New Jersey Geocoding Service

*Questions about this document can be directed to njgin@oit.state.nj.us

NJ_Geocode Service URL:

https://geo.nj.gov/arcgis/rest/services/Tasks/NJ_Geocode/GeocodeServer

Purpose:

To provide a single, comprehensive, statewide geocoding service that meets the needs of the New Jersey GIS community. It is regularly updated with address information from NJ Office of GIS (NJOGIS) address points and road centerlines data. The service can be used within ArcMap, ArcGIS Pro, ArcGIS Online or integrated into custom web applications. It supports complex geocoding capabilities such as interactive search, batch geocoding and reverse geocoding.

Outline:

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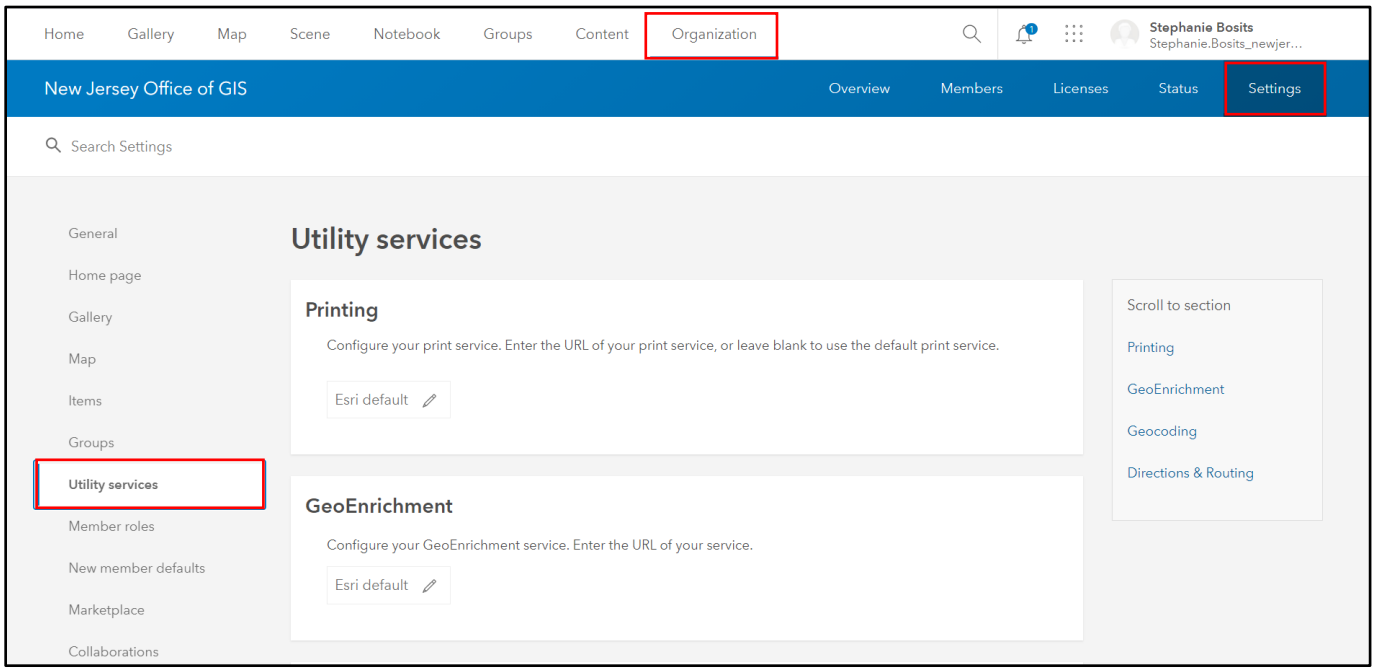
1. Adding the service to an ArcGIS Online organization:

