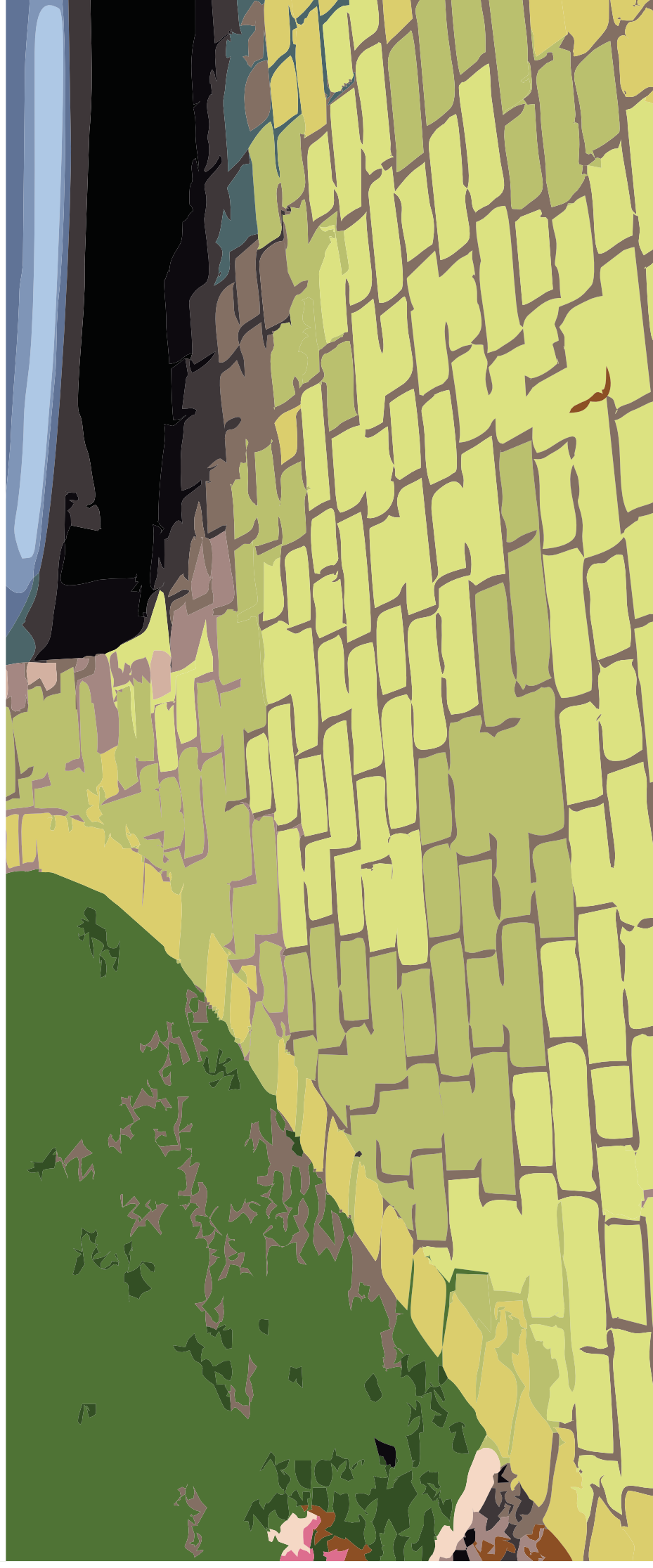


SEL SOURCE SA



SuDS for Housing

Effective Soakaways



Introduction

Sustainable drainage systems are designed to control surface water run off close to where it falls and mimic natural drainage as closely as possible. They provide opportunities to:

- reduce the causes and impacts of flooding;
- remove pollutants from urban run-off at source;
- combine water management with green space with benefits for amenity, recreation and wildlife.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

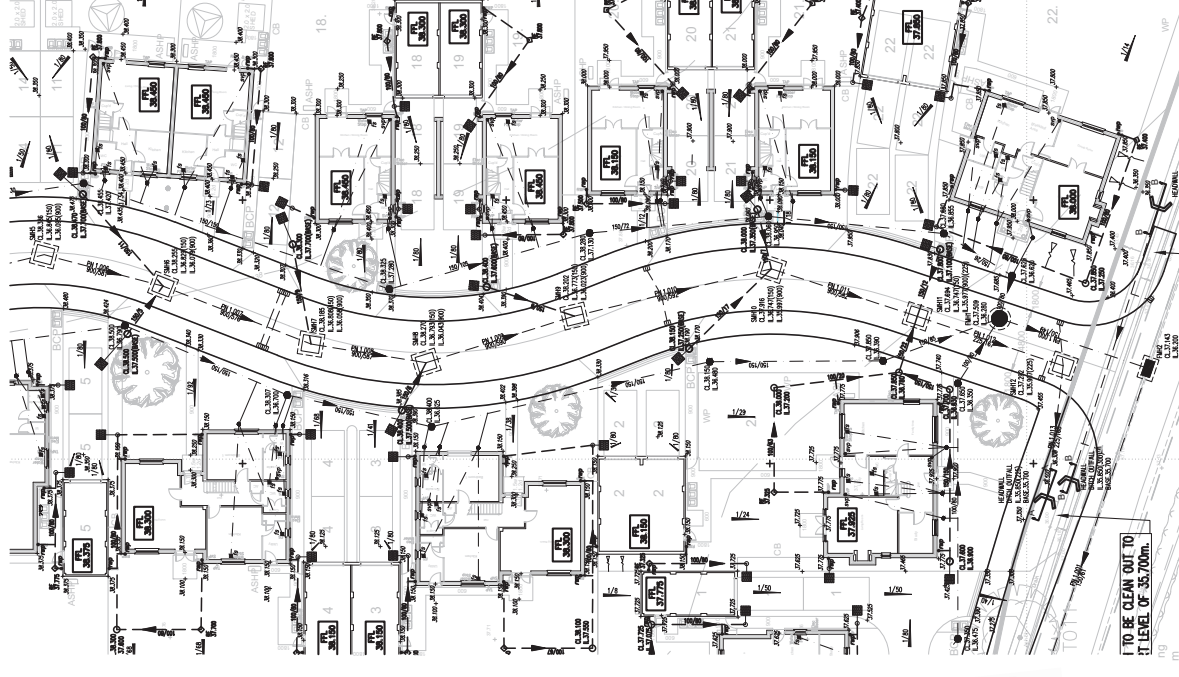
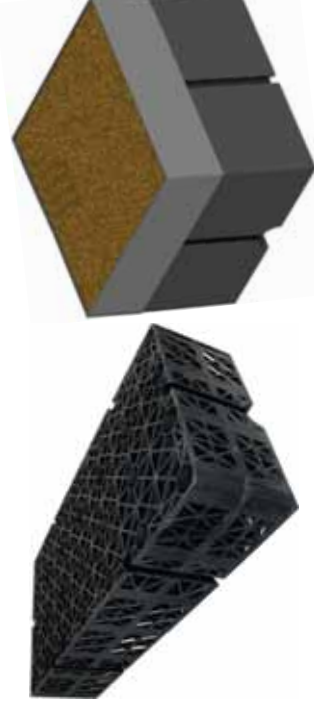
- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer.

Particular types of sustainable drainage systems may not be practicable in all locations. The above discharge options should all be assessed for any site and the most appropriate option should be established within any Flood Risk Assessment or Drainage Strategy.

In accordance with Part H of the Building Regulations, the surface water drainage system should, where feasible, discharge into an at-source infiltration system such as a soakaway or infiltration basin.

