How to Use the Maryland Composite Locator in ArcGIS Pro

This instructive document assumes that you have some familiarity with geocoding. For an overview of the geocoding process and general instructions, please see the ArcGIS Pro Geocode Addresses page.

You can use the Maryland Composite Locator Service for batch geocoding within ArcGIS Pro similarly to a locally-created address locator. The type of features being geocoded (e.g., street address, mile marker, place name) determines the inputs that are needed by the ArcGIS Pro geocoding graphic user interface (GUI). The following describes how to connect to the geocoding service via MD iMAP service in ArcGIS Pro, illustrates the proper table syntax for each feature type and how to interface the table with the ArcGIS Pro geocoding GUI.

The Maryland Composite Locator uses road centerline, address, and point of interest reference data from local jurisdictions, the Maryland Department of Planning (MDP), and the Maryland Department of Transportation State Highway Administration (MDOT SHA). For more information, visit the MD iMAP Composite Locator Data Sources page.

Please note the following:
- No information related to the geocoded data is stored in MD iMAP's servers.
- Results are returned only to the user's local machine.
- This document focuses on the Maryland Composite Locators. The geocoding results for these two services are limited to locations within Maryland.
- ArcGIS Pro 2.5 does not support accessing or modifying locator properties for portal locators and server locators (these are referred to as geocoding options in ArcMap).

It is recommended that you select the **MD_CompositeLocator** geocoding service**.** This service will match inputs to street addresses points, address locations along street centerlines, intersections, highway exits and mile markers. If an input cannot be matched to any of these reference data sources, it will be returned as unmatched. The REST URL for this locator is https://geodata.md.gov/imap/rest/services/GeocodeServices/**MD_CompositeLocator**/GeocodeServer
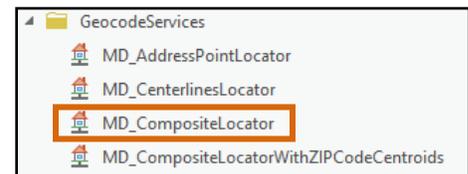
Alternately, if you want any unmatched inputs to be placed at the ZIP Code centroid (geographic center), use the **MD_CompositeLocatorWithZIPCodeCentroid** geocoding service. The REST URL for this locator is: https://geodata.md.gov/imap/rest/services/GeocodeServices/**MD_CompositeLocatorWithZIPCodeCentroids**/GeocodeServer

MD Composite Locator Table Syntax

The following sections describe how to structure your input data based on the type of location you are trying to geocode. Location types include street address, intersection, place name, highway exit/mile marker, and a combination of location types.

Street Address

If geocoding street address data, the input table must contain a complete address field (e.g., 100 State Cir) and preferably a ZIP code or city field. The specific title of the fields is not important, as long as the field containing the address is selected for the **Street or Intersection** input. Similarly, the field containing the ZIP code information should be selected for the **ZIP Code** input. If there is a field that stores city, it can be used for the **City or Placename** input.

Note: When the **MD_CompositeLocator** is used, the results may have unmatched records. When the **MD_CompositeLocatorWithZIPCodeCentroids** is used, any unmatched results may be assigned to the ZIP code centroid (geographic center).

Intersection

If geocoding intersections, intersection format should match one of the options below. The specific title of the field is not important, as long as the field containing the intersection is selected for the **Street or Intersection** input.

- **York Rd @ Burke Ave**
- **York Rd & Burke Ave**

Note: Intersections are located based on the centerline locator. Location identification will not improve with ZIP code information.

Place Name

When geocoding place names, points of interest, or municipalities, the name of the feature must be in a single field with no other ancillary information. For example, **Camden Yards** should be entered *without* a ZIP code, city, or address. The specific title of the field is not important, as long as the field containing the intersection is selected for the **Street or Intersection** input.

Highway Exit/Mile Marker

When geocoding highway exits and mile markers, the exit or mile maker name must be in a single field with no other ancillary information. The specific title of the fields is not important, as long as the field containing the highway exit or mile marker is selected for the **Street or Intersection** input. Format for the highway exit or mile marker input should match one of the options below.

- Mile markers format should match **I 70 Mile Marker 68** or **I-70 Mile Marker 68**
- Highway exits format should match **I 83 Exit 27** or **I-83 Exit 27**

Note: When geocoding a table with highway exits and mile markers, use the **MD_CompositeLocator**.

Combination of Features

You can supply an input table that contains a combination of any of the feature types discussed above. The entries must conform to the syntax explained for each feature. For example, if the table contains points of interest and street addresses, the information for these features must be contained in the same field. This field must be selected for the **Street or Intersection** input.