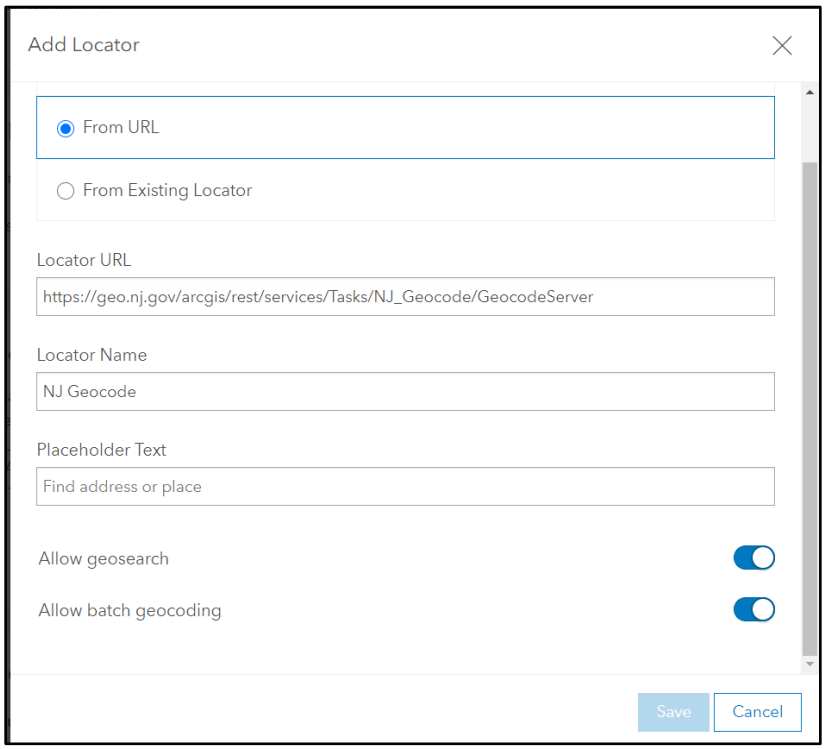
- Once a locator is defined it can be accessed by all members of an organization.
- Log into ArcGIS Online and click the Organization tab at the top followed by the settings tab. Click Utility services on the left and scroll down to the Geocoding Section.



- Click the Add button and choose “From URL.”

- Enter the above service URL in the “Locator URL” box:

- The locator will now be available as a search source in web maps and can be configured as a search source for application widgets. It will also be available in ArcGIS Pro.



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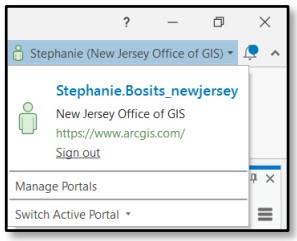
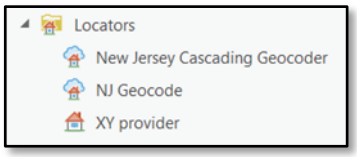
2. Using the locator in ArcGIS Pro

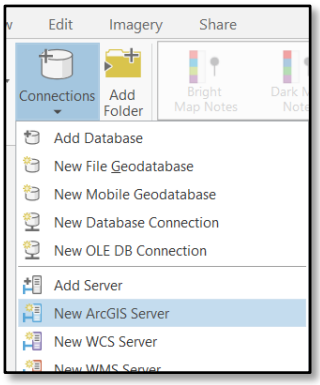
Adding the service:

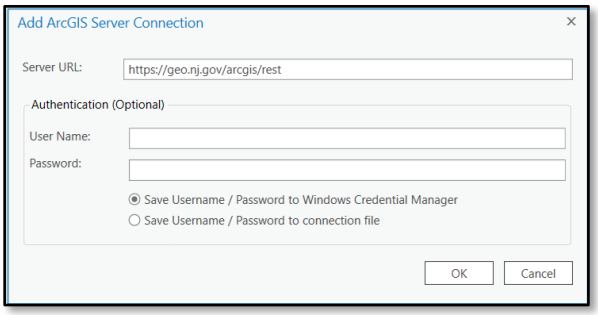
- If the locator has already been added to an ArcGIS Online organization, setting the organization as the active portal in ArcGIS Pro will make the service automatically available in all projects.



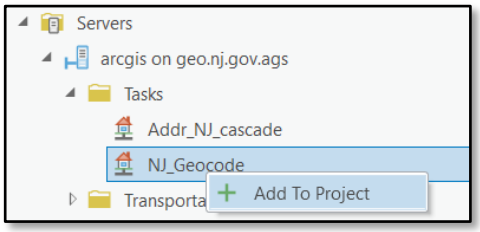


- Otherwise, follow the steps below:
  - From the “Insert tab” go to “Connections” and choose “New ArcGIS Server Connection.”
  - Enter the following server URL: https://geo.nj.gov/arcgis/rest





  - From the server connection navigate to the “Tasks” folder and right-click “NJ_Geocode” then “Add to Project.”



