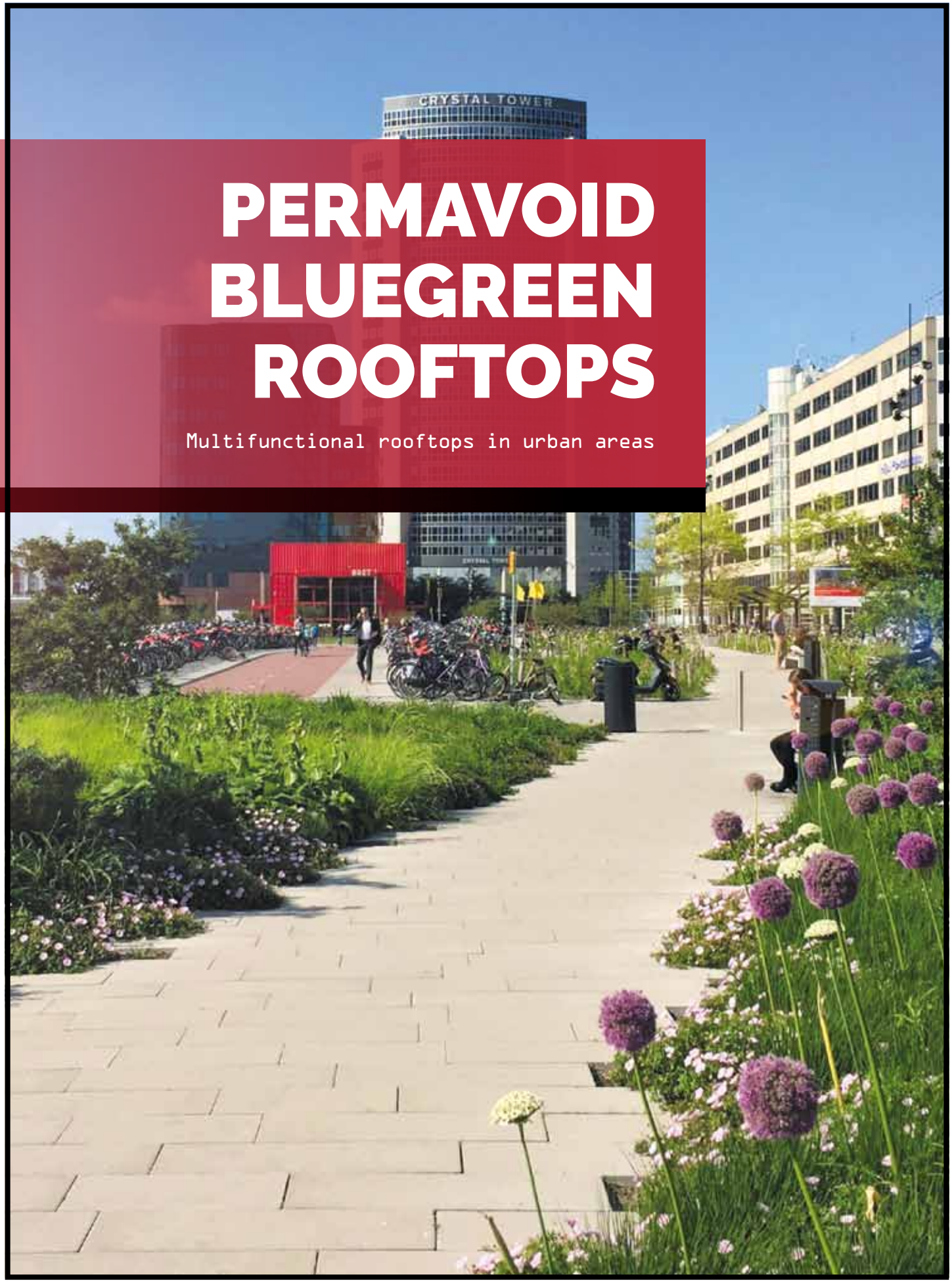
PERMAVOID BLUEGREEN ROOFTOPS

Multifunctional rooftops in urban areas



ABT, INC.