The LLFA highly recommends that this should be a priority aim if it is possible. If the application is proposing to discharge to soakaways or make use of other infiltration systems, percolation tests should be submitted to the LLFA in accordance with BRE Digest 365 or CIRIA guidance R156.

SEL has developed the SEL Source SA range of products to simplify the design and enhance the efficiency of soakaway systems. These products offer treatment at source and enhanced hydrocarbon treatment.

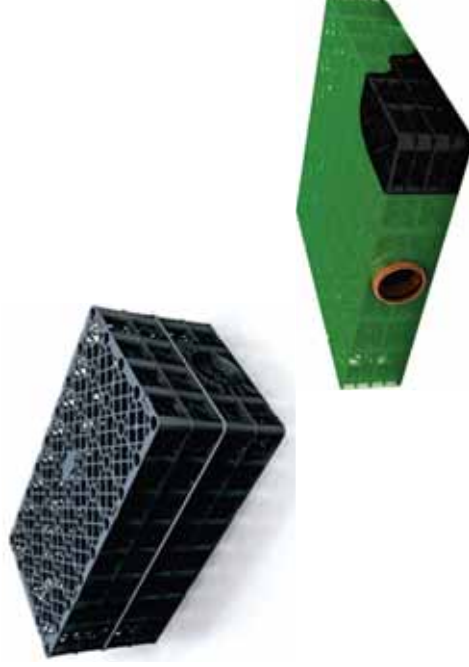


SEL SOURCE SA



The use of SEL Source SA components can:

- Control the flow of water from sub-base layers to provide efficient and managed infiltration.
- Increase the storage capacity of sub-base layers without increasing construction depths
- Allow the use of permeable pavements on developments with gradients.
- Provide efficient distribution of water from downpipes into voided sub-base layers.
- Reduce the risk of silt and debris entering underground networks.
- Eliminate the requirement for 'sacrificial' asphalt layers.
- Speed up construction programmes.
- Simplify and speed up construction.
- Enhance hydrocarbon treatment.



SEL Source SA Components are fully compliant with current guidance and legislation and in particular satisfy LLFA requirements, the Building Regulations, Ciria C753, BS7533-13:2009.

This brochure outlines some typical scenarios. However, the modular SEL Source SA components can be combined to produce a flexible and robust site-specific SuDS design.

Please contact our technical department for more details.

SEL Source SA Design Principles:

- Utilise driveways and shared access roads where possible to form micro-catchments of permeable pavement.
- Infiltrate surface water run-off within curtilage or into a combined large infiltration tank.
- Introduce run-off from downpipes into the voided sub-base of each micro-catchment.
- Simplify and speed up the installation process.
- Provide multiple levels of treatment.

Page Contents

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Prefabricated Permavoid Panels

Permavoid® is a pre-formed, geo-cellular sub-base replacement system providing a unique high strength, consistent structural raft. It can be utilised to provide a very efficient soakaway when installed vertically or horizontally.

To reduce installation durations on site, the Permavoid can be delivered in prefabricated panels to suit the site specific requirements. The panels are sized according to the required design parameters and arrive to site encapsulated in a 2mm plastic mesh.

A mesh surround is superior than the use of geotextiles. It has a higher permeability and is less susceptible to blockage from silts aka 'filter cake' effect.

Adjacent panels are installed by butting together tightly against each other until the required soakaway size is achieved. Pipe connections are achieved using a preformed connection saddle which provides a rigid connection point for a pipe. Connection saddles are available with a range of spigot diameters to suit standard underground drainage pipe.

The main benefits are:

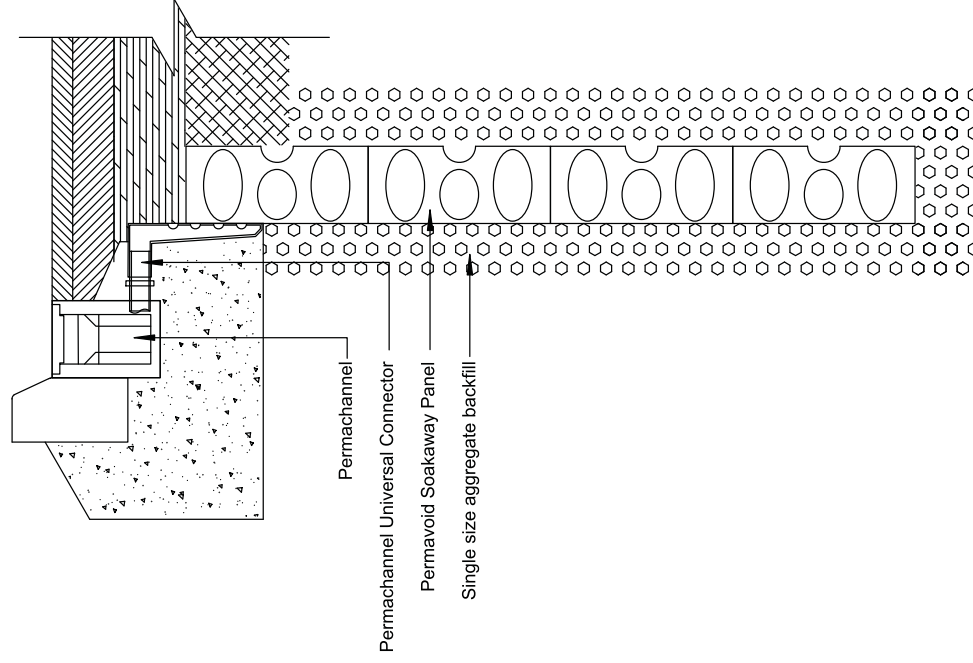
- More efficient infiltration rate
- Ideal for rapid installation on site
- Removes requirement for personnel to enter into excavations



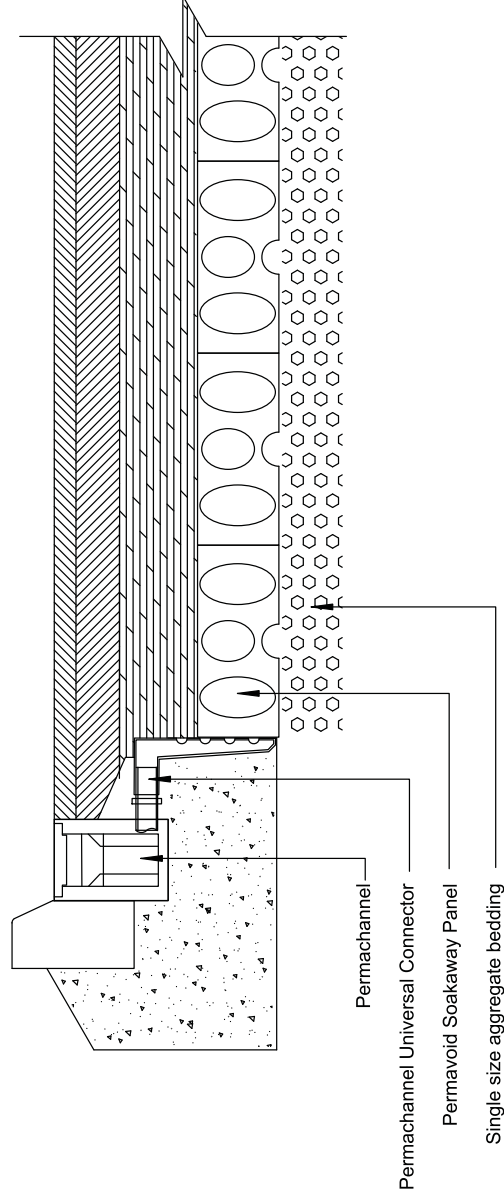
Permavoid assembled in a 2.124m x 2.124m panel

Prefabricated Permavoid Panels

Vertical Permavoid Soakaway



Horizontal Permavoid Soakaway



There should be a minimum of 1 metre between the base of the infiltration device and water table to protect groundwater quality, and ensure groundwater does not enter infiltration devices.

