdirectional abbreviations, or low and high house numbers.

Note: You cannot update the auxiliary file while Geocode US Address is running. If you want to update the auxiliary file, stop Geocode US Address before attempting to replace or edit the file.

Matching to Auxiliary Files

Geocode US Address matches an input address to an auxiliary file as follows:

1. Geocode US Address determines if there is an auxiliary file present.

   If you have an auxiliary file in the dataset directory, Geocode US Address automatically loads and attempts to match to the auxiliary file. You can verify that Geocode US Address found an auxiliary file by looking at the version information page in the Management Console. One of the following statuses display:

   • Loaded—An auxiliary file is loaded
   • None—An auxiliary file has not been found or loaded
   • Invalid—An auxiliary file was found, but failed to successfully load

   Geocode US Address only accepts one auxiliary file. If more than one auxiliary files is present, Geocode US Address attempts to match against the first file. Geocode US Address ignores any additional auxiliary files for matching, regardless if Geocode US Address found a match to the first auxiliary file.

   If a record in the auxiliary files is invalid, Geocode US Address returns a invalid record message. Geocode US Address continues to match input addresses with the auxiliary file, but will not match to the invalid auxiliary file record.

2. If an auxiliary file is present, Geocode US Address attempts to match to the auxiliary file.

   Geocode US Address assumes that the auxiliary file is the most accurate data set and attempts to find a match to the input address in the auxiliary file. If Geocode US Address cannot find a match in the auxiliary file, it matches the input address with the other Enterprise Geocoding Module databases.

   Note: Geocode US Address only matches input address lists to auxiliary files if there is an exact match. Your input address list should be free of misspellings and incomplete addresses.

3. If Geocode US Address finds an exact record match to the auxiliary file, it standardizes the match to USPS regulations and returns the output of the auxiliary file match.

   Geocode US Address uses the following defaults if you do not include the values in the auxiliary file:

   • House number parity = B (both odds and evens)

- Segment direction = A (ascending)
- Side of street = U (unknown)

Record Type Matching Rules

When matching against an auxiliary file, Geocode US Address uses the following rules:

Street record match

- The input house number must fall within or be equal to the low and high house number values of the auxiliary record.
- The input house number must agree with the parity of the auxiliary record.
- The input ZIP Code must exactly match the ZIP Code of the auxiliary record.

Landmark record match

- The input data must contain a ZIP Code and address line, and the values must exactly match the values on the auxiliary record.
- The input address cannot have any other data, such as a house number, unit number, or Private Mail Box (PMB).

Note: Geocode US Address only matches the ZIP Code against the auxiliary file. Geocode US Address does not verify that the ZIP Code of the input address record is correct for the city and state. Validate this information in your input lists before processing against the auxiliary file.

Unavailable Features and Functions

The following features and functions do not apply when Geocode US Address makes an auxiliary file match.

- Geocode US Address does not match to
- two-line addresses
- multi-line addresses
- intersection addresses
- dual addresses
- Geocode US Address does not perform EWS, ZIPMove, LACSLink, or DPV processing on auxiliary matches
- You can only access the auxiliary file with processing through the Find function. You cannot access the auxiliary file through the Find First/Next or MBR functions
- You can only access the auxiliary file logic using the address code option of the Find function, not the geocode option.

Auxiliary Match Output

Geocode US Address provides special data type, match codes, and location code values for auxiliary matches. When Geocode US Address finds a match to an auxiliary file, the default output follows these conventions:

- Geocode US Address formats the auxiliary file match as a street-style address for output. This excludes PO Boxes, Rural Routes, General Delivery, etc.
- Geocode US Address follows the case setting you indicate (by default, upper case) by the casing function. Geocode US Address does not maintain the casing in the auxiliary file for mixed casing values. For example, Geocode US Address returns O'Donnell as ODONNELL or Odonnell depending on the setting of the casing function.

Note: Geocode US Address does not change the casing for the User Data field.

• Geocode US Address removes spaces at the beginning and ending of fields in the auxiliary file.

Note: Geocode US Address does not remove spaces for the User Data field.

