
SUDs Management Plan

Storm water pipework & Road Gullies

The key maintenance requirement for the surface water drainage system includes the removal of sediments and debris from the system as required.

All storm water pipe work should be visually inspected a minimum of monthly for the first three months after installation and then a minimum of once year.

As road gullies are the first on the treatment train and susceptible to higher silt loadings, these will need to be inspected a minimum of monthly for the first three months after installation and then a minimum of every four months.

During this inspection identify any gully pots or pipes that require remedial maintenance such removal of sediment, debris, leaves and litter as required.

This involves the removal all protective covers and grids and the cleaning out of channels or gully pots by hand or with suitable jetting equipment.

During the first year of operation each gully should be inspected every 3 months, and every 6 months thereafter for structural integrity and cleaned out as required.

Permeable Block Paving

Key Maintenance Requirements:

- Sweeping
- Regular brushing and vacuuming (to be carried out by a specialist contractor)

Regular inspection and maintenance is important for the effective operation of permeable pavements and should be inspected regularly, preferably during and after heavy rainfall to check effective operation and to identify any areas of ponding.

Permeable block paving needs to be regularly cleaned of silt and other sediments to preserve infiltration capability and should have a minimum of three surface sweepings per year.

A brush and suction cleaner, which can be a lorry-mounted device or a smaller precinct sweeper, should be used and the sweeping regime should be as follows:

1. End of winter (April) – to collect winter debris.
2. Mid-summer (July/August) – to collect dust, flower and grass-type deposits.
3. After autumn leaf fall (November).

Care should be taken in adjusting vacuuming equipment to avoid removal of jointing material and any lost material should be replaced.

To ensure the continual optimal performance of the permeable paving, it is recommended that the following maintenance should be carried out. The following guidelines are offered as an initial regime, but maybe either increased or decreased depending on the local environment and any external contributing factors:

- A visual inspection of the paving may be carried out on a regular basis.
This will confirm the effectiveness of the agitation maintenance due to variations between sites and allow any refinement of the regular agitation activity if necessary.
- The paving should be agitated (e.g. brushed, vacuumed, etc.) at least twice a year.
This is to ensure no vegetation of any sort is allowed to grow and develop in the joints. Ideally, this activity should be carried out in the spring and autumn seasons.
- The paving should be inspected after any heavy precipitation to ensure no displacement of any organic matter onto the surface of the pavement.
- For winter maintenance, the controlled use of de-icing may be used without causing significant detrimental effects towards the permeable pavements performance.
When used carefully, the use of these chlorides will not result in an increase in the chloride levels in the local ground.
- Weed growth – when sedimentation occurs in areas of permeable paving then there is the potential for weed growth, this will typically occur where there are overhanging trees or soft landscaping slopes down on to the paving or in areas which do not receive over run from vehicles particularly frequently. Weeds can be removed from the surface through the controlled application of proprietary non-persistent contact herbicides.
Those containing Glyphosate are the most suitable.

Depending on the amount of usage and the environment the permeable pavement has received and been exposed to, the laying course material may require either replacement or cleaning after a 25 to 30 year period. This would be evident if the infiltration rate of the paving became prolonged, allowing ponding to develop.

Should this occur, the uplifting and cleaning (or replacing, depending on the costings of the activity) of the laying course maybe considered. The laying course material, jointing and blocks may be reused (once cleaned), minimising costs.

Driveways

Driveways & Private Roads will either be constructed as permeable block paving (outlined above) or constructed as an impervious surface drained via traditional deep trapped / yard gullies discharging into a permeable high-void aggregate sub-base layer beneath. This sub-base allows for filtration of pollutants from the runoff which is discharge to the perforated filter pipework below.

General yard gully and linear channel maintenance involves the removal of dead leaves, soil, litter from the gratings and sediments from the sump within the gully pot or channel. This involves the removal all protective covers and grids and the cleaning out of channels or gully pots by hand or with suitable jetting equipment.

During the first year of operation each gully and channel should be inspected every 3 months, and every 6 months thereafter for structural integrity and cleaned out as required.

Attenuation Basins

Key Maintenance Requirements:

- Litter/trash removal
- Inlet/outlet headwall inspection and cleaning
- Vegetation management
- Sediment monitoring and removal when required

Regular inspection and maintenance is important for the effective operation of the attenuation basin. The basin will be subject to a routine monitoring and maintenance schedule as part of the general site management. This will be carried out at intervals detailed below, and shall comprise of the following operations:

Collection and removal of all litter/large debris from the attenuation pond, inlets, outflows, and water margins once a month.

Monthly inspection of the attenuation ponds to check the following, and repair as necessary:

1. Any failure in the operation of the inlet and outlet headwalls unless adopted by others in which case they will be notified of any observed defect.
2. Any damage or erosion to the perimeter edges and slopes of the attenuation ponds.

Please see landscape management plan for further details of planting and management.

An annual check carried out by a suitably qualified person, to assess the condition and operation of the attenuation basin inlet and outflow, and the accumulation of silt/sediment.