Soakaways design should follow the above guidance with regards to half drain times and construction; they should also comply with any other relevant buildings regulations, i.e. Soakaways should be no closer than 5m to the foundations of adjacent buildings and must not be located in contaminated areas.

Raintaina Soakaway Modules

Raintaina TSA are pre-formed soakaway modules in a range of sizes to satisfy within curtilage requirements. They can be used below trafficked zones or within soft landscaping areas. The modules can be interlinked to achieve desired storage volumes forming a highly efficient soakaway installation.

Raintaina TSA are available in the following sizes:

- RTNA02101 Raintaina TSA 1.6 (1600 litres)
- RTNA02102 Raintaina TSA 1.2 (1200 litres)
- RTNA02103 Raintaina TSA 0.8 (800 litres)
- RTNA02104 Raintaina TSA 0.4 (400 litres)

Each Raintaina module is encapsulated with WASP02001 Suds HD Geotextile which provides an excellent open surface area, allowing collected surface water runoff to easily flow into surrounding sub-soils.

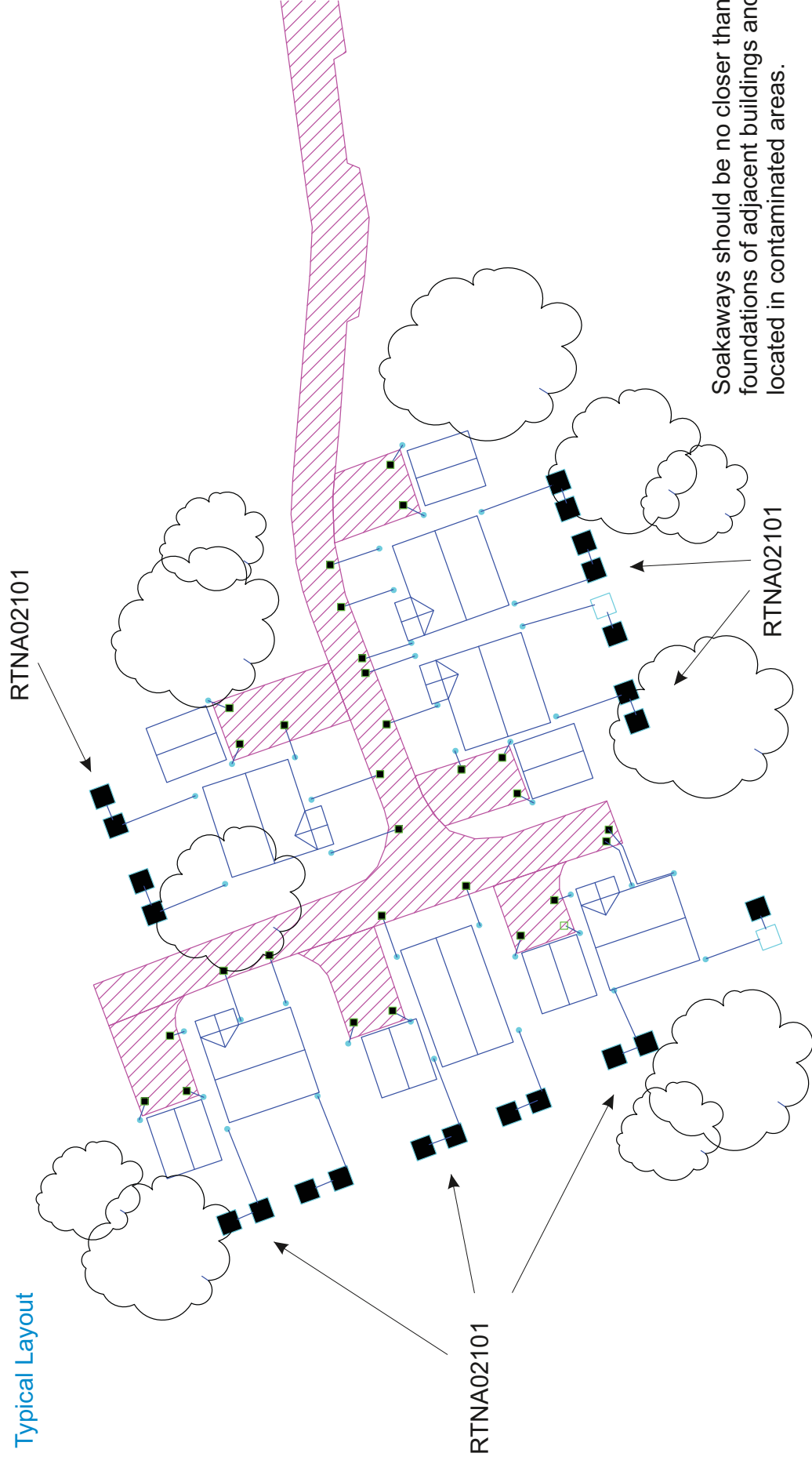
Each module also has a pre-formed 110mm diameter socket, allowing connection to standard PVC-u underground pipework and allowing units to be easily interlinked.





Raintaina Soakaway Modules

Typical Layout



Diffusing Water into & out of a Voided Sub-base

PVOD05101 Diffuser Unit 710mm X 710mm X 150mm; 110mm Ø Socket

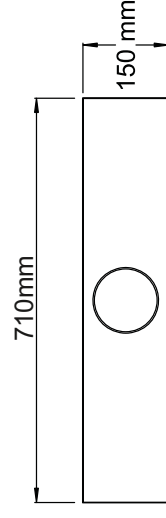
Diffuser Units comprise pre-assembled Permavoid® units, which are pre-wrapped in a 2mm polypropylene mesh fabric and fitted with an integrated socket to connect to standard 110mm Ø PVCu pipework. Each unit provides efficient diffusion of collected rainwater run-off from downpipes, into and out of the voided sub-base aggregate layers beneath permeable pavements.

Diffuser Units provide the following benefits:

- High strength allows placement within sub-base.
- Cover depths as low as 130mm in domestic driveways.
- Large open surface (52% perforated) area allows efficient diffusion of collected run-off into voided sub-base.
- 2mm mesh encapsulation to minimise clogging.
- Connects to standard 110mmØ underground push-fit PVCu drainage.
- 710mm x 710mm x 150mm diffuser will service up to 100m² of roof catchment into minimum 30% voided sub-base.
- 710mm x 710mm x 150mm diffuser will accept flow of up to 3l/s from a minimum 30% voided sub-base.
- Fully compliant with BS7533-13:2009
- Ready to install with no-site assembly required.