Auxiliary File Layout

You must comply with the following organizational rules when you create auxiliary file:

• Files are fixed-width text files with a `.gax` extension
• Files can contain up to 500,000 records.
• Use semicolons in the first column to indicate a row is a comment, not a data record; Geocode US Address ignores rows that begin with a semicolon.
• For optimal performance, order the records within the file by descending ZIP Code, and then descending street name.
• Records must represent only one side of a street. To represent both sides of a street, create a record for each side of the street.
• Records must represent segments that are straight lines.
• House numbers must follow USPS rules documented in Publication 28.
• Numeric fields, such as ZIP Codes, must contain only numbers.
• If house numbers are present in the record, the house number range must be valid according to USPS rules documented in Publication 28, Appendix E.
• Latitude and Longitude values must be in millionths of decimal degrees.
• Records cannot contain PO Box addresses.

The following table shows auxiliary file layout.

Table 38: Auxiliary File Layout

Field	Description	Required	Required for Street Segment Match	Required for Landmark Match	Exact Match Required if Present	Length	Position
ZIP Code	5-digit ZIP Code.	X	X	X	X	5	1-5
Street name	Name of the street or landmark.	X	X	X	X	30	6-35
Street type abbreviation	Street type. Also called street suffix. See the USPS Publication 28, Appendix C for a complete list of supported street types.				X	4	36-39
Predirectional	USPS street name predirectional abbreviation. Supported values are N, E, S, W, NE, NW, SE, and SW.				X	2	40-41

Field	Description	Required	Required for Street Segment Match	Required for Landmark Match	Exact Match Required if Present	Length	Position
Postdirectional	USPS street name postdirectional abbreviations. Supported values are N, E, S, W, NE, NW, SE, and SW.				X	2	42-43
RESERVED	RESERVED					4	44-47
Low house number	Low house number of the address range.	X	X			11	48-58
High house number	High house number of the address range.	X	X			11	59-69
House number parity	Indicates the parity of the house number in the range. E - Even O - Odd B - Both					1	70
Segment direction	Direction the house numbers progress along the segment: F - Forward (default) R - Reverse					1	71
RESERVED	RESERVED					1	72
FIPS state	US government FIPS state code.					2	73-74
FIPS county	US government FIPS county code.					3	75-77
Census tract	US Census tract number.					6	78-83
Census block group	US Census block group number.					1	84
Census block ID	US Census block ID number.					3	85-87
RESERVED	RESERVED					5	88-92
State abbreviation	USPS state abbreviation.					2	93-94
County name	Name of the county.					25	95-119

Field	Description	Required	Required for Street Segment Match	Required for Landmark Match	Exact Match Required if Present	Length	Position
MCD code	Minor Civil Division code.					5	120-124
MCD name	Minor Civil Division name.					40	125-164
CBSA code	Core Based Statistical Area code.					5	165-169
CBSA name	Core Based Statistical Area name.					49	170-218
RESERVED	RESERVED					5	219-223
City Name	City name. Overrides the city/state preferred city name upon a return.					40	224-263
RESERVED	RESERVED					237	264-500
User-defined data	User-defined data.					300	501-800
Record ID Number	User-defined unique record identifier.					10	801-810
Side of street	Side of the street for the address: L - Left side R - Right side B - Both sides U - Unknown side (default) This is relative to the segment endpoints and the segment direction.					1	811
Beginning longitude	Beginning longitude of the street segment in millionths of degrees.	X	X	X		11	812-822
Beginning latitude	Beginning latitude of the street segment in millionths of degrees.	X	X	X		10	823-832
Ending longitude	Ending longitude of the street segment in millionths of degrees.					11	833-843

Field	Description	Required	Required for Street Segment Match	Required for Landmark Match	Exact Match Required if Present	Length	Position
Ending latitude	Ending latitude of the street segment in millionths of degrees.					10	844-853

5

Location and Match Codes for U.S. Geocoding

In this section:

Address Location Codes

Location codes that begin with an "A" are address location codes. Address location codes indicate a geocode made directly to a street network segment (or two segments, in the case of an intersection).

An address location code has the following characters.

1st character	Always an A indicating an address location.	
2nd character	May be one of the following	
	C	Interpolated address point location
	G	Auxiliary file data location
	I	Application infers the correct segment from the candidate records
	P	Point-level data location
	R	Location represents a ranged address
	S	Location on a street range
	X	Location on an intersection of two streets
3rd and 4th character	Digit indicating other qualities about the location.	