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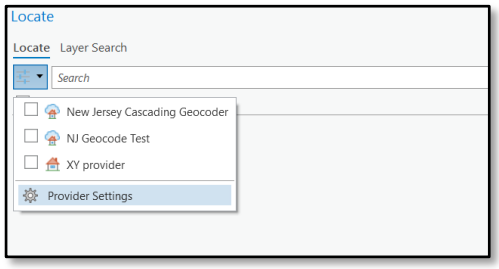
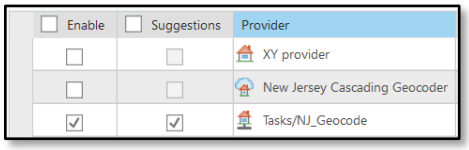
Interactive Geocoding

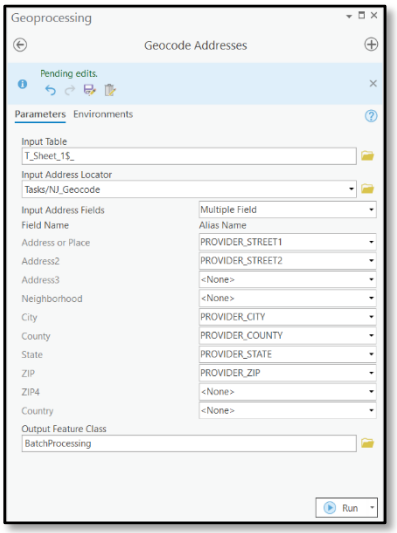
- In order to use the suggest capabilities in the locate tool, make sure that the NJ_Geocode service is enabled and that suggestions are turned on





Batch Geocoding

- Enter jurisdictional information in the city field.
- Information does not need to be entered in the neighborhood field or the country field.



Reverse Geocoding

- Use the reverse geocode geoprocessing tool to generate address locations from point features. See the feature type hierarchy table below for more information on how results are returned.
- Useful documentation from ESRI: https://developers.arcgis.com/rest/geocode/api-reference/geocoding-reverse-geocode.htm

3. Setting the service as a Default locator in ArcMap:

- By adding a default locator, the locator will always appear as an optional locator in ArcMap sessions. This must be applied on a user-by-user basis.
- Open Windows Explorer and type **%appdata%** (with the percent signs) into the address bar at the top, and it will open your user profile directory.
- From there, navigate to **ESRI\Desktop10.7\Locators.** If running a different 10.x version, use that folder name instead.
- Find **DefaultLocators.xml** in that folder.
- Save a copy of this file for backup.
- Open the DefaultLocators.xml file in a text editor, such as NotePad or NotePad++.
- Paste the following code in between the <**default_locators**> tags:

```
<locator_ref>
    <name>Tasks/NJ_Geocode</name>
    <display_name>NJOGIS NJ_Geocode</display_name>
    <workspace_properties>
     <factory_progid>esriGISClient.AGSServerConnectionFactory</factory_progid>
     <ags_connection_properties>
      <url>https://geo.nj.gov/arcgis/rest/services</url>
     </ags_connection_properties>
    </workspace_properties>
  </locator_ref>
```

- Launch ArcMap and confirm that it works. There should now be an entry for the locator as “NJOGIS NJ_Geocode” in the Find locations window and Geocoding toolbar.

4. Making REST Calls

Find Address Candidates - Find possible address candidates for a single address

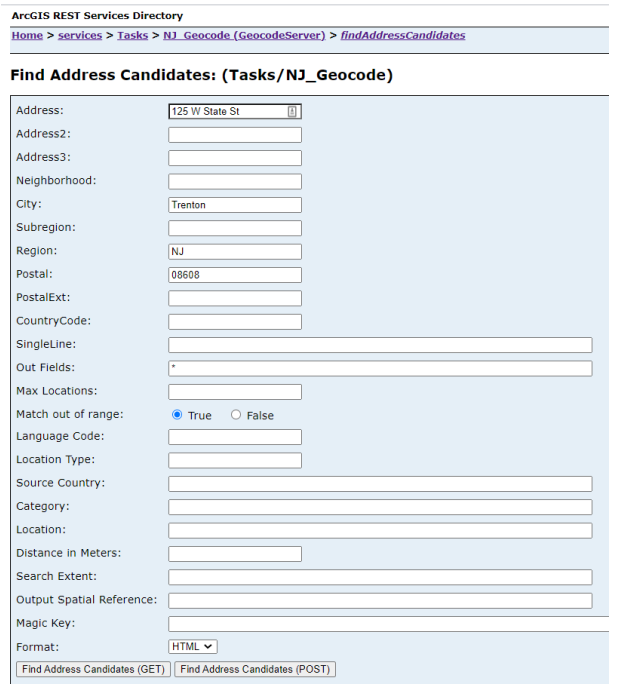
- Service URL:

https://geo.nj.gov/arcgis/rest/services/Tasks/NJ_Geocode/GeocodeServer/findAddressCandidates

- Useful documentation from ESRI -

https://developers.arcgis.com/rest/geocode/api-reference/geocoding-find-address-candidates.htm

- Enter the address with parsed address variables (Address, City, Region, Postal) or a concatenated address (SingleLine).
- Out Fields – Enter * to return all output fields
- Output Spatial Reference – By default results are returned in NJ State Plane. If Latitude/Longitude coordinates are desired, enter 4269.
- Format - Use JSON to return candidates in JSON.