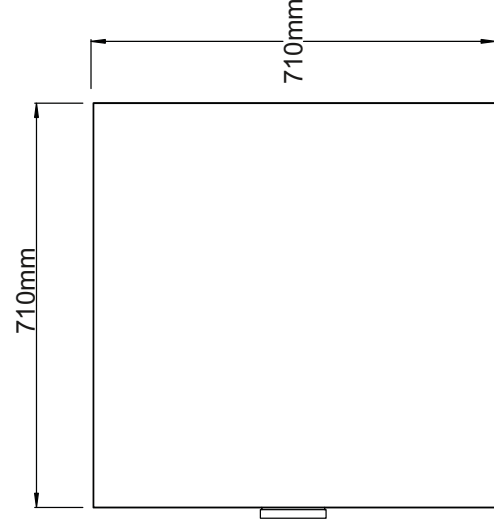
PVOD05101 Diffuser Unit
710mm x 710mm x 150mm
with 110mmØ socket



END ELEVATION



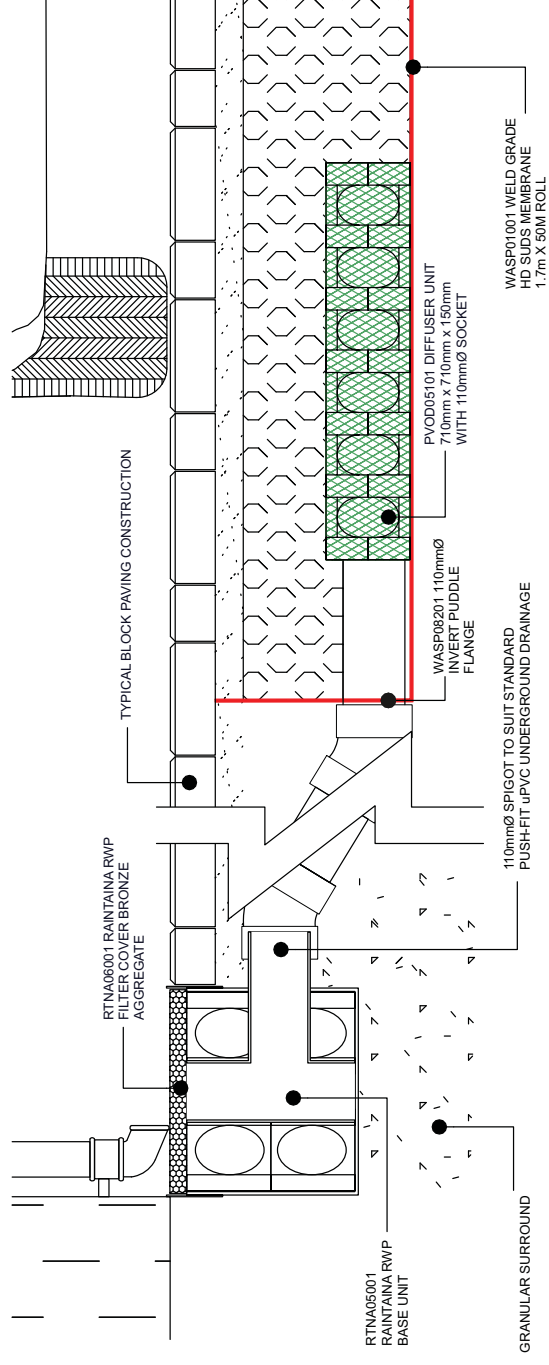
SIDE ELEVATION



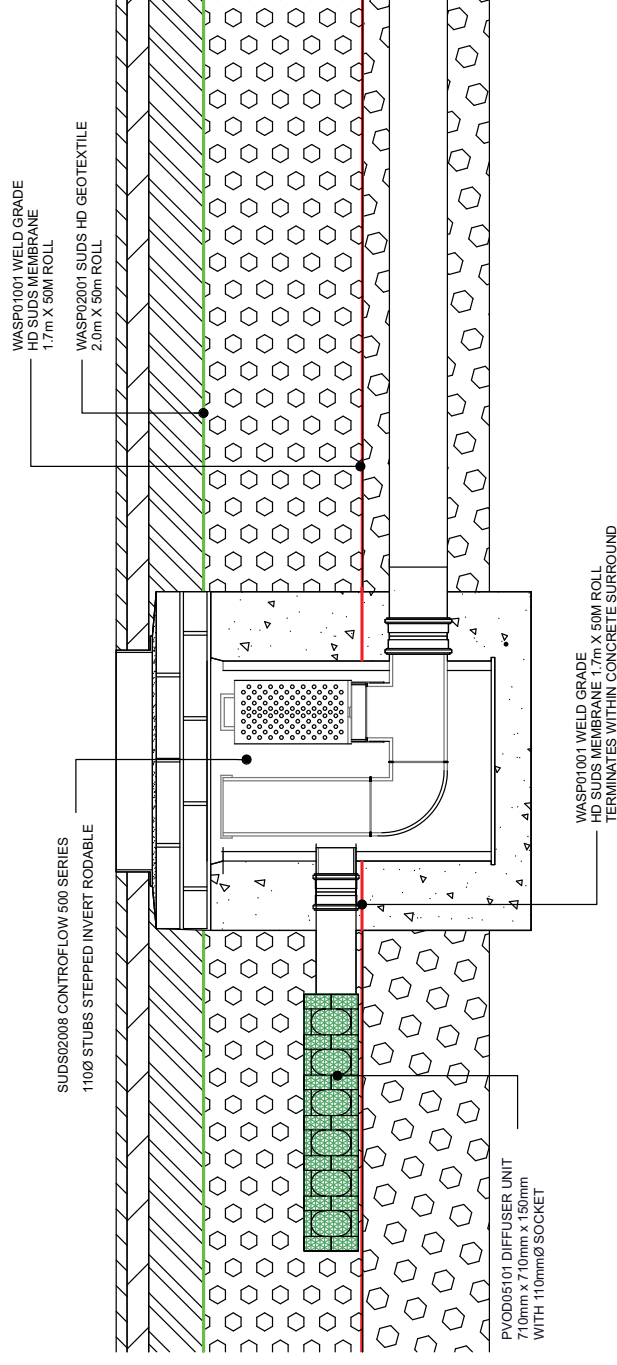
PLAN



Diffuser Inlet to Voided Sub-base



Diffuser Outlet from Voided Sub-base



In Situ Soakaways

WASP000001 Attenuation Crate; 1m x 0.5m x 0.4m

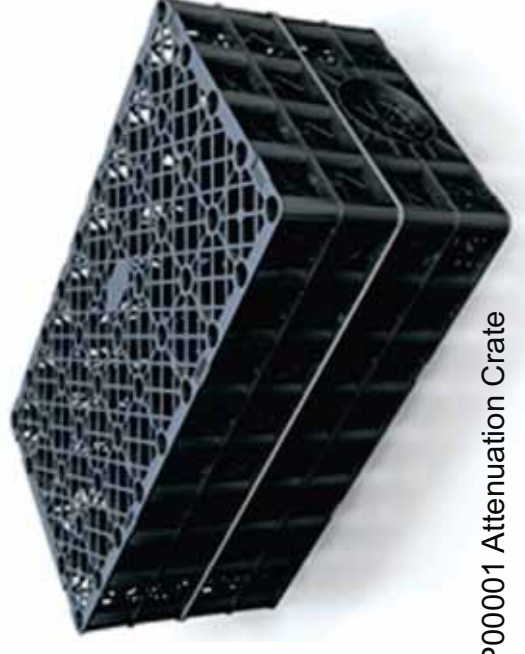
WASP000001 is used for trafficked and loaded applications and has a compressive strength of 61 tonne per square metre. WASP000001 has the added benefit of having up to 100% recycled material content. It is ideally suited for housing, commercial and infrastructure projects.

They are BBA approved and the modular nature of the system allows flexibility of shape. They can be used as part of a robust Suds system.