Table 39: Address Location Codes

Code	Description
AGn	Indicates an auxiliary file for a geocode match where n is one of the following values:
n = 0	The geocode represents the center of a parcel or building.
n = 1	The geocode is an interpolated address along a segment.
n = 2	The geocode is an interpolated address along a segment, and the side of the street cannot be determined from the data provided in the auxiliary file record.
n = 3	The geocode is the midpoint of the street segment.
APnn	Indicates a point-level geocode match representing the center of

Code	Description
	a parcel or building, where nn is one of the following values:
`nn = 02`	Parcel centroid
	Indicates the center of an accessor's parcel (tract or lot) polygon. When the center of an irregularly shaped parcel falls outside of its polygon, the centroid is manually repositioned to fall inside the polygon as closely as possible to the actual center.
`nn = 04`	Address points
	Represents field-collected GPS points with field-collected address data.
`nn = 05`	Structure centroid
	Indicates the center of a building footprint polygon, where the building receives mail or has telephone service.
	Usually a residential address consists of a single building. For houses with outbuildings (detached garages, shed, barns, etc.), only the residences have a structure point. Condominiums and duplexes have multiple points for each building. Larger buildings, such as apartment complexes, typically receive mail at one address for each building and therefore individual apartments are not represented as discrete structure points.
	Shopping malls, industrial complexes, and academic or medical center campuses where one building accepts mail for the entire complex are represented as one point. When addresses are assigned to multiple buildings within one complex, each addressed structure is represented by a point.
	If the center of a structure falls outside of its polygon, the center is manually repositioned to fall inside the polygon.

Code	Description
nn = 07	Manually placed
	Address points are manually placed to coincide with the midpoint of a parcel's street frontage at a distance from the center line.
nn = 08	Front door point
	Represents the designated primary entrance to a building. If a building has multiple entrances and there is no designated primary entrance or the primary entrance cannot readily be determined, the primary entrance is chosen based on proximity to the main access street and availability of parking.
nn = 09	Driveway offset point
	Represents a point located on the primary access road (most commonly a driveway) at a perpendicular distance of between 33-98 feet (10-30 meters) from the main roadway.
nn = 10	Street access point
	Represents the primary point of access from the street network. This address point type is located where the driveway or other access road intersects the main roadway.
nn=21	Base parcel point
	When unable to match to an input unit number, or when the unit number is missing from an address location with multiple units, the "base" parcel information is returned, the address is not standardized to a unit number, and additional information, such as an Assessor's Parcel Number, is not returned.
AIn	The correct segment is inferred from the candidate records at match time.

Code	Description
`ASn`	House range address geocode. This is the most accurate geocode available.

AIn and ASn share the same qualities for n as follows:

`n = 0`	Best location.
`n = 1`	Street side is unknown. The Census FIPS Block ID is assigned from the left side; however, there is no assigned offset and the point is placed directly on the street.
`n = 2`	Indicates one or both of the following: • The address is interpolated onto a TIGER segment that did not initially contain address ranges. • The original segment name changed to match the USPS spelling. This specifically refers to street type, predirectional, and postdirectional. **Note:** Only the second case is valid for non-TIGER data because segment range interpolation is only completed for TIGER data.
`n = 3`	Both 1 and 2.
`n = 7`	Placeholder. Used when starting and ending points of segments contain the same value and shape data is not available.

ACnh

The ACnn 4th digit characteristics are as follows:

n = 0	Represents the interpolation between two points, both coming from User Dictionaries.
n = 1	Represents the interpolation between two points. The low boundary came from a User Dictionary and the high boundary, from a non-User Dictionary.

