



Welcome to the UC Davis Extension
Center for Water and Land Use

Stormwater Runoff Volume Calculator

Designed in conjunction with the California State Water Resources Control Board, Storm Water Division, this Storm Water Volume Calculator was developed to give you a rough estimate of the stormwater runoff generated by sites located within California pre- and post-project development. It will also aid you in determining the amount, size and type of Alternative Storm Water Management System (ASWMS) needed to reduce the amount of post-development runoff.

Note: This calculator is not a substitute for calculations done by certified professionals. It is merely a tool for non-engineers to use to understand the storm water requirements of a site.

Program requirements

- Microsoft Excel 97 or higher
- Microsoft Excel 98 Macintosh Edition or higher

Using the calculator

Main Page (Volume Calculator):

- The first tab is the “Main Page” of the calculator. All other spreadsheets tie back to that page.
- Data can only be entered in the gold and peach colored cells. A variety of options are available for data entry including fill in the blank, drop-down menus, and radio buttons.

Step 1: Select a county

- Select the county where the project is located. To select a county, use the drop down menu. Selecting the county allows the calculator to determine rainfall based on the average 85th percentile rainfall event. This data is derived from 30 to 50 year rainfall events collected by CalTrans.

Step 2: Select the soil type:

- Select the soil type that best describes the predominate soil type for the area under consideration. A brief description is provided in the green box to the left of the soil type to help guide you in your selection. If a Geo-Technical report is available for the project, reference that. Alternatively, visit the USGS website (<http://websoilsurvey.nrcs.usda.gov/app/>), click on the green dot in the center of the page marked “Start SSW” to begin the process.

Steps 3 and 4: Select an existing/proposed land use:

- Select the land use type that most closely matches the current and proposed land use type.

Step 5: Total Project Area

- Determine the total area of the project, either in square feet or in acres and record it here.

Note: If both fields are filled in and the areas conflict, the calculator will automatically use the square feet value for the calculations.

Step 6: Sub-watershed area

- Determine the area of the portion of the project you will be calculating values. You will need to divide the site by sub-watershed or sub-basin, and run the calculation for each of the sub areas.
- What is a sub-watershed (or basin)?
 - A sub-watershed is a portion of the site or watershed where all of the runoff drains to the same point. If the site has different soil types or land use designations, you should treat these different areas as sub-basins with the same soil type and land use that drains to the same point.
- When do I start dividing the project site area into multiple sub-watersheds?
 - Every project will have at least one drainage basin. The question is when to delineate the project into multiple sub-watersheds.
 - A sub-watershed becomes necessary for projects that contain more than one drainage basin, predominate soil types or land use types. If multiple drainage basins, soil types or land use types are in a project, that project must be sub-divided into enough sub-areas (or what we will call sub-watersheds) that all land within any sub-watershed has the same land use and soil type (as defined in Step 2). For an example, see the following: [Example](#)

Step 7: Sub-watershed calculations

- Fill in either square feet or acres of existing and proposed roof-top area and all non-roof-top area (parking areas, sidewalks, patios or other hard surface). Include hardscape areas that are pervious—credit will be given in the next sections.

Steps 8 and 9:

- The blue links in Steps 8 and 9 will take you to the secondary pages that pertain to various site elements capable of offsetting stormwater generated on a site.
- Not all areas in Steps 8 or 9 or in the subsequent links need to be filled in. Navigate to and fill-in appropriate fields for any site elements the project uses. For information on the secondary pages, see below.

Final results of the calculator:

- Does the project fulfill storm water requirements?

- To determine if the project fulfills the pre/post runoff goal, refer to the large box in the lower left corner of the main page. If it is red, you still need more storm water runoff volume reduction. If it is green, the calculator has estimated the project has achieved the objective.

Secondary Pages:

The Secondary Pages are a little different from the main page. Unlike the main page, all the fields do not have to be filled in—only the relevant ones. Yes/No boxes or drop-down boxes need to be filled in to get credit for that specific site-element category.

Porous pavement:

- Sites may have different types of pavement and depth of under-storage. Fill in the box(es) to reflect the type(s) of the porous pavement that apply to the site. The results are cumulative; so fill in all of the boxes that most accurately describe the pavement on site. When you are finished, click on the Return to Calculator link to go back to the main page.

Tree planting:

- Fill in only the relevant fields.

Downspout disconnection:

- All Yes/No boxes must be answered to receive credit for this section.

Impervious area disconnection:

- All Yes/No boxes must be answered in this section to receive credit for the site element. This section measures how well the site was able to break-up large impervious surfaces. Impervious area refers to any area that does not allow water to percolate into the soil. Examples of this are concrete or compacted soil (95% compaction).

Green roof:

- All Yes/No boxes must be answered to receive credit for this section.

Stream buffer:

- All Yes/No boxes must be answered to receive credit for this section. It would also be helpful to fill in the large text area for future reference which describes how the project will ensure the stream buffer is protected.

Vegetated swales:

- All Yes/No boxes must be answered to receive credit for this section.

Rain barrel/cistern:

- Answer only the total storage in gallons.

Landscaping soil quality:

- The Yes/No box and the soil type from the drop-down menu must be answered. Additionally, provide appropriate depth, length and width measurements to receive credit for this section.

Why does the Calculator have a No Editable Data page?

- This page contains several of the essential equations that run the calculator, but none that need to be edited by the user.

Return to the calculator to see if the sub-watershed is compliant.

Troubleshooting

Why is the first page so small?

- Due to the formatting constraints of Excel, in order to have a readable, functional calculator, we needed to shrink the size of the first page. To zoom, either use the toggle sliding zoom bar in the lower right-hand corner of your screen or the standard toolbar, depending on your version of Excel.

Why are some things not displaying?

- Be sure to fill in all gold fields (save either acres or square feet). Some features of the calculator don't work unless you give it a complete set of data.

Can I undo the Reset All button?

- No. Once you accept the option to reset all, every field that you filled in will be erased.

Do I have to fill in all fields on the secondary pages of the calculator?

- No. You can leave as many fields after the first page blank as you wish.

If I answer No for the Yes/No questions, do I still get credit for what they apply to?

- Sometimes. You may get partial credit.

Can I undo the Reset Page button option?

- No. Just like the Reset Workbook button on the first page, once you hit the button, you cannot undo the results.

Example:

One example project consists of a woods or forest next to a large paved parking lot. Even though all of the project area drains to one place, a

separate calculation will need to be done for the woods and the parking lot; so the project would have two sub-watersheds, one for the woods and one for the parking lot. If there were two different kinds of soil in the project, say Group B Soils and Group C Soils onsite, and both soil types were found in the woods and parking lot areas, then four sub-watersheds would need to be calculated, one for the woods with Group B Soils, one for the woods with Group C Soils, one for the parking lot with Group B soils and one for the parking lot with group C soils. This ensures that the results of the calculator will be accurate.

[Back to Step 6](#)

Disclaimer

The UC Davis Extension Center for Water and Land Use Volume Calculator was designed for non-engineers. It was created to give a general approximation of the stormwater runoff generated by sites that utilize various ASMS. The calculator is not a replacement for an engineer or other qualified professionals' evaluation, and as such, should not be used to prove compliance to state, regional or local requirements, or be relied upon for legal reasons, in any way.

This calculator gives the user a rough estimate of the total storm water runoff of a site, and the means of matching post-development runoff with pre-project runoff. This calculator is not intended to be used in substitution, or in place of actual volume calculations done to determine any legal compliance with the law. UC Davis Extension and/or the Center for Water and Land Use cannot be held liable for any and all calculations generated by this spreadsheet for any purpose.