

How the System Works

A control panel is located in the building, usually a garage or utility room. When a toilet is flushed or a connected tap is run the pressure drop in the line triggers a signal to a submersible pump located inside the tank. This delivers rainwater to meet the demand, until the tap is turned off.

Rainwater drains from the building roof via downpipes, which are collected into a single run before entering the tank.

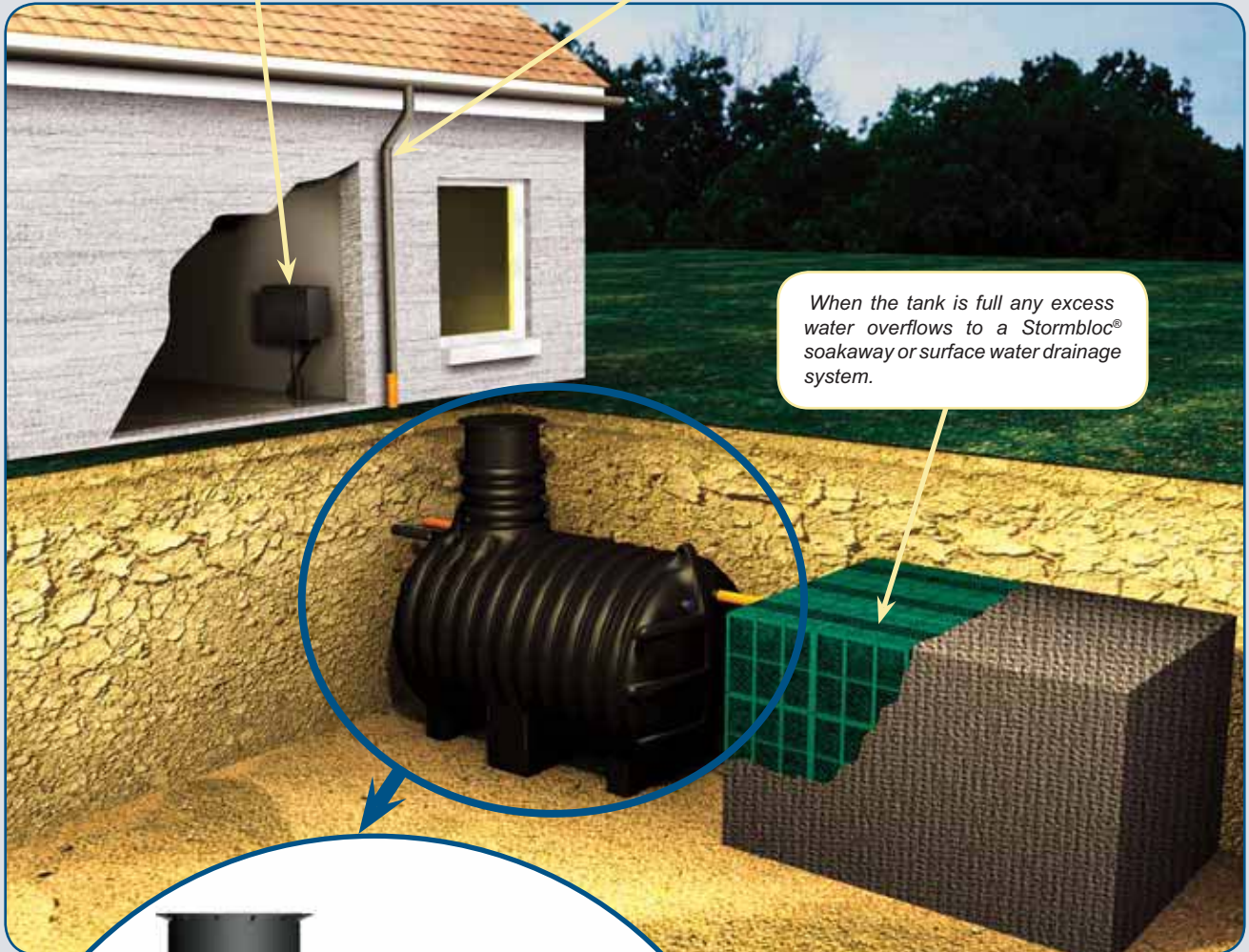


Figure 2 - System Overview

Components

The Storage Tank

The tank is manufactured in one piece from high quality LDPE, to form a watertight tank. It is supplied with an access cover, specially designed to stop ingress of water from above the tank. The cover is adjustable to meet finished levels, and is designed to keep loading away from the top of the tank. In this way the tank can be used underneath lightly trafficked driveways.