Code	Description
n = 2	Represents the interpolation between one point and one street segment end point, both coming from User Dictionaries.
n = 3	Represents the interpolation between one point (low boundary) and one street segment end point (high boundary). The low boundary came from a User Dictionary and the high boundary from a non-User Dictionary.
n = 4	Represents the interpolation between two points. The low boundary came from a non-User Dictionary and the high boundary from a User Dictionary.
n = 5	Represents the interpolation between two points, both coming from non-User Dictionaries.
n = 6	Represents the interpolation between one point (low boundary) and one street segment end point (high boundary). The low boundary came from a non-User Dictionary and the high boundary from a User Dictionary.
n = 7	Represents the interpolation between one point and one street segment end point and both came from non-User Dictionaries.
n = 8	Represents the interpolation between one street segment end point andone point, both coming from User Dictionaries.
n = 9	Represents the interpolation between one street segment end point (low boundary) andone point (high boundary). The low boundary came from a User Dictionary and the high boundary from a non-User Dictionary.
n = A	Represents the interpolation between two street segment end points, both coming from User Dictionaries.
n = B	Represents the interpolation between two street segment end points. The low boundary came

Code	Description
	from a User Dictionary and the high boundary from a non-User Dictionary.
n = C	Represents the interpolation between one street segment end point (low boundary) and one point (high boundary). The low boundary came from a non-User Dictionary and the high boundary from a User Dictionary.
n = D	Represents the interpolation between one street segment end point and one point, both coming from non-User Dictionary.
n = E	Represents the interpolation between two street segment end points. The low boundary came from a non-User Dictionary and the high boundary from a User Dictionary.
n = F	Represents the interpolation between two street segment end points, both coming from non-User Dictionaries.
ARn	Ranged address geocode, where n is one of the following:
n = 1	The geocode is placed along a single street segment, midway between the interpolated location of the first and second input house numbers in the range.
n = 2	The geocode is placed along a single street segment, midway between the interpolated location of the first and second input house numbers in the range, and the side of the street is unknown. The Census FIPS Block ID is assigned from the left side; however, there is no assigned offset and the point is placed directly on the street.
n = 4	The input range spans multiple USPS segments. The geocode is placed on the endpoint of the segment which corresponds to the first input house number,

Code	Description
	closest to the end nearest the second input house number.
`n = 7`	Placeholder. Used when the starting and ending points of the matched segment contain the same value and shape data is not available.
`AXn`	Intersection geocode, where n is one of the following:
`n = 3`	Standard single-point intersection computed from the center lines of street segments.
`n = 8`	Interpolated (divided-road) intersection geocode. Attempts to return a centroid for the intersection.

Street Centroid Location Codes

Location codes that begin with "C" are street centroid location codes. Street centroid location codes indicate the Census ID accuracy and the position of the geocode on the returned street segment. Street centroids may be returned if the street centroid fallback option is enabled and an address-level geocode could not be determined.

A street centroid location code has the following characters.

1st character	Always C indicating a location derived from a street segment.
2nd character	Census ID accuracy based on the search area used to obtain matching Street Segment.
3rd character	Location of geocode on the returned street segment.

The following table contains the values and descriptions for the location codes.

Character position	Code	Description
2nd Character		
	B	Block Group accuracy (most accurate). Based on input ZIP Code.
	T	Census Tract accuracy. Based on input ZIP Code.

Character position	Code	Description
	C	Unclassified Census accuracy. Normally accurate to at least the County level. Based on input ZIP Code.
	F	Unknown Census accuracy. Based on Finance area.
	P	Unknown Census accuracy. Based on input City.
3rd Character		
	C	Segment Centroid.
	L	Segment low-range end point.
	H	Segment high-range end point.

ZIP + 4 Centroid Location Codes

Location codes that begin with a "Z" are ZIP + 4 centroid location codes. ZIP + 4 centroids indicate a geocode could not be determined for the address, so the location of the center of the address's ZIP + 4 was returned instead. ZIP + 4 centroid location codes indicate the quality of two location attributes: Census ID accuracy and positional accuracy.

A ZIP + 4 centroid location code has the following characters.

1st character	Always Z indicating a location derived from a ZIP centroid.
2nd character	Census ID accuracy.
3rd character	Location type.
4th character	How the location and Census ID was defined. Provided for completeness, but may not be useful for most applications.

Table 40: ZIP + 4 Centroid Location Codes

Character Position	Code	Description
2nd Character		
	B	Block Group accuracy (most accurate).
	T	Census Tract accuracy.
	C	Unclassified Census accuracy. Normally accurate to at least the County level.