WASP000001 units are made from specially selected and controlled recycled materials making them an environmentally friendly, sustainable solution. The units have undergone stringent testing to ensure product performance with a compressive strength of 61 tonnes/m² and a 95% void ratio and 60 year creep limited life expectancy.

WASP000001 units are ideal for soakaway infiltration applications when used with a suitable geotextile such as WASP020001 Suds HD Geotextile for a typical installation or PVOD00501 Permafilter Oil Trapping Geotextile where enhanced hydrocarbon protection may be required.

Soakaways provide stormwater attenuation, stormwater treatment and groundwater recharge. The system is suitable beneath asphaltic, block-paved or concrete pavements and for the full range of traffic conditions from domestic driveways to highways.



WASP000001 Attenuation Crate

Permafilter Geotextile



Product Code: PVOD00501
Permafilter Oil Trapping Geotextile
2.4m x 50m Roll

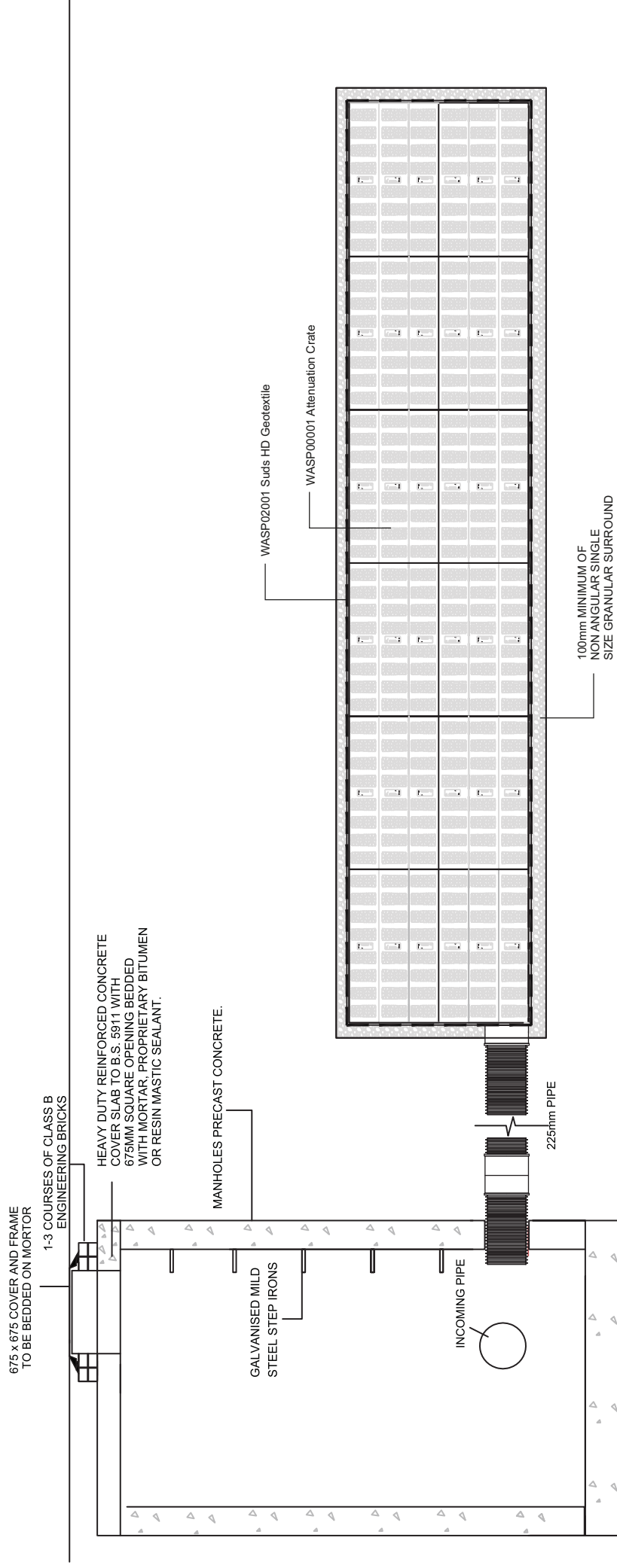
Suds HD Geotextile



Product Code: WASP02001
Suds HD Geotextile
2.0m x 50m Roll



In Situ Soakaways



TYPICAL SOAKAWAY INSTALLATION - WASP00001 ATTENUATION CRATE

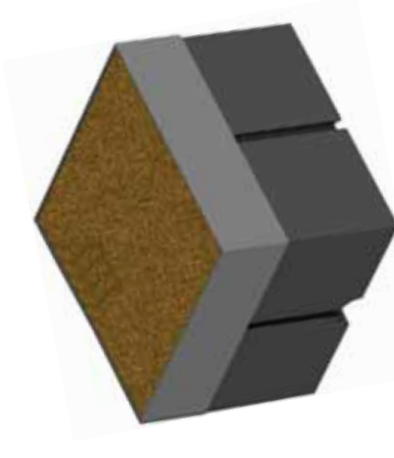
Downpipe Filter Chamber for use within Voided Sub-base

RTNA05002 Raintaina RWP Base Unit Diffuser with Mesh Surround
RTNA06001 Raintaina RWP Filter Cover Bronze Aggregate

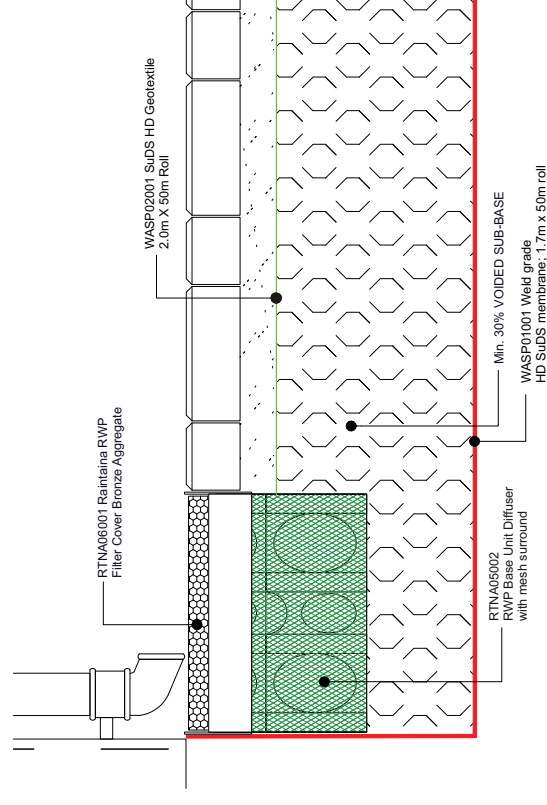
Raintaina Erosion Pad Filter System is a self-flushing downpipe erosion pad and filter chamber. Downpipes discharge directly onto the permeable cover which effectively prevents detritus, such as leaves, moss and feathers, from entering a permeable pavement. The permeable cover is formed from resin bound gravel and removable for easy maintenance

Raintaina Erosion Pad Filter System provides the following benefits:

- Downpipe discharges directly onto the top of the SEL Raintaina Erosion Pad Filter System.
- Self-flushing; removes leaves, moss, feathers and other debris at ground level potentially avoiding overtopping of gutters.
- Provides a treatment phase, which is especially beneficial where planning conditions seek one treatment phase for roof run-off.
- Efficient filtration and silt separation.
- Prevents silt and debris entering the permeable paving system.
- Units situated under each individual downpipe to minimise the risk of system failure.
- Units positioned within the permeable paving system.
- Suitable for pedestrian areas with filter cover available in a variety of finishes.