Note: Street addresses require a ZIP code field, but place names do not. It is recommended that you use the **MD_CompositeLocator**.

Prepare the Table

Excel spreadsheets, CSVs and TXT files can be added to ArcGIS Pro for geocoding. Prior to adding your table, use the steps below to prepare it.

1. Format the table using the tips below:
   - Every column must have a header (field name) that appears on the first row, starts with a letter, and does not exceed 64 characters.
   - Field names also cannot contain spaces or special characters. Use underscores as a substitute for spaces.
   - Do not merge cells.
   - Table should contain field names and data only.
   - Ensure that numeric fields are formatted as numbers. Field names should be formatted as text.
   - If the table has multiple sheets, rename the sheets to help keep things clear and organized.
   - Excel file names cannot contain spaces or special characters when saving the table.

- If you are not able to add the Excel sheet, you may need to install a driver from the Microsoft Download Center, or convert your Excel to a CSV. See [Work with Microsoft Excel files in ArcGIS Pro](#) for more information.

2. Format address/location information as follows:
   - Street number and street name should be stored in the same field (e.g., 100 State Cir).
   - Note that any records without a street address may be mapped to the ZIP code centroid.
   - If you need to store building, suite, or unit number, it is ideal to store that in a separate field. This field will <u>not</u> be utilized by the locator.
   - Fields containing additional information such as unit number or contact can remain in the spreadsheet. These will be included in the geocoded result.

| Name	Address	City	State	Zip
WESTERN MARYLAND REGIONAL MEDICAL CENTER	12500 WILLOWBROOK ROAD	CUMBERLAND	MD	21502
ANNE ARUNDEL MEDICAL CENTER	2001 MEDICAL PARKWAY	ANNAPOLIS	MD	21401
UNIVERSITY OF MD BALTO WASHINGTON MEDICAL CENTER	301 HOSPITAL DRIVE	GLEN BURNIE	MD	21061
BON SECOURS HOSPITAL	2000 W BALTIMORE STREET	BALTIMORE	MD	21223
JOHNS HOPKINS BAYVIEW MEDICAL CENTER	4940 EASTERN AVENUE	BALTIMORE	MD	21224
JOHNS HOPKINS HOSPITAL, THE	600 NORTH WOLFE STREET	BALTIMORE	MD	21287
MEDSTAR GOOD SAMARITAN HOSPITAL	5601 LOCH RAVEN BOULEVARD	BALTIMORE	MD	21239
MEDSTAR UNION MEMORIAL HOSPITAL	201 EAST UNIVERSITY PARKWAY	BALTIMORE	MD	21218
MERCY MEDICAL CENTER INC	301 SAINT PAUL PLACE	BALTIMORE	MD	21202

Add Geocoding Service to ArcGIS Pro

1. In ArcGIS Pro, open a new project or an existing project. Follow the instructions for **How to Add Web Services in ArcGIS Pro** to establish a connection to the MD iMAP server.

2. Once connected, expand the **Servers** folder in the Catalog Pane. Expand **services on geodata.md.gov.ags**. Expand **GeocodeServices**.

3. Right-click **MD_CompositeLocator** and select **Add to Project**.

4. Once the locator has been added to your project, you will see it in the **Locators** folder in the Catalog Pane.
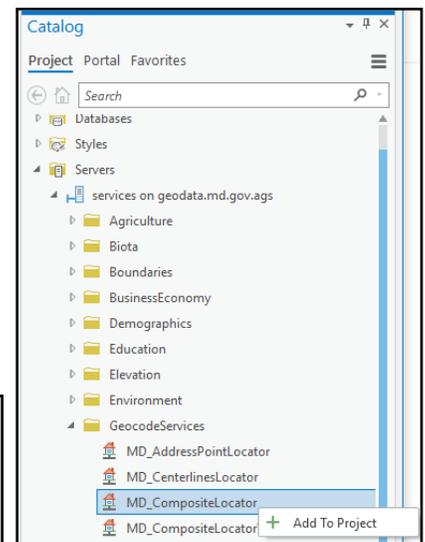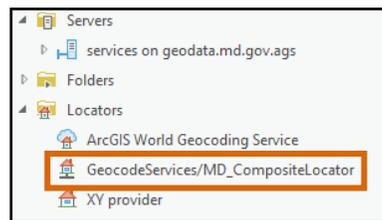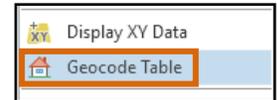
Geocode Table

