Example Flowchart Description, and Analysis Output
The example flowchart provided on the course website is intended to help you think through the processing for your project. Note that key steps are included, but you may need additional steps, e.g., additional operations may be required for variants of the identify and recode steps.

Data layers are depicted as rectangles, operations as ovals. Input data are shown with brown borders, approximately the data you've developed over the first 8 weeks of class, with the exception of the rainfall layer. This is simply a layer encompassing your study area and with an attribute that is the amount of rainfall for one of your storm events. As such, you'll actually have three rainfall layers, and the flowchart just illustrates one of the runs. You'll have to do a similar analysis for each rainfall level, substituting an appropriate rainfall layer into each analysis. Remember to convert the rainfall data to appropriate metric units, here meters, because you'll be reporting your output in cubic meters of water per grate.

The flowchart was built under the assumption the buildings, soils, and canopy extent data are vector polygons layers, and the target grates layer is a vector point layer. This grates layer is a subset of those on campus, and we assume all surface area in the upstream watersheds drains to these grates, either directly, or through entering another grate which is connected via pipes to this grate. You don't need to calculate runoff for individual grates other than those provided in the final data package by the instructor.

The DEM and the Rainfall data are assumed to be raster data layers in this depiction.

This flowchart assumes you will eventually convert the vector data, after processing, to raster data, before the combination steps shown in the right-most processing stream. The vector to raster conversions are noted with asterisks (*) within the late processing steps for the surface absorption and canopy interception layers. The explicit conversion step is not shown to save space, it simply would be another operation (vector to raster) and layer (e.g., raster Canopy interception) in the processing flow.

Note you don't have to conduct the analysis in raster. If conducting in vector, then you would create a vector rainfall layer, and you would convert the watersheds to vector polygons from the raster watershed delineation. You would then union the layers in the rightmost column of the flowchart, creating a table for the various combinations of canopy interception and surface absorption within your study area. You would subtract these from rainfall, calculate area and then runoff volumes for each runoff polygon, and then sum over the polygons that are in each watershed.

Once you have the surface water volume delivered to each grate/sink, you may export the surface water per grate/sink to a table.

You will have to further develop your flowchart, adding details for the processing steps.

You will then execute the analysis in the flow chart several times, first for storms without any modification (1" and 2" for everyone, 5295 students do additional rainfall levels).

For each rainfall level, you will record the runoff for each pourpoint/grate/watershed, under current conditions, into your tables.

You will then modify the landscape in a way to reduce the runoff to zero for each of your rainfall levels, e.g., you will add canopy, perhaps change deciduous trees to conifers, add rain gardens, convert roads and parking lots to pervious pavement, add green roofs, and add underground storage.

This means you'll change your spatial data for each layer, and then use these as new inputs, and apply the analysis steps in your flowchart again.

You need to turn in both a set of output tables contained in a report, and the modified data layers for each of your rainfall amounts that you mitigate. The course website describes the data formats, in week 15

The problem description document distributed in the first week of class lists the requirements for your output tables. You should organize your output table in order by the unique ID for each storm sewer grate, corresponding to its watershed ID, with this ID listed first in the runoff volume table. The table will thus have a row for each grate, the volume runoff at that grate/pourpoint, and the cost for modifications.

Note that you may have to break the tables up if a single table will be too large to fit on a page, for example, you may have data for a 1" storm on one page, and a 2" storm on another.