Figure 3

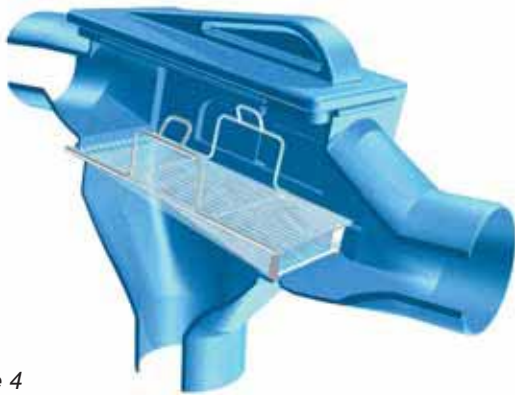


Figure 4

The Filter

The two-stage filter initially removes large debris such as leaves and then smaller particles. The filter is flushed when subjected to a significant inflow and the filtered material is ejected through the overflow to the surface water drain or soakaway.

A filter is pre-fitted to your StormBank™ tank, suitable for up to 200 m² of roof drainage. Larger filters are available on request.

The Control Panel

The control panel combines a rainwater connection from the StormBank™ tank to the supply pipework and the mains top-up supply to the tank. The operation of the pump is switched via a pump control, to supply rainwater on demand. A junction box is linked to a float switch in the tank and triggers a second solenoid valve to supply mains water to the tank at times of low rainfall.



Figure 5

The Pump

The submersible pump sits inside the tank, operating on demand from the control panel. The floated inlet filter takes only the cleanest water from just below the surface, and the float switch to monitor the water level is pre-fitted to the pump.



Figure 6

Design

A typical tank layout is shown below. There are three main connections to the tank:

- 1) The inlet from the rainwater downpipes.
- 2) The overflow to the soakaway or suitable mains drainage.
- 3) The sealed, watertight service duct between the tank and the control panel in the house.