Character Position	Code	Description
3rd Character		
	5	Location of the Post Office that delivers mail to the address, a 5-digit ZIP Code centroid, or a location based upon locale (city). See the 4th character for a precise indication of locational accuracy.
	7	Location based upon a ZIP + 2 centroid. These locations can represent a multiple block area in urban locations, or a slightly larger area in rural settings.
	9	Location based upon a ZIP + 4 centroid. These are the most accurate centroids and normally place the location on the correct block face. For a small number of records, the location may be the middle of the entire street on which the ZIP + 4 falls. See the 4th character for a precise indication of locational accuracy.
4th Character		
	A	Address matched to a single segment. Location assigned in the middle of the matched street segment, offset to the proper side of the street.
	a	Address matched to a single segment, but the correct side of the street is unknown. Location assigned in the middle of the matched street segment, offset to the left side of the street, as address ranges increase.
	B	Address matched to multiple segments, all segments have the same Block Group. Location assigned to the middle of the matched street segment with the most house number ranges within this ZIP + 4. Location offset to the proper side of the street.
	b	Same as methodology B except the correct side of the street is unknown. Location assigned in the middle of the matched street

Character Position	Code	Description
		segment, offset to the left side of the street, as address ranges increase.
	C	Address matched to multiple segments, with all segments having the same Census Tract. Returns the Block Group representing the most households in this ZIP + 4. Location assigned to t he middle of the matched street segment with the most house number ranges within this ZIP + 4. Location offset to the proper side of the street.
	c	Same as methodology C except the correct side of the street is unknown. Location assigned in the middle of the matched street segment, offset to the left side of the street, as address ranges increase.
	D	Address matched to multiple segments, with all segments having the same County. Returns the Block Group representing the most households in this ZIP + 4. Location assigned to the middle of the matched street segment with the most house number ranges within this ZIP + 4. Location offset to the proper side of the street.
	d	Same as methodology D except the correct side of the street is unknown. Location assigned in the middle of the matched street segment, offset to the left side of the street, as address ranges increase.
	E	Street name matched; no house ranges available. All matched segments have the same Block Group. Location placed on the segment closest to the center of the matched segments. In most cases, this is on the mid-point of the entire street.
	F	Street name matched; no house ranges available. All matched segments have the same Census

Character Position	Code	Description
		Tract. Location placed on the segment closest to the center of the matched segments. In most cases, this is on the mid-point of the entire street.
	G	Street name matched (no house ranges available). All matched segments have the same County. Location placed on the segment closest to the center of the matched segments. In most cases, this is on the mid-point of the entire street.
	H	Same as methodology G, but some segments are not in the same County. Used for less than .05% of the centroids.
	I	Created ZIP + 2 cluster centroid as defined by methodologies A, a, B, and b. All centroids in this ZIP + 2 cluster have the same Block Group. Location assigned to the ZIP + 2 centroid.
	J	Created ZIP + 2 cluster centroid as defined by methodologies A, a, B, b, C, and c. All centroids in this ZIP + 2 cluster have the same Census Tract. Location assigned to the ZIP + 2 centroid.
	K	Created ZIP + 2 cluster centroid as defined by methodologies A, a, B, b, C, c, D, and d. Location assigned to the ZIP + 2 centroid.
	L	Created ZIP + 2 cluster centroid as defined by methodology E. All centroids in this ZIP + 2 cluster have the same Block Group. Location assigned to the ZIP + 2 centroid.
	M	Created ZIP+2 cluster centroid as defined by methodology E and F. All centroids in this ZIP + 2 cluster have the same Census Tract. Location assigned to the ZIP + 2 centroid.
	N	Created ZIP + 2 cluster centroid as defined by methodology E, F,

Character Position	Code	Description
		G, and H. Location assigned to the ZIP + 2 centroid.
	V	Over 95% of addresses in this ZIP Code are in a single Census Tract. Location assigned to the ZIP Code centroid.
	W	Over 80% of addresses in this ZIP Code are in a single Census Tract. Reasonable Census Tract accuracy. Location assigned to the ZIP Code centroid.
	X	Less than 80% of addresses in this ZIP Code are in a single Census Tract. Census ID is uncertain. Location assigned to the ZIP Code centroid.
	Y	Rural or sparsely populated area. Census code is uncertain. Location based upon the USGS places file.
	Z	P.O. Box or General Delivery addresses. Census code is uncertain. Location based upon the Post Office location that delivers the mail to that address.