Raintaina Erosion Pad
RTNA05002 RWP Base Unit Diffuser with mesh surround
with RTNA06001 Raintaina RWP Filter Cover Bronze Aggregate



Downpipe Filter Chamber with Pipework Connection

RTNA05001 Raintaina RWP Base Unit

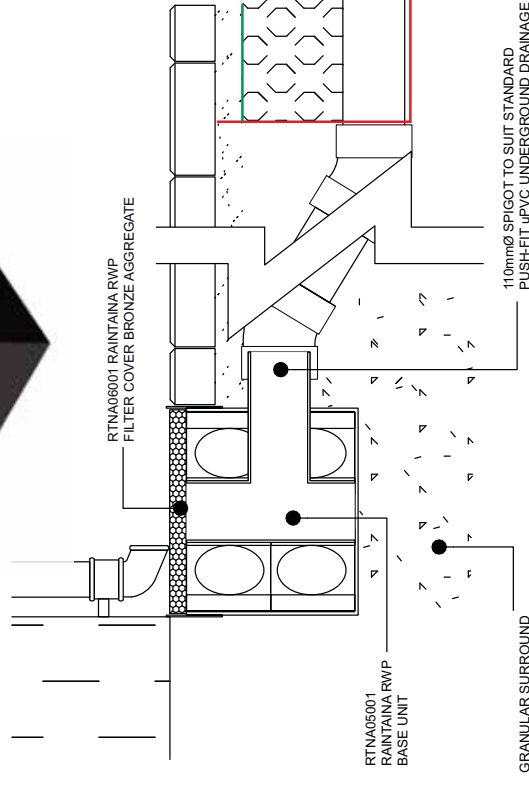
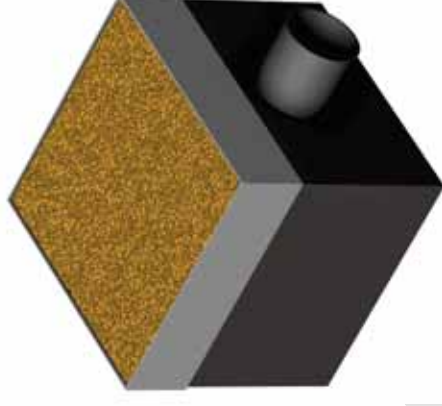
RTNA06001 Raintaina RWP Filter Cover Bronze Aggregate

Raintaina RWP Filter System is a self-flushing downpipe filter chamber. Downpipes discharge directly onto the permeable cover which effectively prevents detritus, such as leaves, moss and feathers, from entering a permeable pavement or pipe collection network. The permeable cover is formed from resin bound gravel and removable for easy maintenance.

The SEL Raintaina RWP Filter System provides the following benefits:

- Downpipe discharges directly onto the top of the SEL Raintaina RWP Filter System.
- Self-flushing; removes leaves, moss, feathers and other debris at ground level potentially avoiding overtopping of gutters.
- Provides a treatment phase, which is especially beneficial where planning conditions seek one treatment phase for roof run-off.
- Efficient filtration and silt separation.
- Prevents silt and debris entering the underground drainage system.
- Units situated under each individual downpipe to minimise the risk of system failure.
- Units for use outside of permeable paving system.
- Suitable for pedestrian areas with filter cover available in a variety of finishes.

RTNA05001 Raintaina RWP Base Unit
with RTNA06001 Raintaina RWP Filter Cover Bronze Aggregate



Filter Chambers

Purpose-built high density polyethylene (HDPE) pre-fabricated catchpits are ideal for stormwater drainage systems.

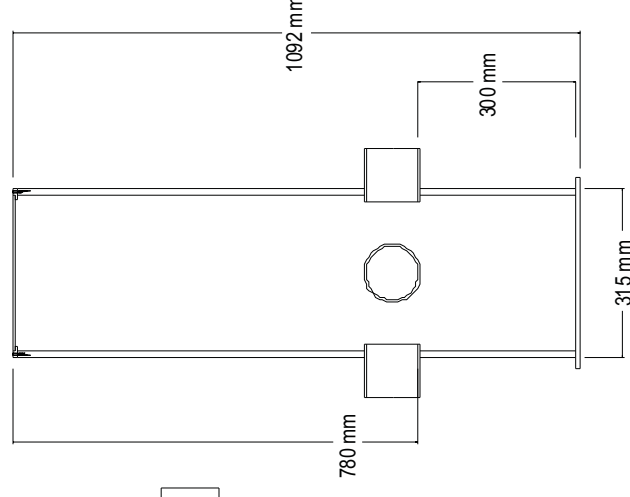
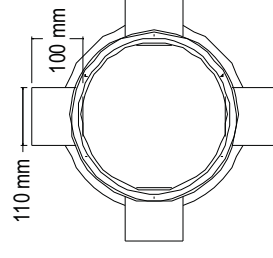
WASP Catchpits are designed to separate silt and other particles, helping to improve the quality of water before it is reintroduced into the environment.

They can be integrated into any drainage system requiring 'in line' silt and debris separation prior to attenuation or infiltration.

WASP Catchpits provide the following benefits:

- Provide a treatment phase, which is especially beneficial where planning conditions seek one treatment phase for runoff.
- Efficient filtration and silt separation.
- Prevents silt and debris entering an attenuation or infiltration system to minimise the risk of system failure.
- Have a 300mm deep collection sump for silt / debris deposition to enable easy removal at regular maintenance intervals.
- No moving parts.
- Spigots sized to suit standard PVCu pushfit pipework.

WASP04301 315mmØ Chamber, 3 x 110mm Ø inlets, 1 x 110mm Ø outlet



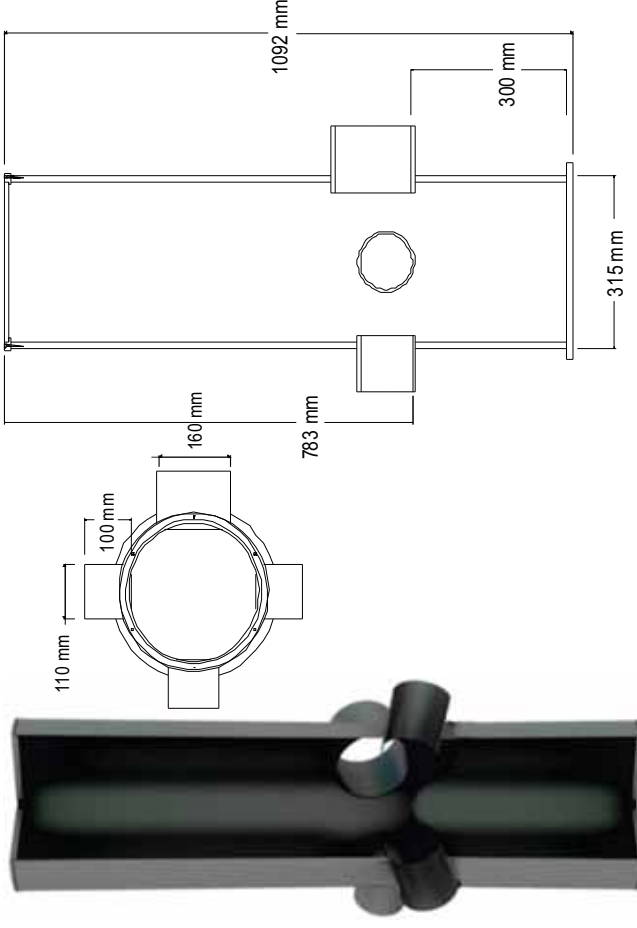
The WASP04301 has a diameter of 315mm and an overall nominal height of 1092mm. The polyethylene chamber can be easily reduced on site to suit required invert levels.