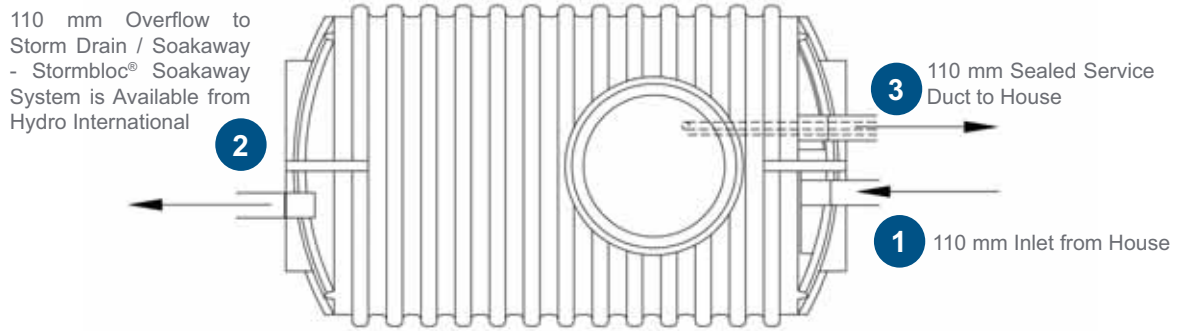


Figure 7

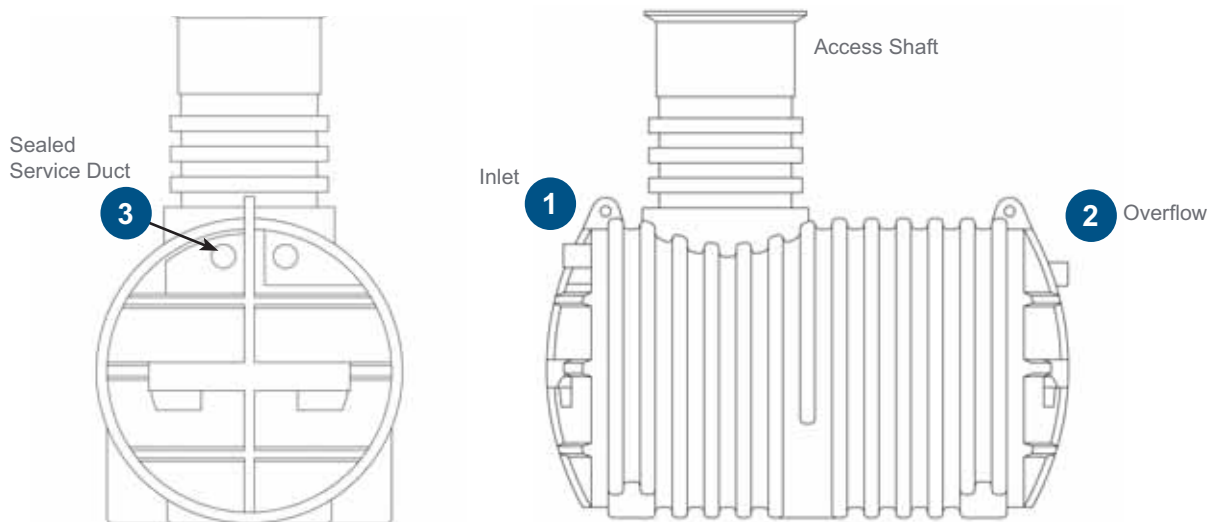


Figure 8

Tank Capacity (litres)	Length (mm)	Width (mm)	Minimum Depth from Cover to Base of Tank (mm)	Minimum Depth from Cover to Inlet Pipe Invert Level (mm)	Minimum Depth from Cover to Overflow Pipe Invert (mm)
3300	2450	1400	2370	1200	1285
5000	2458	1710	2680	1200	1285
6000	2370	2050	2760	1120	1285

Adjustable Height

The depth can easily be increased by up to 250 mm as the access shaft is telescopic - the above are minimum depths. This also allows for adjustment of the overall finished levels so that the installation is as unobtrusive as possible.

Design

When selecting the best system for your project it is important to consider all the factors that will result in a successful installation. The StormBank™ system is available with a range of tank sizes, suitable for any size of development and intended usage.

We can assess the quantity of water available for collection using a simple calculation (see right). This can be done using an annual rainfall estimate, and the overall surface area of the roof. However, not all the water falling on the roof runs into the tank; light rainfall may only wet the roof and evaporate and the filter may not allow all water to be collected, especially in peak flows. The StormBank™ system uses a very efficient cross-flow filter, with at least 90% of water collected, whilst the remaining 10% helps to clean any particles from the filter and on to the overflow. The evaporation factor can vary depending on the roof construction and material.

The water collected in your tank can be used for watering the lawn, flushing toilets, washing the car and other 'non-potable' applications, although not for personal hygiene, drinking, cooking or dish washing. Toilet flushing is by far the biggest single application - each person uses on average 50 litres/day flushing toilets.

It is important not to oversize the tank as it only increases the capital cost without providing any benefit. A well-designed system should also overflow regularly, helping to skim off any floating debris and keep the water fresh.

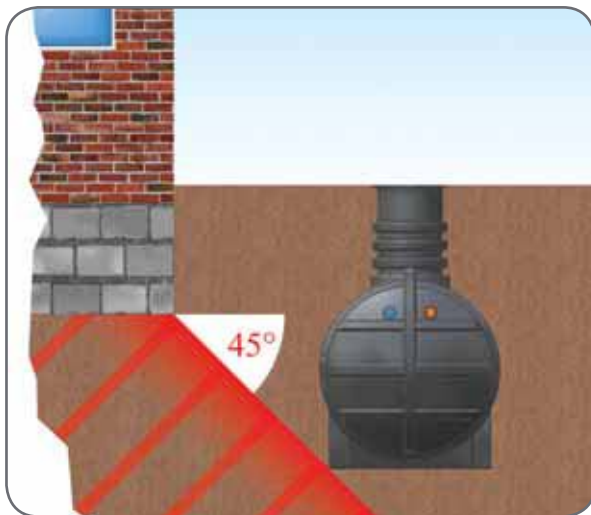


Figure 9 - Installation Close to Buildings

The tank should be installed outside of a 45 degree angle projected from the base of the foundations. This will protect the side of the tank from any undue lateral loading from the building. In general this means installation should be at least 2 m away, although this can vary with tank size. If you are in any doubt, contact Hydro International for advice.

Typical Calculation

First look at the available rainfall:

- Annual Yield (litres) = Annual Rainfall (mm) x Roof Area (m²) x Evaporation Factor* x Filter Loss Factor*
- So for a typical 3 bedroom house the yield might be:
 $800 \text{ mm} \times 120 \text{ m}^2 \times 0.9^* \times 0.9^* = 77,760 \text{ litres}$ per year.

* Where factors for reduced collection due to evaporation and filter loss are assumed to be 0.9.

Then compare this with the expected usage:

- Using the typical values for usage of:
45% x 150 litres per person per day;
a family of three could make use of up to:
73,912.5 litres of rainwater in a single year.

