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SDS GEOLight® and the Water UK Design and Construction Guide

The SDS GEOLight® tank system is specifically designed so that the stormwater passes through the central pipe for most rain events, and does not enter the tank. Only when the flow control device at the downstream end of the tank activates, does stormwater back-up into the perforated pipe and into the tank. As it passes from the pipe to the tank, it goes through a layer of geotextile and clean stone, which filters out most of the sediment and prevents it from entering the tank.

Once the storm has passed, the water passes back through the stone & geotextile, back into the pipe and away. The photo below shows the installation of an SDS GEOLight® tank, illustrating the central trench with the pipe being installed, wrapped in geotextile and surrounded by clean stone.



The SDS GEOLight® tank differs from other open-void type tanks and so the Water UK Design & Construction Guide (DCG) applies to them differently. This document describes how the Guide applies to SDS GEOLight® tanks.

1. In Clause C7.1.1 (5) the DCG states:

“Where there is any risk of sediment entering an underground tank, provision should be made for removal of the sediment.” Our GEOLight® tank was specifically designed to prevent sediment from entering the tank because we recognised the risk of sedimentation in the tank which would be very difficult to remove. The layout of the GEOLight® tank is intended to retain any solids in the central pipe so that there is no need to access the tank for sediment removal.

2. **Reducing the risk of sediment entering the tank.** During all rainfall events when the flow capacity of the flow-control device is not exceeded, the water passes from the upstream manhole along the central pipe and away without ever entering the tank. This means that for the majority of rainfall events the water never enters the tank so any sediment that persists beyond the upstream manhole may settle out in the central pipe where it can easily be removed using familiar low-pressure jetting operations.
3. **Capturing any sediment that passes out of the central pipe.** The central pipe is perforated and surrounded by a layer of geotextile and a layer of pea-gravel. This means that if the design-rainfall event occurs and the flow-control device takes effect, the water will pass out through the perforations, through the geotextile, through the stone and into the tank void space. This then allows the water to be retained during the storm event to provide flood risk management for the development. As the water passes through the geotextile and the stone, a proportion of any suspended solids in the water will be captured and will not enter the tank. Once the storm passes and the water passes back into the tank, it flushes those solids back off the face of the geotextile and into the central pipe and away. This design was specifically developed to minimise any passage of sediment into the tank void space.
4. **No access to the tank for the removal of sediment.** Because the system is designed to minimise the amount of sediment that enters the tank void space, there is never any need to access the tank to remove sediment. This means that the structural integrity of the tank is never compromised by any operatives or equipment which may damage the membrane or the tank itself, and it significantly reduces the time & cost of maintenance operations. All that is required is a camera inspection of the central pipe, and low-pressure jetting when required. The sediment that is jetted out of the central pipe can be captured in either the upstream or downstream manhole chamber and removed using a vacuum tanker. As there is no need to access the tank for maintenance operations, this allows the tank to be located under surfaces such as football pitches where vehicle access would be disruptive.
5. **The CIRIA SuDS Manual.** The SuDS Manual states that “SuDS should be designed to prevent or minimise the risk of sediment ingress into the tank systems especially geocellular and arch systems. This is because there is limited access, and it can be difficult to remove sediment build-up once it enters those type of structures.” We consider that our GEOLight® geocellular tank system satisfies this guidance because it is designed to minimise the risk of sediment ingress into the tank.

6. **Figure 21.20 of the CIRIA SuDS Manual:** the SuDS Manual states that “Sediment forebays or tunnels can also be provided within tanks, or can be combined with an upstream and downstream manhole to trap sediment in a location that is accessible. Figure 21.20 shows forebays in a geocellular construction combined with manhole construction at either end of the tank. However, these should not be considered a replacement for effective upstream treatment. The forebay should be easily accessible to clean out. This is the preferred option rather than inspection channels through the tank because the forebay should be accessible for easy visual inspection with the use of CCTV. Many manufacturers can supply specific inspection/forebay modules to incorporate into a tank.” Figure 21.20 is included below and illustrates a tank layout that is identical to that of a GEOLight® tank.

CIRIA SuDS Manual 2015

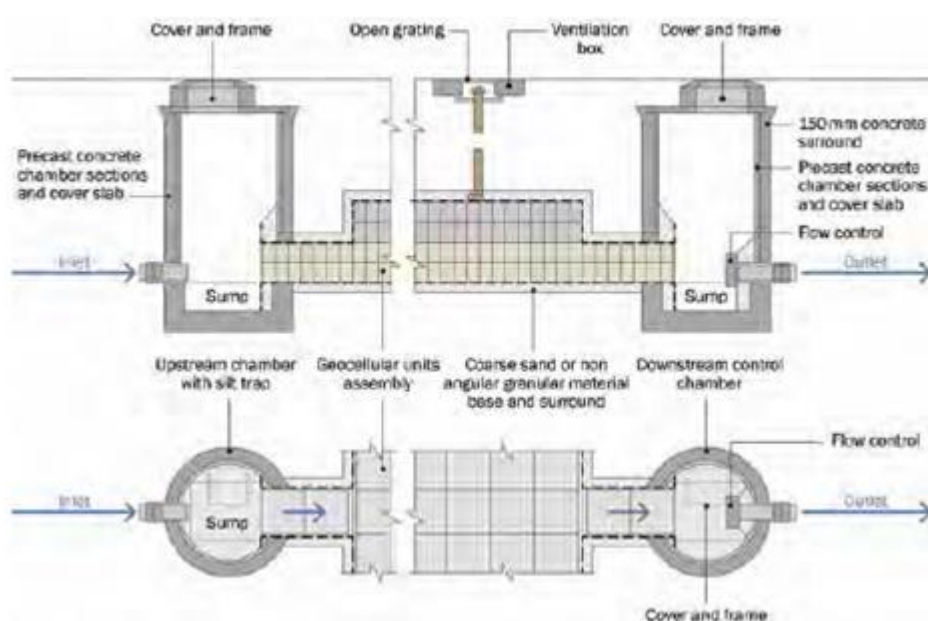


Figure 21.20 Example of sediment forebay

The GEOLight® tank is always designed with a manhole chamber upstream and this can include a sediment sump, and ideally be supplemented with an upstream vortex grit separator to capture 50% of the total suspended solids before it passes through the central pipe.

7. **Trial with Welsh Water.** We have concluded a three year trial with Welsh Water where we installed a number of GEOLight tanks with inspection ‘shafts’ at each corner of the tank. These ‘shafts’ allowed the base of the tank to be observed from above and a series of observations over a three year period revealed that no sediment build up was observed.
8. **Tank installation and warranty.** Most of our GEOLight® tanks are installed by our own installation team who are experienced in these installations. If our teams install the tank, so that we can be certain of the quality of the installation, then our GEOLight® tanks are covered by a warranty.

9. **Additional Volume for sedimentation.** The SuDS Manual states that “ it is common to provide slightly oversized tanks to allow for some volume loss over time (typically 10% extra volume by rounding up the size of a tank to form a cuboid structure, so there is no extra cost for this).” We recognise that our tank design will not **completely** eliminate all the sediment from the tank. The geotextile may allow smaller particles to pass through and into the tank void. However, we always recommend the inclusion of a vortex grit separator upstream of the tank, so the sediment load is reduced before it enters the central pipe through the tank. Further, depending on the design criteria, only a small percentage of rainfall events will cause water to pass from that central pipe into the tank, so only a small proportion of the stormwater ever enters the tank. Therefore, there is a minimal risk of sedimentation so the 10% allowance will allow for that over the design-life of the tank, so there is no need to remove that sediment from the tank as it will not compromise its flood risk management role.