Geographic Centroid Location Codes

Location codes that begin with "G" are geographic centroid location codes. Geographic centroids may be returned if the street centroid fallback option is enabled and an address-level geocode could not be determined. Geographic centroid location codes indicate the quality a city, county, or state centroid.

A geographic centroid location code has the following characters.

1st character	Always G indicating a location derived from a geographic centroid.
2nd character	Geographic area type. One of the following:
	M Municipality (for example, a city)
	C County
	S State

Address Unavailable

Location codes that begin with "E" indicate that neither an address location nor a ZIP + 4 centroid could be determined. This usually occurs when you have requested ZIP Code centroids of a high quality, and one is not available for that match.

An unavailable address code has the following characters.

Table 41: Match Codes for No Match

Code	Description
Ennn	Indicates an error, or no match. This can occur when the address entered does not exist in the database, or the address is badly formed and cannot be parsed correctly. The last three digits of an error code indicate which parts of an address the application could not match to the database.
nnn = 000	No match made.
nnn = 001	Low level error.
nnn = 002	Could not find data file.
nnn = 003	Incorrect GSD file signature or version ID.
nnn = 004	GSD file out of date. Only occurs in CASS mode.
nnn = 010	No city and state or ZIP Code found.
nnn = 011	Input ZIP not in the directory.
nnn = 012	Input city not in the directory.
nnn = 013	Input city not unique in the directory.
nnn = 014	Out of licensed area. Only occurs if using Pitney Bowes Software licensing technology.
nnn = 015	Record count is depleted and license has expired.
nnn = 020	No matching streets found in directory.
nnn = 021	No matching cross streets for an intersection match.
nnn = 022	No matching segments.

Code	Description
nnn = 023	Unresolved match.
nnn = 024	No matching segments. (Same as 022.)
nnn = 025	Too many possible cross streets for intersection matching.
nnn = 026	No address found when attempting a multiline match.
nnn = 027	Invalid directional attempted.
nnn = 028	Record also matched EWS data, therefore the application denied the match.
nnn = 029	No matching range, single street segment found.
nnn = 030	No matching range, multiple street segments found.

Geocoding Match Codes

Geocoding components return match codes indicating the address portions that matched or did not match to the database. If the geocoder cannot make a match, the match code begins with E and the remaining digits indicate why the address did not match. The digits do not specifically refer to which address elements did not match, but rather why the address did not match.

Table 42: Match Codes

Code	Description
Ahh	Same as Shh, but indicates match to an alias name record or an alternate record.
Chh	The street address did not match, but the geocoder located a street segment based on the input ZIP Code or city .
D00	Matched to a small town with P.O. Box or General Delivery only.
Gxx	Matched to an auxiliary file.
Hhh	The house number was changed.
Jhh	Matched to a user-defined dictionary.
Nxx	Matched to the nearest address. Used with reverse geocoding. The following are the only values for N:

Code	Description
	NSO Nearest street center match (nearest street segment interpolated)
	NS1 Nearest unranged street segment
	NP0 Nearest point address
	NX0 Nearest intersection
P	Successful reverse APN lookup.
Qhh	Matched to USPS range records with unique ZIP Codes. CASS rules prohibit altering an input ZIP if it matches a unique ZIP Code value.
Rhh	Matched to a ranged address.
Shh	Matched to USPS data. This is considered the best address match, because it matched directly against the USPS list of addresses. S is returned for a small number of addresses when the matched address has a blank ZIP + 4.
Thh	Matched to a street segment record. Street segment records do not contain ZIP Code information. If you enter a ZIP Code, the application returns the ZIP Code you entered. If the input city and state has only one ZIP Code, the application returns that ZIP Code.
Uhh	Matched to USPS data but cannot resolve the ZIP + 4 code without the firm name or other information. CASS mode returns an E023 (multiple match) error code.
Xhhh	Matched to an intersection of two streets, for example, "Clay St & Michigan Ave." The first hex digit refers to the last line information, the second hex digit refers to the first street in the intersection, and the third hex digit refers to the second street in the intersection.
	Note: The USPS does not allow intersections as a valid deliverable address.
Yhhh	Same as Xhhh, but an alias name record was used for one or both streets.
Z	No address given, but verified the provided ZIP Code .

The following table contains the description of the hex digits for the match code values.