A record of maintenance visits and remedial operations shall be maintained.

Desilting of Attenuation Basins

In addition to regular routine items, SuDS maintenance will be carried out which may include de-silting the attenuation ponds, usually on a 10-15 year cycle depending on the on-going silt level checking. This can be an intrusive operation when carried out within housing areas and prior to any planned desilting or dredging, consultation will be undertaken with both the LLFA and the Environment Agency.

Before any desilting operations are carried out, residents and members of the public in the general area will be informed and those in the immediate vicinity will be notified in writing well in advance of commencement of works.

The desilting work will be carried out under the supervision of consulting engineers and to a pre-agreed method statement. Such a method statement should be submitted in writing to the local authority and agreed in advance of the commencement of the works.

Prior to desilting works commencing, a suitably qualified ecologist shall be appointed to undertake an assessment of the ecological interest within the pond and its margins. In the event that the attenuation ponds develop particular ecological interest, then careful consideration will be given to the timing of this operation.

Hydrodynamic Vortex Separator & Filter

SDS Ltd Aqua Swirl proprietary Hydrodynamic Vortex Separator provided on the outfalls to the attenuation basin and from the access road.

Maintenance:

Long term performance of the Aqua Swirl or any other device depends on inspection and maintenance program.

Recommended schedule in line with CIRIA C753 guidance; upon hand over – 3 months -6 months -12 months and then annually or as deemed necessary from details obtain from previous inspections. Each site sediment loadings will be different and at its highest just after the build phase, hence why a more frequent visit is required at the start of the programme.

The Aqua-Swirl® has been designed to minimize and simplify the inspection and maintenance process. The single chamber system can be inspected and maintained entirely from the surface thereby eliminating the need for confined space entry. Furthermore, the entire structure (specifically, the floor) is accessible for visual inspection from the surface. There are no areas of the structure that are blocked from visual inspection or periodic cleaning. Inspection of any free- floating oil and floatable debris can be directly observed and maintained through the manhole access provided directly over the swirl chamber. Chamber system can be inspected and maintained entirely from the surface.

Inspection:

To inspect the Aqua-Swirl®, remove the manhole cover. The only tools needed to inspect the Aqua-Swirl® system are a flashlight and a measuring device such as a stadia rod or pole. Given the easy and direct accessibility provided, floating oil and debris can be observed directly from the surface.

Sediment depths can easily be determined by lowering a measuring device to the top of the sediment pile and to the surface of the water.

When the sediment pile is within 42 to 48 inches of the water surface (or sediment pile thickness is 18 to 24 inches as measured from the base), the system should be maintained. The maximum Sediment storage capacity of the Aqua-Swirl® is reached when the sediment pile is within 30 inches of the water surface (or sediment accumulation is 36 inches thick as measured from the base).

It should be noted that to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile. Keep in mind that the finer sediment at the top of the pile may offer less resistance to the measuring device than the larger particles which typically occur deeper within the sediment pile.

The Aqua-Swirl® design allows for the sediment to accumulate in a semi-conical fashion as illustrated above. That is, the depth to sediment as measured below the water surface may be less in the center of the swirl chamber; and likewise, may be greater at the edges of the swirl chamber.

Removal:

Cleaning the Aqua-Swirl® is simple and quick. Free-floating oil and floatable debris can be observed and removed directly through the 750mm service access riser provided. A vacuum truck is typically used to remove the accumulated sediment and debris. An advantage of the Aqua-Swirl® design is that the entire sediment storage area can be reached with a vacuum hose from the surface (reaching all the sides). Since there are no multiple or limited (hidden or “blind”) chambers in the Aqua-Swirl®, there are no restrictions to impede on-site maintenance tasks.

Disposal:

Sediments excavated from swales that receive runoff from residential or standard road and roof areas are generally not toxic or hazardous material and can be safely disposed of by either land application or landfilling. All removed products should be disposed of in line with local council and environmental requirements

Outfall Headwalls

Outfall headwalls should be visually inspected a minimum of monthly for the first three months after installation and then a minimum of once a year. Accumulated sediments, debris and any overgrown vegetative material should be removed from the culvert and margins of the outlet headwalls as necessary. During the inspections the general operation, and structural condition of the headwall and any erosion of banks or scour control features should be identified and rehabilitated as required.



Flow Control Chamber

The key maintenance requirement for the flow control chambers will be the inspection of the units for blockages of the vortex flow control unit and silt removal from sump of chamber.

The hydraulic vortex flow control unit has no moving parts and is self-activating, requiring minimal maintenance. After initial installation, it is recommended that the unit be inspected monthly for three months.

Thereafter the manhole chamber and control device should be inspected at least every six months to verify the condition and operation of the unit and check for blockages within the inlet of the chamber and of the flow control device. During these inspections, accumulated silts should be removed and the sump cleaned out using a conventional sump vacuum cleaner. Flow Controls are fitted with a pivoting by-pass door, which allows the manhole chamber to be drained down should blockages occur.