Example JSON request body:

```
{
  "SingleLine":"125 W State St Trenton, NJ 08608",
  "outFields":"*",
  "outSR":"4269",
  "f":"pjson"
}
```

Searching for Road Intersections:

- Use the SingleLine parameter as input.
- At a minimum include a city or zip code after the intersection name.
- The following are acceptable intersection connectors: **& @ | and at**
- Example: "SingleLine": "Vandeventer Ave & Nassau St, Princeton, NJ 08542"

Response Information:

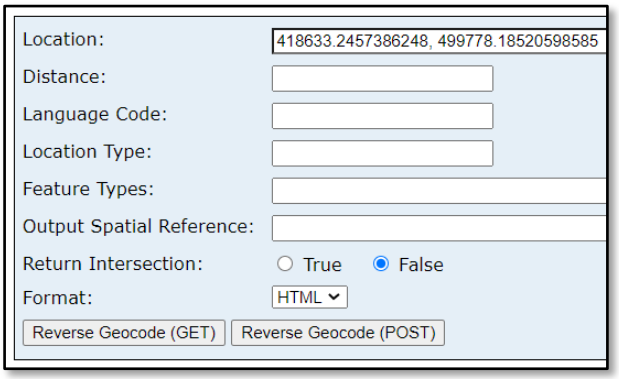
- Candidates are returned in order of scoring hierarchy.
- Score – score of the candidate (0-100). 85 is required as a minimum match score.
- See ESRI documentation for further explanation of response output fields:

https://pro.arcgis.com/en/pro-app/latest/help/data/geocoding/what-is-included-in-the-geocoded-results-.htm

Reverse Geocoding - Enter a location in x/y coordinates and receive the closest address with coordinates.

- Service URL: https://geo.nj.gov/arcgis/rest/services/Tasks/NJ_Geocode/GeocodeServer/reverseGeocode
- Useful documentation from ESRI: https://developers.arcgis.com/rest/geocode/api-reference/geocoding-reverse-geocode.htm
- See the feature type hierarchy table below for more information on search distance

- Location - Input coordinates
- Distance – No longer used, search distances defined by feature type hierarch table mentioned above
- FeatureTypes - Limits the possible match types returned by the operation, see ESRI documentation provided above.
- Output Spatial Reference – By default results are returned in NJ State Plane. If Latitude/Longitude coordinates are desired, enter 4269.
- Format - Use JSON to return candidates in JSON.



Example JSON request body:

```
{
  "location": {   "x": -74.65722696392,
                  "y": 40.350405203324,
 "spatialReference": {    "wkid": 4269     } }
  “distance”: “100”,
  "outSR":"4269",
  "f":"pjson"
}
```

Response Information

- See ESRI documentation for further explanation of response output fields:

https://pro.arcgis.com/en/pro-app/latest/help/data/geocoding/what-is-included-in-the-geocoded-results-.htm

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Geocode Addresses - Batch geocode one or many addresses at one time (up to 1,000)

- Service URL:

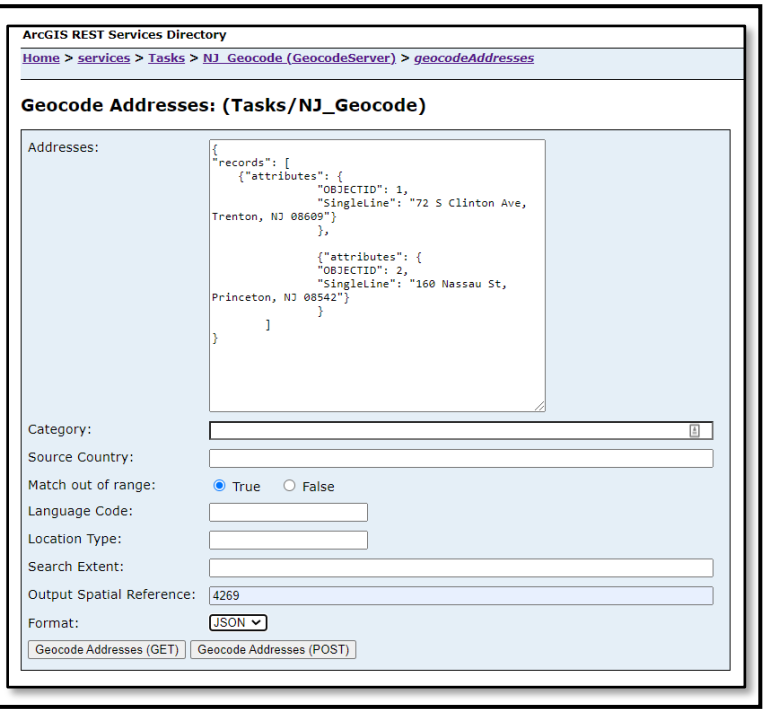
https://geo.nj.gov/arcgis/rest/services/Tasks/NJ_Geocode/GeocodeServer/geocodeAddresses