Sizing the Tank

The best-practice method for sizing the tank is to use 5% of the lower value, between the yield and the usage. This allows for the irregular timing of both rainfall and usage patterns without oversizing the tank. We use the lower value to ensure a balance between the two. In the example above, the total amount of water that the family could use is a little less than the water available. Taking the usage x 0.05, the best tank size would be 3695 litres.

The StormBank™ range includes a choice of tank sizes:

- 3300 litres
- 5000 litres
- 6000 litres

It can be seen that the best fit for the required size is the 3300 litre tank.

If the required storage volume exceeds 6000 litres the capacity of the system can easily be increased - either add multiple tanks with pre-fitted connections or use Hydro's Stormbloc® surrounded by an impermeable membrane.

Design Soakaway

A simple, compact, high-strength overflow soakaway can be constructed using Stormbloc®.

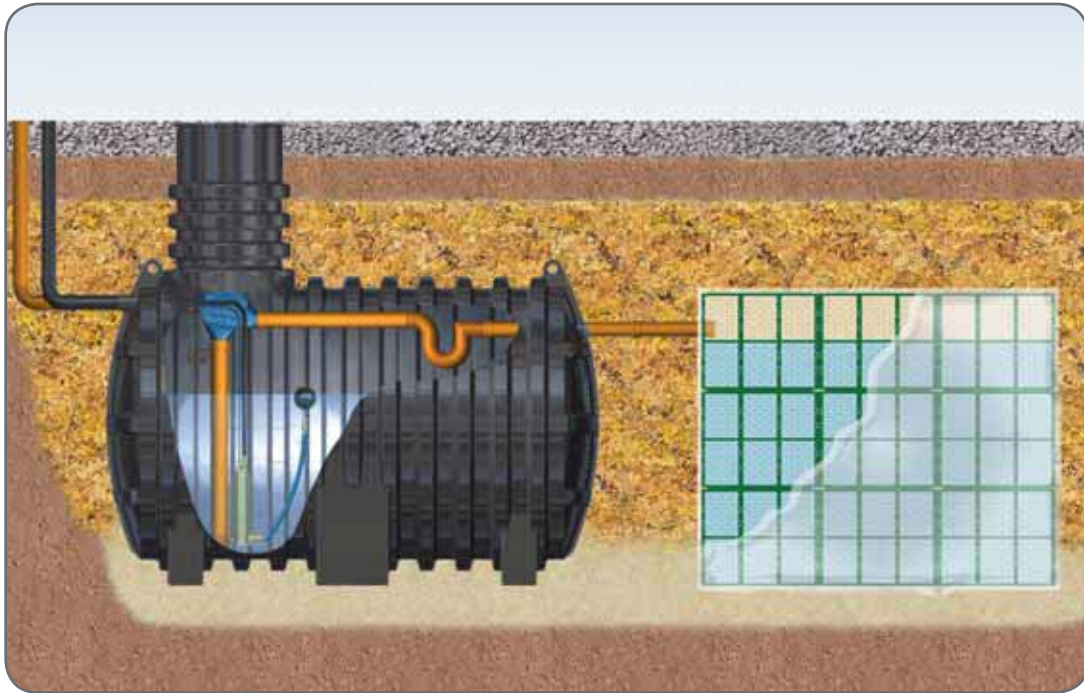


Figure 10 - StormBank™ with a Stormbloc® Soakaway

Stormbloc® is a cellular block type structure for providing below ground surface water infiltration or storage systems. The unique advantage of Stormbloc® over other 'crate' type systems is the patented inspection / maintenance tunnel through each block. This tunnel allows for inspection with CCTV cameras, maintenance and cleaning if required.

The blocks are supplied with connectors and endplates, and can be installed within a geotextile wrapping, providing a straightforward solution to the need for overflow from the StormBank™ tank.



Figure 11 - Stormbloc®

Stormbloc® Advantages

- Fully accessible for inspection and maintenance through the patented 222 mm x 570 mm tunnel within the blocks.
- High void ratio (95%) - high storage volume (an 800 mm x 800 mm x 660 mm block holds 0.401 m³ of stormwater).
- Lightweight with high strength. Strong enough to be used under trafficked areas including roads and HGV areas.
- Zero instances of failure.
- BBA certification applied for.
- Delivery - generally 1-2 weeks.
- Simple and quick to install.

Note: Stormbloc® can also be used with an impermeable membrane to extend your storage volume - contact Hydro International for further details.