Table 43: Description of Hex Digits

Code	In first hex position means:	In second and third hex position means:
0	No change in last line.	No change in address line.
1	ZIP Code changed.	Street type changed.
2	City changed.	Predirectional changed.
3	City and ZIP Code changed.	Street type and predirectional changed.
4	State changed.	Postdirectional changed.
5	State and ZIP Code changed.	Street type and postdirectional changed.
6	State and City changed.	Predirectional and postdirectional changed.
7	State, City, and ZIP Code changed.	Street type, predirectional, and postdirectional changed.
8	ZIP + 4 changed.	Street name changed.
9	ZIP and ZIP + 4 changed.	Street name and street type changed.
A	City and ZIP + 4 changed.	Street name and predirectional changed.
B	City, ZIP, and ZIP + 4 changed.	Street name, street type, and predirectional changed.
C	State and ZIP + 4 changed.	Street name and postdirectional changed.
D	State, ZIP, and ZIP + 4 changed.	Street name, street type, and postdirectional changed.
E	State, City, and ZIP + 4 changed.	Street name, predirectional, and postdirectional changed.
F	State, City, ZIP, and ZIP + 4 changed.	Street name, street type, predirectional, and postdirectional changed.

If neither an address location nor a ZIP + 4 centroid can be determined, the location code will start with "E". This occurs infrequently when the component does not have a 5-digit centroid location. Enterprise Geocoding Module components can also return an E location code type when it cannot standardize an input address and there is no input ZIP Code. In this case, do not assume the ZIP Code returned with the non-standardized address is the correct ZIP Code because the component did not standardize the address; therefore, the component does not return geocoding or Census Block information.

Table 44: Match Codes for No Match

Code	Description
Ennn	Indicates an error, or no match. This can occur when the address entered does not exist in the database, or the address is badly formed and cannot be parsed correctly. The last three digits of an error code indicate which parts of an address the application could not match to the database.
nnn = 000	No match made.
nnn = 001	Low level error.
nnn = 002	Could not find data file.
nnn = 003	Incorrect GSD file signature or version ID.
nnn = 004	GSD file out of date. Only occurs in CASS mode.
nnn = 010	No city and state or ZIP Code found.
nnn = 011	Input ZIP not in the directory.
nnn = 012	Input city not in the directory.
nnn = 013	Input city not unique in the directory.
nnn = 014	Out of licensed area. Only occurs if using Pitney Bowes Software licensing technology.
nnn = 015	Record count is depleted and license has expired.
nnn = 020	No matching streets found in directory.
nnn = 021	No matching cross streets for an intersection match.
nnn = 022	No matching segments.
nnn = 023	Unresolved match.
nnn = 024	No matching segments. (Same as 022.)
nnn = 025	Too many possible cross streets for intersection matching.
nnn = 026	No address found when attempting a multiline match.

Code	Description
`nnn = 027`	Invalid directional attempted.
`nnn = 028`	Record also matched EWS data, therefore the application denied the match.
`nnn = 029`	No matching range, single street segment found.
`nnn = 030`	No matching range, multiple street segments found.

Encountering False Positives

6

In this section:

What is a False-Positive?

To prevent the generation of address lists, the DPV and LACS^{Link} databases include false-positive records. False-positive records are artificially manufactured addresses that reside in a false-positive table. For each negative response that occurs in a DPV or LACS^{Link} query, a query is made to the false-positive table. A match to this table (called a false-positive match) disables your DPV or LACS^{Link} key. In batch processing the job that contains the violation will complete successfully but you will not be able to run any subsequent jobs that use DPV or LACS^{Link} until you report the violation and obtain a key to reactivate DPV or LACS^{Link}.

Note: The term "seed record violation" is also used to refer to encountering false positive records. The two terms mean the same thing.

Reporting DPV False-Positive Violations

Spectrum^{TM} Technology Platform indicates a false-positive match via messages in the server log.

During batch processing, if you encounter a false positive record the job will continue. After the job completes you will not be able to run any other jobs using DPV because your DPV key is disabled. When a DPV false positive record violation occurs, the following text is displayed in the Execution History:

```
DPV Seed Record Violation. Seed Code S<ZIP, ZIP+4, Address, Unit>
```

You can report the violation and obtain a restart key by following these steps.