ABT, Inc. has been creating innovative water management systems in North America since 1983.

ABT, ADVANCED BUILDING TECHNOLOGIES

While our solutions and operations have grown tremendously over the years we still hold tightly to the core beliefs that made us successful: Create the most innovative, highest quality solutions, we stand behind our work and always put people first. Both with our own team and partners, it has been strong, lasting relationships that have driven our organization to success.

We take this belief outward as we evaluate our role in the global community and in turn strive to be stewards of a healthy planet. This is seen in many ways, like our actions: the fleet of hybrid cars we drive, the EPS recycling program we conduct, the solar powered manufacturing plants we operate. We demonstrate this in our products: Nanosteel that outperforms galvanizing without leeching zinc into the groundwater, Polydrain's chemical

resistance that captures caustic industrial chemicals and prevents contamination, FirstFlush which removes hydrocarbons and other pollutants from stormwater and Permavoid which captures, retains, utilizes and conserves our rainfall locally as the precious resource it truly is.

INTRODUCING PERMAVOID SOLUTIONS

With the ABT Permavoid range of products we are capable of creating circular, nature based solutions for sustainable water management in metropolitan areas. Solutions that combine rainwater management and green infrastructure, enabling reliable multifunctional use of space in the urban environment. Our solutions are usable in Blue-Green vegetated roof systems, podium decks, gardens, for urban trees, sports pitches and Sustainable Urban Drainage Systems (SUDS) when aiming at water-sensitive design. We make sure no water goes to waste by embracing the Permavoid philosophy: "catch, store and reuse water where it falls". We enable cities to treat water like a valuable resource, instead of a nuisance. For more than fifteen years Permavoid has specialized in a wide range of innovative solutions for urban areas worldwide, which will be explained in more detail.

