User Defined

Rather than define one of the specific stormwater controls for which property sheets have been predefined, the user may choose to define their own stormwater control using predefined flow and pollutant calculations.

Total Volume

The Total Volume value shown in the bottom-right corner of the data form shows the volume available in the system up to the Freeboard level.

User Defined: Dimensions

The depth within the stormwater control is determined from two of the following three parameters, with the third automatically calculated based on the option selected:

- **Exceedence Level** - Represents the level (above datum) of the stormwater control above which flooding is reported. This may be the level that interacts with the ground surface or the top of an embankment, whichever is higher. An overflow or spillway crest level may be specified at a lower level as part of the outlet control details. If a ground model (TIN) is present the Exceedence Level will automatically be picked up from the centre of the icon or from the lowest point on the bioretention perimeter if an outline has been drawn. This combined with the Freeboard setting allows a Status of Flood Risk to be assigned to the system on the Summary. For stormwater controls on a slope the Exceedence level applies to the downstream (lowest) end. Above the Exceedence Level, water will be stored above the ground and then allowed to drain back into the network. The default ponding area used for the flooded volume is 1000m² .
- **Depth** - Represents the depth of the stormwater control.
- **Base Level** - Represents the level (above datum) of the base of the stormwater control. For structures on a slope the invert level applies to the downstream (lowest) end.

The cross sectional area of the stormwater control is then determined from the Top Area, Side Slope and Base Area. As per the depth calculation when two values are specified the third will automatically be calculated based on the option selected:

- **Top Area** - Displays the calculated surface area at the Top of the stormwater control.
- **Side Slope -** Side Slope of the stormwater control.
- **Base Area -** Defines the surface area at the base of the stormwater control.

Note: Behind the scenes the length is used along with the top and base areas to determine the cross section. if no length is specified the software has to assume the structure is circular.

Freeboard - Controls how close to the specified Exceedence Level the water must reach before the Status (on the Summary) shows Flood Risk.

Length - The maximum path length through the stormwater control, used only for the purpose of calculating Time of Travel. The Length will be automatically set from the dimensions of the stormwater control unless over typed, in which case it is set to "user specified".

Slope - Slope along the length of the stormwater control.

Void Ratio - The percentage of the stormwater control that is available for storage. This is dictated by the type of fill material that is used. I.e. 100% if empty or typically 30% for rubble.

Sizing Calculator

Stormwater Control Types

- Bioretention
- Infiltration Trench
- Pond
- Porous Paving
- Soakaway
- Swale
- Tank
- User Defined
- Stormwater Control Sizing Calculator

These systems can be customized to represent a variety of drainage or treatment facilities. Please review the description of each system to see which one would be the most convenient to use.
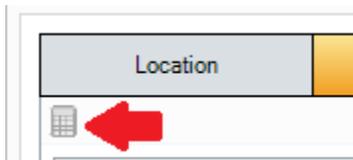
Workflow - What's next...?

Connect Inflows to your **Stormwater Control**, specify **Inlets** or **Outlets** or connect to another Stormwater Control or **Junction**.

Back to...?

- Inflows
- Analysis Criteria
- Site Ribbon

The Sizing Calculator option allows the user to re-size the Used Defined drainage system by specifying a volume and a parameter to modify to achieve that volume. The Sizing Calculator is discussed in more detail in the **Stormwater Control Sizing Calculator** section.
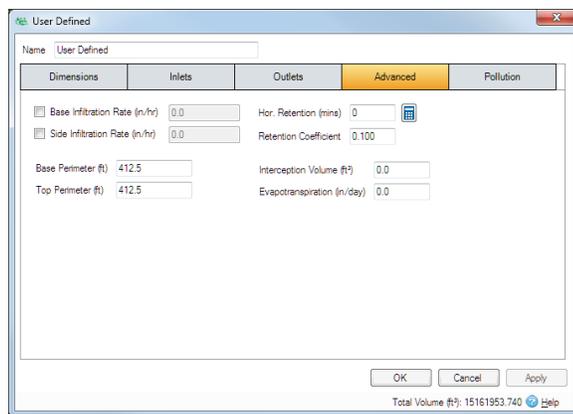
User Defined: Inlets

Explore the **Inlets** page for more details on the different types of Inlets that can be specified.

User Defined: Outlets

Explore the **Outlets** page for more details on the different types of Outlets that can be specified.

User Defined: Advanced

Base infiltration rate - Defines the rate of infiltration through the base. This should be determined from a performance site test.

Side infiltration rate - Defines the rate of infiltration through the sides. This should be determined from a performance site test.

Base Perimeter - Defines the perimeter of the base of the stormwater control. If the surface area is drawn on the Plan the field will be automatically populated based on the side slope and the Top Perimeter. It can also be overwritten to become user-defined.

Top Perimeter - Defines the perimeter at the top of the stormwater control (exceedence level). If the surface area is drawn on the Plan the field will be automatically populated but can be overwritten to become user-defined.

Horizontal Retention - Specifies the time for water to pass from the inlet to the outlet in the horizontal direction. This is used in the Analysis of SWC/Junctions method to calculate velocity, flow and volume for each timestep.The value can be calculated based on the dimensions of the system in several ways:

- **Manning's equation** - The software can determine the retention time based on the dimensions will be used to determine the travel time using the Manning's equation. To do this a Manning's n value must first be specified on the calculator. The calculated velocity will then be applied to the Length of the system to determine the retention time.
- **User Specified** - If the retention time is a know value it can simply be entered into the field to bypass any calculations.

Retention Coefficient - Analysis of SWC/Junctions attenuation coefficient – scalar value between 0.1 and 0.5. This will be calculated automatically from the dimensions of the system using Musikingum-Cunge . Alternatively the value can be entered by the user if known to bypass any calculations.

Interception Volume - The volume of water that enters the stormwater control that is permanently held within it. Once full it can be emptied by evapotranspiration only.

Evapotranspiration - The amount of water lost to the environment due to evaporation, transpiration and evapotranspiration. Used by the software during analysis. First the evapotranspiration removes water held in the swale, then it removes water from the interception storage volume.

User Defined: Pollution

Pollution Name - Name of pollutants. This is populated based on the Pollutants set up as part of the Site Data.

Background Concentration - Value below which the pollution concentration cannot fall during analysis. When concentration reaches this level, no further removal occurs.

Removal Method - Percentage Removal or First Order Decay method can be chosen. Click on the links for more information about each method.

Percentage Removal - Available if Percentage Removal entered. The value entered will be deducted from the Inflow into the system.

 - The decay time constant or (mean) lifetime of the pollutant. It can be entered manually or calculated from the decay constant or decay half-life. See Pollutant Removal Method - First Order Decay for more details.

Back To Top

- User Defined: Dimensions
- Sizing Calculator
- User Defined: Inlets
- User Defined: Outlets
- User Defined: Advanced
- User Defined: Pollution