1. Add the non-spatial table to ArcGIS Pro.
   a. To connect Pro to data on your local machine or a shared drive, a folder connection must be created. Use **Add Folder** on the Insert tab of the ribbon to create a saved folder connection.
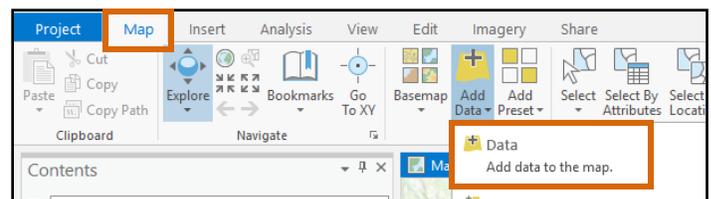
   b. On the ribbon, click the **Map** tab. Click **Add Data**, then **Data**. Navigate to the spreadsheet or table you wish to geocode. Select the spreadsheet and click **OK**. The table will be added to the Contents pane under Standalone Tables.

2. Open the table's **Attribute Table** to ensure all columns and rows were included.

3. Right-click the table to geocode in the Contents Pane in Pro. Select **Geocode Table**.

4. The Geocode Table geoprocessing pane will open. To begin stepping through the instructions for geocoding, click Start.
   a. Step One: Select the correct input table and choose whether the table's address information is in **More than one field** or **One field**.

   b. Step Two: Select **GeocodeServices/MD_CompositeLocator** as the Input Locator. This is the locator that was added to the Pro project.

   c. Step Three: Map the fields in the table to the fields the geocoder needs to match addresses.

   d. Step Four: Save geocoded output.

   e. Step Five: Review inputs and click **Run**.

Troubleshooting

- If the geocode fails, try geocoding the table again. If issues persist, remove the table and save the project. Close ArcGIS Pro entirely. Open the project, add the table, and geocode again.
- Check the MD iMAP server health for operational status.
- Review the steps from the MD Composite Locator Table Syntax and Prepare the Table sections of this document for how to structure and format your input table.
- If you are not able to add the Excel sheet, you may need to install a driver from the Microsoft Download Center, or convert your Excel to a CSV. See Work with Microsoft Excel files in ArcGIS Pro for more information.
- If the table is large, try importing it into a geodatabase first for better performance. To do this:
  a. Create a new geodatabase (right-click folder connection > New > File Geodatabase) or use existing geodatabase.
  b. Right-click the geodatabase > **Import** > **Table**
  c. Browse to the table and fill in an output name to load the table into the geodatabase.
  d. Once loaded, ensure that all fields and records from the original spreadsheet were included.

Rematch Addresses

The Rematch Addresses pane allows users to review matches and correct unmatched input addresses. A few common reasons for unmatched addresses include:
- Incorrect or transposed digits in ZIP code
- Incorrect spelling of street or city
- Incorrect street suffix
- Presence of a suite number or apartment unit in the street or intersection
- Use of PO box in the street or intersection field

1. A **Geocoding Completed** pop-up will appear indicating the number of addresses that were matched, unmatched, and tied. Click **Yes** to start the rematch process to match unmatched address and review other matches.
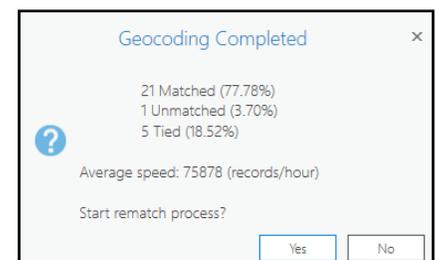
2. The **Rematch Addresses** pane contains:
   - Tabs for reviewing Unmatched, Matched, and Tied results.
   - The top half of the pane represents the information from the input table.
   - The bottom half represents the potential candidates the geocoder has found based on the input information.

Note: If the Rematch Addresses pane does not appear or has been closed, right-click the geocoded layer. Click **Data** and select **Rematch Addresses**.

3. If you have unmatched addresses, edit address information in the top half of the Rematch Addresses pane to update the list of potential match candidates. After making edits to the text, hit the **Tab** key and then **Apply** to refresh the candidate list.

   You can use the following strategy to try to find matches:
   - Correct errors in the street name, ZIP code or city.
   - Remove the ZIP code or city and refresh the candidate list.
   - Remove the street suffix and refresh the candidate list.

4. Review the locations and match scores of the candidates.

5. To match to one of the candidates, select an address from the candidate list and click the green check ✔ to match the address.

6. The Rematch Addresses pane will automatically move to the next unmatched address.

7. If you are unable to find a suitable candidate, try searching the address in another source. The location can be placed manually on the map by using **Pick Address from Map**.

   - In the **Map** tab of the ribbon, click **Locate** to search for the address using the ArcGIS World Geocoding Service.
   - Try searching the address in Google Maps.

8. After rematching the unmatched addresses, review the matched and tied addresses to ensure that the results are acceptable.