1. In your browser, go to http://<yourserver>:<port>/<product code>/dpv.jsp. For example, http://localhost:8080/unc/dpv.jsp for the Universal Addressing Module and http://localhost:8080/geostan/dpv.jsp for the Enterprise Geocoding Module.
2. Enter the mailer's information into each field. The number in parentheses after each field name indicates the maximum length of the field.
3. Click **Submit** when you're done. A **File Download** dialog will appear.
4. Click **Save** to save the file to your computer. A **Save As** dialog will appear.
5. Specify a file name and location on your local hard drive (for example `c:\DPVSeedFile.txt`) and click **Save**.
6. Go to **www.g1.com/support** and log in.
7. Click **DPV & LACS^{Link} False Positive**.
8. Follow the on-screen instructions to attach your seed file and obtain a restart key.

DPV False Positive Header File Layout

The USPS® has determined the required layout of the DPV false-positive header file, which is currently defined as a fixed-length file containing two or more 180-byte records. The first record must always be the header record, whose layout is shown below.

Table 45: DPV False-Positive Header Record Layout

Position	Length	Description	Format
1-40	40	Mailer's company name	Alphanumeric
41-98	58	Mailer's address line	Alphanumeric

Position	Length	Description	Format
99-126	28	Mailer's city name	Alphanumeric
127-128	2	Mailer's state abbreviation	Alphabetic
129-137	9	Mailer's 9-digit ZIP Code	Numeric
138-146	9	Total Records Processed	Numeric
147-155	9	Total Records DPV Matched	Numeric
156-164	9	Percent Match Rate to DSF	Numeric
165-173	9	Percent Match Rate to ZIP + 4®	Numeric
174-178	5	Number of ZIP Codes on file	Numeric
179-180	2	Number of False-Positives	Numeric

The trailer record contains information regarding the DPV false-positive match. There must be one trailer record added to the false-positive file for every DPV false-positive match. The layout is shown below.

Table 46: DPV False-Positive Trailer Record Layout

Position	Length	Description	Format
1-2	2	Street predirectional	Alphanumeric
3-30	28	Street name	Alphanumeric
31-34	4	Street suffix abbreviation	Alphanumeric
35-36	2	Street postdirectional	Alphanumeric
37-46	10	Address primary number	Alphanumeric
47-50	4	Address secondary abbreviation	Alphanumeric
51-58	8	Address secondary number	Numeric
59-63	5	Matched ZIP Code	Numeric
64-67	4	Matched ZIP + 4®	Numeric
68-180	113	Filler	Spaces

Reporting LACS/Link False-Positive Violations

Spectrum™ Technology Platform indicates a false-positive match via messages in the server log. Batch jobs will fail if a false-positive match occurs and client/server calls will throw an exception.

Note: The term "seed record violation" is also used to refer to encountering false positive records. The two terms mean the same thing.

When a false positive record is encountered, the server log will say:

```
2005-05-19 09:40:10,758 WARN [com.g1.dcg.component.Log] Seed record
violation for RR 1          R74039  2924
2005-05-19 09:40:10,774 ERROR [com.g1.dcg.component.Log] Feature Disabled:
 LLB: LACS Seed Record Violation. Seed Code: R74039  2924
2005-05-19 09:40:10,867 ERROR [com.g1.dcg.job.server.stages.JobRunnerStages]
 Error executing job
com.g1.dcg.stage.StageException: com.g1.dcg.component.ComponentException:
 Feature Disabled: LLB
```

1. In your browser, go to http://<ServerName>:<port>/<product code>/lacslink.jsp. For example, http://localhost:8080/unc/lacslink.jsp for the Universal Addressing Module and http://localhost:8080/geostan/lacslink.jsp for the Enterprise Geocoding Module.

2. Enter the mailer's information into each field. The number in parentheses after the field name indicates the maximum length of the field. Click **Submit** when you're done. A **File Download** dialog will appear.

3. Click **Save** to save the file to your computer. A **Save As** dialog will appear.

4. Specify a file name and location on your local hard drive (for example `c:\lacslink.txt`) and click **Save**.

5. Go to **www.g1.com/support** and log in.

6. Click **DPV & LACS**^Link **False Positive**.

7. Follow the on-screen instructions to attach your seed file and obtain a restart key.

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