Flow Data App Development Requirements

Required installations:

* Visual Studio 2022 (17.4.2 or newer)
* Visual Studio Code
  + Extensions: Python, Pylance, Python Debugger, Thunder Client
* Python 3.10.4 64-bit (or newer)
* Anaconda3
* Pyinstaller (newest)
* Node.js 16.20.2 (or newer)

Program breakdown and issues:

* The purpose of this program is to be able to pull data from both NWM archives as well as USGS archives for past information on river catchments and stream gauges respectively.
* The program is launched through Visual Studio 2022 and within windows forms.
* C# tested in Visual Studio 2022, Python tested in command prompt and with thunder client, HTML and JavaScript tested in browser.
* Current unresolved issues:
  + Gauge is not fully functional:
    - Data does not currently download from USGS, and unable to determine why.
    - Data is not output into a DataGridView table within the application itself such as with comid.
    - Gauge existence is not properly checked in C# before code attempts to find data for it.
  + Comid data retrieval is very slow due to the python exe that pulls data taking long lengths of time.
    - Time length might be based on overall computer performance and specification, but unknown without testing.
    - Possible solutions:
      * Determine how to run the python file from with the C#, maybe IronPython addon in Visual Studio Code or another method.
      * Determine how to make the .exe execute the data pull quicker.
      * Perhaps attempt pulling from NetCDF files instead of Zarr to test data retrieval time difference.
  + Leaflet map is little slow to load on startup due to number of markers placed from the local file.
    - Leaflet.js is not optimized well for large numbers of markers. Marker clusters significantly speeds up loading times and removes freezing when zooming or panning, however, it does not fix the beginning loading time of about 10-15 seconds for the map to render.
    - Possible solutions:
      * Determine how to speed up the loading time for the leaflet application.
      * Add a loading screen for the application’s startup to allow the leaflet map to render before the user can begin using the program.
  + Class Library is currently unused in all regards, and I have not heard anything about or when it should be used or if it is still needed.