Each chamber has 4 number 110mm diameter pipe spigots to suit standard PVC-u push fit drainage pipework. Each spigot can be used to form either an inlet or outlet.

The WASP04301 chamber has a 300mm deep sump to accommodate the deposition of silt and debris in the collected rainwater for later removal under a regular maintenance regime.



WASP04310 315mmØ Chamber, 3 x 110mm Ø inlets, 1 x 160mm Ø outlet

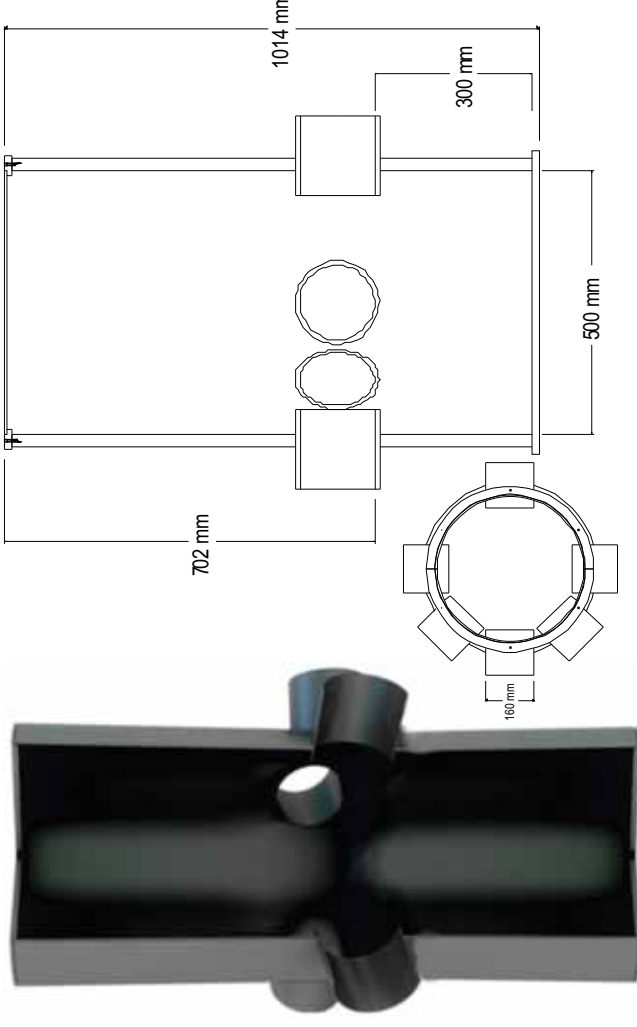


The WASP04310 has a diameter of 315mm and an overall nominal height of 1092mm. The polyethylene chamber can be easily reduced on site to suit required invert levels.

Each chamber has 3 number 110mm diameter inlet pipe spigots and 1 number 160mm diameter outlet pipe spigot to suit standard PVC-u push fit drainage pipework.

The WASP04310 chamber has a 300mm deep sump to accommodate the deposition of silt and debris in the collected rainwater for later removal under a regular maintenance regime.

WASP04510 500mmØ Distribution Chamber, 5 x 160mm Ø inlets, 1 x 160mm Ø outlet



The WASP04510 has a diameter of 500mm and an overall nominal height of 1014mm. The polyethylene chamber can be easily reduced on site to suit required invert levels.

Each chamber has 5 x 160mm diameter inlet pipe spigots and 1 x 160mm diameter outlet pipe spigot to suit standard PVC-u push fit drainage pipework. The inlet/outlets can be reduced to 110mm diameter by incorporating level invert reducers as required.

The WASP04510 chamber has a 300mm deep sump to accommodate the deposition of silt and debris in the collected rainwater for later removal under a regular maintenance regime.

Effective encapsulation of a Pervious Pavements for Infiltration

A pervious surfaces can be either porous or permeable. The important distinction between the two is:

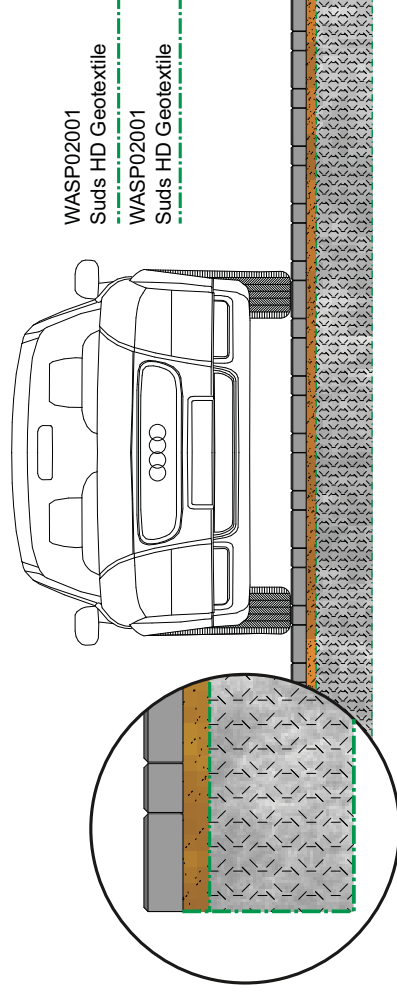
- Porous surfacing is a surface that infiltrates water across the entire surface.
- Permeable surfacing is formed of material that is impermeable to water but creates a void to allow infiltration through itself.

Pervious surfaces provide a surface suitable for pedestrian or vehicular traffic, while allowing surface water to infiltrate through the surface and into underlying layers into a porous sub-base below where it is stored temporarily before infiltration into the underlying soils or entry into a drainage network. Aggregate sub-base can provide good water quality treatment.

A range of porous surface finishes are available such as pervious concrete, porous asphalt, paving blocks, porous concrete or aggregate filled plastic grids. All these systems allow surface water to percolate and infiltrate.

The goal is to control stormwater at the source, reduce runoff and improve water quality by filtering pollutants in the substrate layers.

Standard Infiltration



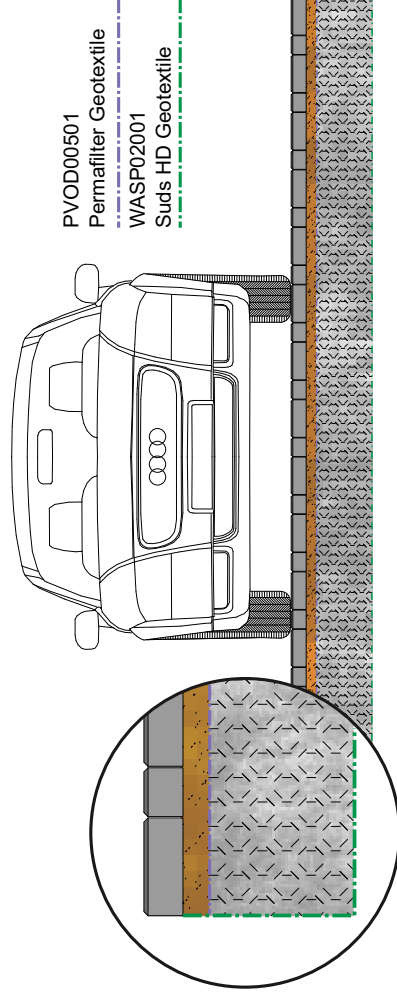
WASP02001 Suds HD Geotextile is a heavy duty, non-woven, needle-punched polypropylene geotextile which is suitable for infiltration (or membrane protection in attenuated areas). When used in a standard infiltration application Suds HD Geotextile is laid to the base and sides of the voided sub-base aggregate and also used as a separation layer between the permeable surfacing bedding layer and voided sub-base.