- Useful documentation from ESRI –

https://developers.arcgis.com/rest/geocode/api-reference/geocoding-geocode-addresses.htm

Note - When batch geocoding a large number of records outside of ArcMap or ArcGIS Pro, the client application must account for the maximum batch size limit by dividing the input address records into lists of 1000 or less.

- Addresses - Input address records to be geocoded.
- For each record, use either the input fields: Address, City, Region, Postal, or SingleLine for address attributes.
- Output Spatial Reference – By default results are returned in NJ State Plane. If Latitude/Longitude coordinates are desired, enter 4269.
- Format - Use JSON to return candidates in JSON.
- Optional - Use the OBJECTID attribute and pass a unique ID for each input address.



Example JSON request body:

```
{
    "records": [
                        { "attributes": { "OBJECTID": 1,
                                "SingleLine": "72 S Clinton Ave, Trenton, NJ 08609" } },
                        {"attributes": { "OBJECTID": 2,
                                "SingleLine": "160 Nassau St, Princeton, NJ 08542" } } ]
                }
      "outSR":"4269",
      "f":"pjson"
    }
```

Response Information

- All input addresses are returned regardless of whether they have matched.
- See ESRI documentation for further explanation of response output fields:
  https://pro.arcgis.com/en/pro-app/latest/help/data/geocoding/what-is-included-in-the-geocoded-results-.htm

5. Using the ArcGIS API for Python

See the following ArcGIS Online Notebook example that demonstrates how to establish a geocode object via service URL, find address candidates in single-line or multi-line format, batch geocode, and reverse geocode

```
# Import the necessary modules
from arcgis.geocoding import Geocoder, geocode, batch_geocode, reverse_geocode
# Establish the geocode object via URL
geocoder_url = 'https://geo.nj.gov/arcgis/rest/services/Tasks/NJ_Geocode/GeocodeServer'
ogis_geocoder = Geocoder(geocoder_url)
print(ogis_geocoder)
```

```
# Find address candidates in single line format
single_line = "200 Riverview Plaza, Trenton, NJ, 08611"
results = geocode(single_line, geocoder = ogis_geocoder)
```

```
# Find address candidates in multi line format
multi_line = {"Address": "200 Riverview Plaza", "City": "Trenton", "State": "NJ", "Postal": "08611"}
results = geocode(multi_line, geocoder = ogis_geocoder)
```

```
# Batch Geocode Addresses
addresses = ["200 Riverview Plaza, Trenton, NJ, 08611",
             "401 East State Street, Trenton, NJ, 08625"]
results = batch_geocode(addresses, geocoder = ogis_geocoder)
```

```
reverse_geocode({'x': 418317.507545, 'y': 500203.405041}, geocoder = ogis_geocoder)
```

ArcGIS Python API Resources:
https://developers.arcgis.com/python/api-reference/arcgis.geocoding.html

https://developers.arcgis.com/python/guide/part6-working-with-custom-geocoders/

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Feature Type Hierarchy

Feature Type	Search Tolerance	Comments
StreetInt	10 meters	Intersections are only returned when featureTypes=StreetInt is included in the request.
StreetAddress (near), DistanceMarker, or StreetName	3 meters	Candidates of type StreetName are only returned if featureTypes=StreetName is included in the request.
POI centroid	25 meters	A business or landmark that can be represented by a point.
Subaddress	10 meters	Subaddress candidates, which can be features like apartments or floors in a building, are not returned if multiple subaddresses exist at the same X/Y location and one of the following conditions is met: 1.The subaddress units cannot be collapsed into a contiguous range. 2. The subaddresses have different street address, postal code, or administrative zone values.
PointAddress	50 meters	A PointAddress match is not returned if it is on the opposite side of the street as the input location, even if it is within 50 meters of the location.
StreetAddress (distant), DistanceMarker, or StreetName	100 meters	Candidates of type StreetName are only returned if featureTypes=StreetName is included in the request.