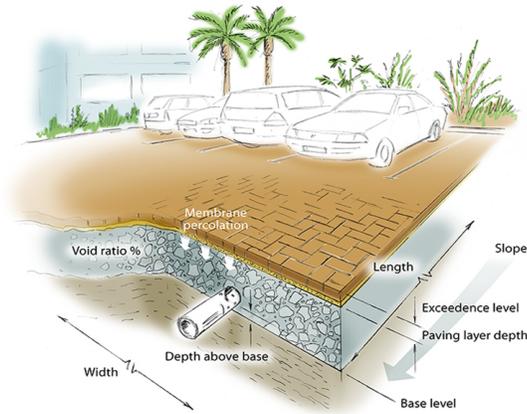


Porous Paving

Porous paving stormwater controls may be used to model a range of stormwater controls including, but not limited to porous paving, permeable paving, permeable surfaces (e.g. tarmac), permeable interlocking paving, all with and without underdrain pipes.



[Back to: Help Documentation](#)



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.

Porous Paving: Dimensions

| Dimensions | Inlets | Outlets | Advanced | Pollution |
|------------------------------|--------|--------------------------------------|------------------------|-----------|
| Sizing Calculator | | | | |
| Exceedence Level (ft) | 1859.5 | <input type="checkbox"/> Under Drain | Height Above Base (ft) | 0.0 |
| Depth (ft) | 1859.5 | Diameter (in) | No. of Barrels | 0 |
| Base Level (ft) | 0.0 | Manning's n | Release Height (ft) | 0.0 |
| Paving Layer Depth (in) | 0.0 | | | |
| Membrane Percolation (in/hr) | 0.0 | | | |
| Void Ratio (%) | 0 | | | |
| Length (ft) | 302.6 | | | |
| Slope (ft/ft) | 0.00 | | | |
| Width (ft) | 177.3 | | | |

OK Cancel Apply

Total Volume #?: 0.000 Help

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 area 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.

Paving Layer Depth - The depth of the paving blocks at the top of the stormwater control. This depth will be excluded from the available volume calculations.

Membrane Percolation - The rate at which water can pass through the membrane under the paving and into the storage available.

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](#)

Void Ratio - The percentage of the storage volume that is available for storage. This is dictated by the type of fill material that is used. I.e. Typically 30% for rubble.

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.

Width - The width of the stormwater control.

Under Drain: Specifies whether a pipe or conduit underdrain is present in the lowest layer of the filter area. If under drain is on the following can be specified:

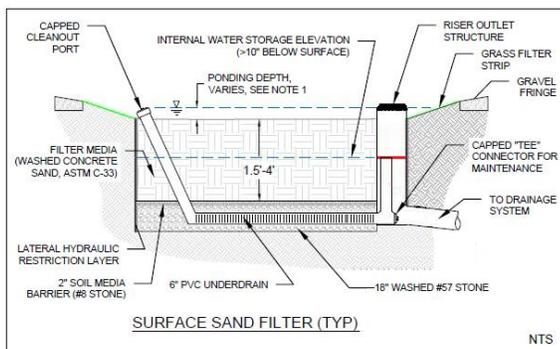
Height Above Base - Height of the invert of the pipe above the base of the system.

Diameter - Defines the diameter of the pipe/s.

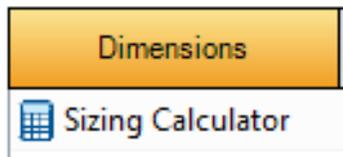
No of Barrels - Represents the number of pipes.

Manning's n - Manning's n roughness value used to calculate the velocity and therefore time of travel.

Release Height - Height above the invert of the under drain pipe at which the water is released (marked in red on the diagram below). This is commonly used to create a saturated zone.



Sizing Calculator



The Sizing Calculator option allows the user to re-size the Porous Paving 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.

Porous Paving: Inlets

Explore the [Inlets](#) page for more details on the different types of Inlets that can be specified.

Porous Paving: Outlets

Explore the [Outlets](#) page for more details on the different types of Outlets that can be specified.

Porous Paving: Advanced

Name: Porous Paving

| Dimensions | Inlets | Outlets | Advanced | Pollution |
|---|--------|-----------------------|----------|-----------|
| <input type="checkbox"/> Base Infiltration Rate (in/hr) | 0.0 | Hor. Retention (mins) | 0 | |
| <input type="checkbox"/> Side Infiltration Rate (in/hr) | 0.0 | Retention Coefficient | 0.500 | |
| Interception Volume (#) | 0.0 | | | |
| Evapotranspiration (in/day) | 0.0 | | | |

Buttons: OK, Cancel, Apply

Total Volume (#): 0.000 Help

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

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

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.

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:

- **Under Drain** - If the Under Drain is being used, its dimensions will be used to determine the travel time using the Manning's equation.
- **Hydraulic Conductivity** - Without the under drain the software can determine the retention time based on the filter rate within the system, which can be entered into the calculator. This will then be applied to the Length of the system to determine the retention time.
- **User Specified** - If the retention time is a known 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 [Muskingum-Cunge](#). Alternatively the value can be entered by the user if known to bypass any calculations.

Porous Paving: Pollution

Name: Porous Paving

| Dimensions | Inlets | Outlets | Advanced | Pollution | |
|------------|--------|----------------------|--------------------|------------------------|----------|
| | Label | Concentration (mg/L) | Method | Percentage Removal (%) | τ (mins) |
| 1 | TSS | 0.0 | Percentage Removal | 0 | 0 |
| 2 | TP | 0.0 | Percentage Removal | 0 | 0 |
| 3 | TN | 0.0 | Percentage Removal | 0 | 0 |

Buttons: OK, Cancel, Apply

Total Volume (#): 0.000 Help

Label - Name of pollutants. This is populated based on the [Pollutants](#) set up as part of the Site Data.

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

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.

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