WASP02001 Suds HD Geotextile provides the following benefits:-

- Zero breakthrough head.
- High permeability.
- Good resistance to elongation.
- Excellent protection to WASP01001HD Suds membrane (when used in an attenuation application).



Infiltration with enhanced hydrocarbon treatment



PVOD00501 Permafilter Oil Trapping Geotextile is a non-woven, dimpled, needle-punched geotextile that has been specifically designed to provide enhanced hydrocarbon pollution treatment. In an enhanced infiltration application, Suds HD Geotextile is laid to the base and sides of the voided sub-base aggregate with Permafilter oil trapping geotextile used as a separation layer between the permeable surfacing bedding layer and voided sub-base.

PVOD00501 Permafilter Oil Trapping Geotextile provides the following benefits:-

- Enhanced hydrocarbon pollution treatment.
- Capable of retaining oil contamination ranging from daily car drip losses to catastrophic events.
- Entrapped hydrocarbons are biodegraded by naturally occurring micro-organisms, providing a self-cleansing action.

Porous Sub-bases (SudsAgg)

SEL recommend SudsAgg for use as a sub-base layer within pervious pavements. SudsAgg is a graded, low fines, crushed aggregate with a maximum nominal aggregate size of 40mm.

It is designed to guarantee a void ratio of greater than 30% whilst maintaining all the physical properties necessary to fulfill the role of a standard granular type 1 sub-base making it easier to work with than many other 'voided stone' products.

Porous Sub-base layers have an extensive track record as an effective sustainable drainage component providing attenuation and filtration of daily effluent loadings associated with car park run-off.

The final pavement design must be generally in compliance with BS 7533 and will depend greatly upon the strength and nature of the underlying soils.

When infiltrating the SudsAgg sub-base would be underlain by a permeable geotextile. SEL can provide more information on SudsAgg or contact Aggregate Industries direct.



Permafilter Geotextile



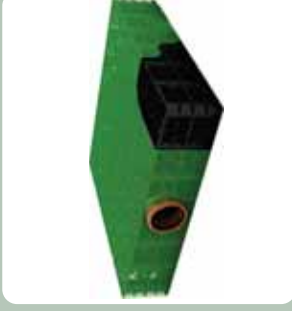
Product Code: PVOD00501
Permafilter Oil Trapping Geotextile;
2.4m x 50m Roll

Filter Chambers



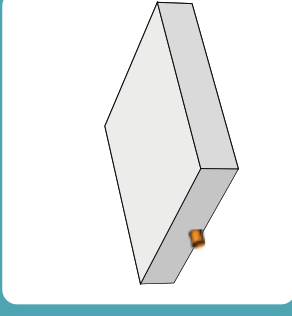
Product Code: WASP04510
500mm Ø Distribution Chamber
5x160mm Ø inlets, 1x160mm Ø outlet

RWP Diffuser Unit



Product Code: PVOD05101
Diffuser Unit 710mm x 710mm
x 150mm; 110mm socket

Raintaina TSA



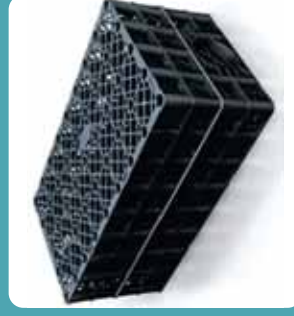
Product Code: RTNA02101
Raintaina 1.6 TSA
2.0m x 2.0m x 0.4m

Permavoid



Product Code: PVOD00001
Permavoid Unit
710mm x 355mm x 150mm

Polystorm R



Product Code: WASP00001
Attenuation Crate
1.0m x 0.5m x 0.4m

HD Suds Membrane



Product Code: WASP04301
315mm Ø Chamber
3x110mm Ø inlets, 1x110mm Ø outlet

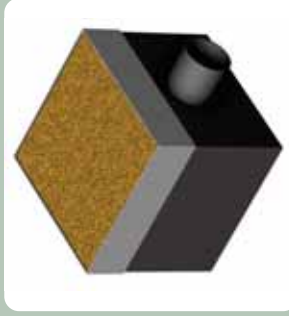
Suds HD Geotextile



Product Code: WASP02001
Suds HD Geotextile;
2.0m x 50m Roll

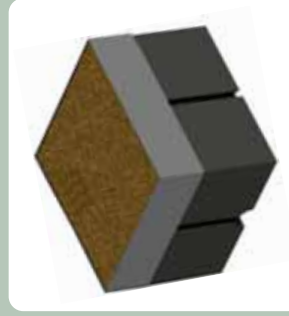


Raintaina Filter Chamber



RTNA05001 Raintaina RWP Base Unit
& RTNA06001 Raintaina RWP Filter
Cover Bronze Aggregate

Raintaina Erosion Pad



RTNA05002 Raintaina RWP Base Unit
Diffuser with Mesh Surround
& RTNA06001 Raintaina RWP Filter
Cover Bronze Aggregate

Benefits of SEL Source SA

- It's simple
- Satisfies the planning requirement for SuDs, source control and treatment.
- Easily integrated within other drainage systems.
- Optimises the storage within voided sub-base.
- Can offer a zero discharge solution.
- Provides a 'within curtilage' solution.
- Allows filtered connection from roof.
- Allows use of permeable paving on sloping sites.
- Simplifies and speeds up construction.
- Can avoid personnel entry into deep excavations.
- Eliminates 'underdrain' pipework.
- Can be installed towards end of construction which can eliminate contamination during building works, avoiding the need for expensive protection measures e.g. sacrificial asphalt layers.
- Reduces volume of imported stone.
- Reduces volume of excavation and muck off site.
- Allows use of small diameter pipe at shallower depths.
- Reduces excavation depths for drainage system.
- Can be used with permeable surfaces and impermeable surfaces.

SEL at Your Service



- SEL can help with your permeable paving design.
- Free design review service.
- Check catchment areas and levels.
- Calculate attenuation volumes.
- Optimise depths of voided sub-base required.
- Model the flow control requirements.
- Size the orifice diameters.
- Provide CAD details for incorporation into drawings.
- Undertake CAD layouts.
- Provide 3rd party detailed designs.

This brochure summarises the core products within the SEL Source SA range and will satisfy most schemes. There are other ancillary components and flow control chambers available and in extreme circumstances special one-off solutions would be developed. Please contact SEL to discuss your requirements.

SEL SOURCE SA



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Web: www.selsource.co.uk

Technical Services

To support architects, engineers and contractors in designing and installing SEL Source SA systems, our design services department offers computer aided scheme details and advice on installation.

SEL reserves the right to change or modify the design of products and specifications as their policy is one of continued research and improvement.

The information contained in this publication is believed to be correct at the date of publication, but it should be understood that between publications there may be changes in pertinent standards or regulations affecting the accuracy of the information contained therein.

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Several of the products shown in this brochure are subject to patent and/or registered design - please contact SEL for further details.

www.selsource.co.uk

Other Services

Virtual Curtain Gas Migration Barrier
Commercial SuDS
Attenuation Tanks
Gas Protection
SEL Sports Rooftop Sports
MUGA & Sports Pitches
Cloud Water Control
Modular Paving

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Lancashire
BB2 4DD



SuDS for Housing

Effective Permeable Pavements