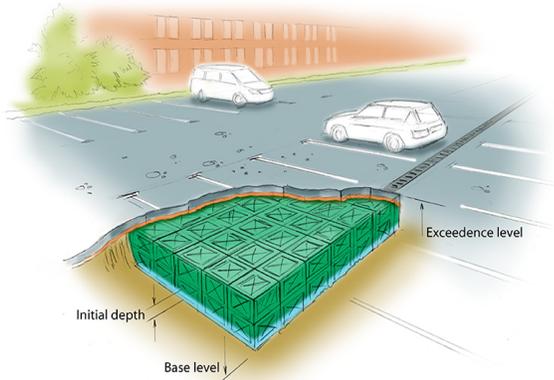# Tank

Tank stormwater controls may be used to model a range of stormwater controls including, but not limited to, tanks and municipal harvesting tanks.

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.

Tank: 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 Surface Data 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.

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

Initial Depth - Defines the initial wetted depth within the facility.

Void Ratio - Defines the percentage of the tank 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.

Section Pages

- Bioretention
- Chamber
    - Define Chamber
- 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...?

Inflows connect to either **Junctions** or **Stormwater controls** via **Inlets** . Specify an **Tank** on these objects then choose to connect to another Junction or Stormwater Control.

Depth-Area-Volume Spreadsheet

This spreadsheet specifies the circular infiltration cross-sectional area and volume for the structure at each depth. A depth of 0m corresponds to the invert level and area specified at 0m is considered to be the base of the structure. All areas above the top of the structure may be left as blank.

Above the spreadsheet is an Editable Column drop-down list box which allows the user to specify either 'Area' or 'Volume' values in the spreadsheet.

Whilst the Area at each depth specifies the circular cross-sectional area at that depth, the volume is the cumulative volume for all depths up to the depth the *next* row. If the Editable Column drop-down list box is 'Area' then the user can specify an area and the volume in the same row is calculated calculated. Conversely if 'Volume' is selected in the Editable Column drop-down list box then the user can specify a volume in a row and the area is calculated in the subsequent row (keeping the area in the same row the same). Note that in this case it is possible to specify a volume that is it too small for the area of the current row and height between the current and next rows, in which case the area will be set to -1 and a higher volume will need to be specified.

Depth Increment (m)

Enter the depth increment for the tank area spreadsheet. Small values lead to a more accurate result but limit the height of the structure.

Sizing Calculator:
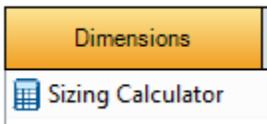
The Sizing Calculator option allows the user to re-size the Tank by specifying a volume and a parameter to modify to achieve that volume. It also allows the user to specify a Side Slope for the Tank. The Sizing Calculator is discussed in more detail in the **Stormwater Control Sizing Calculator**.

Tank: Inlets

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

Tank: Outlets

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

Tank: Advanced

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.

Perimeter - Specified whether the perimeter shape for the side infiltration calculation is to be circular or square. The default is circular.

Interception Volume - The volume of water that enters the stormwater control that is permanently held within it. *Note: this cannot be emptied as there is no evapotranspiration for tanks.*

Routing Method - provides three ways of determining the time it takes to water to travel through the system:

- **No Delay** - Water is seen as traveling through the system without any delay. This may be useful when considering systems with permanent water levels.
- **Simple Time Delay** - The horizontal Retention value can be specified, see below, to introduce a delay in water leaving the system. However the Muskingum method is Not used.
- **Muskingum** - The horizontal retention time and retention coefficient are used in the Analysis of SWC/Junctions equation to calculate velocity, flow and volume for each timestep.

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 Formula 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.
- **Colebrook-White equation** - The software can determine the retention time based on the dimensions will be used to determine the travel time using the Colebrook-White Formula equatio n. To do this a Colebrook-White roughness 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 Muskingum-Cunge . Alternatively the value can be entered by the user if known to bypass any calculations.

Tank: Pollution

Name - 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.