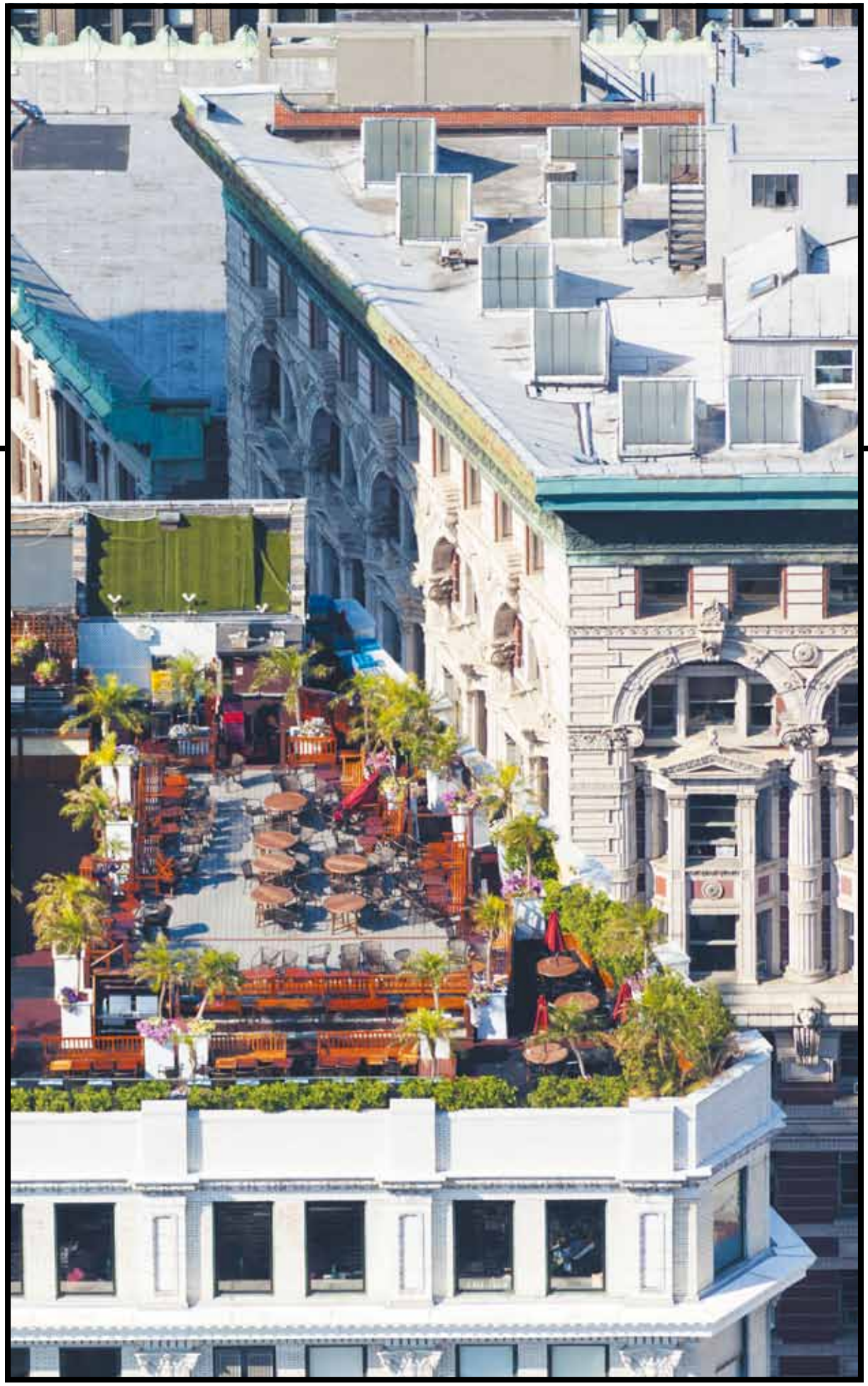
CURRENT CITIES & BLUEGREEN ROOFS

Dense urbanised areas face many challenges. Worldwide, people continue to move to large metropolitan areas, while at the same time weather patterns are changing.

More people in cities leads to more built-up and paved areas and less green space, creating the Urban Heat Island Effect and a distorted water cycle, resulting in high flood damage costs and reduced human wellbeing.

Ecosystems offer great examples of how to prevent excessive heat and floods. Nature uses vegetation and soil as a 'sponge' to absorb rainwater rather than allowing it to run-off and plants evaporate water, cooling themselves and their surroundings, creating a favourable microclimate to thrive in. In cities, one could argue there is no space for such greenery, yet vast areas of unused rooftop space exist. These empty spaces can be reclaimed for stormwater management (Blue) in combination with plant growth (Green) by creating BlueGreen roofs, roofgardens and podium decks.

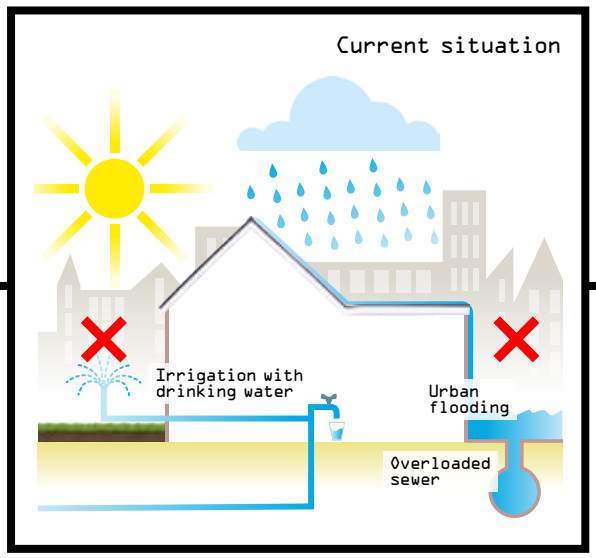
In order to create futureproof cities we must unlock and exploit the potential of rooftops in our urban landscapes. Unused rooftops should be transformed into functional landscapes (roofscapes), designed to conserve and/or generate energy, manage rainwater, create space for biodiversity and for people to enjoy; or any smart combination thereof. In this approach, roofs are no longer just there to keep the rain out, but become an integral and functional part of the building they are on and the environment they are in.

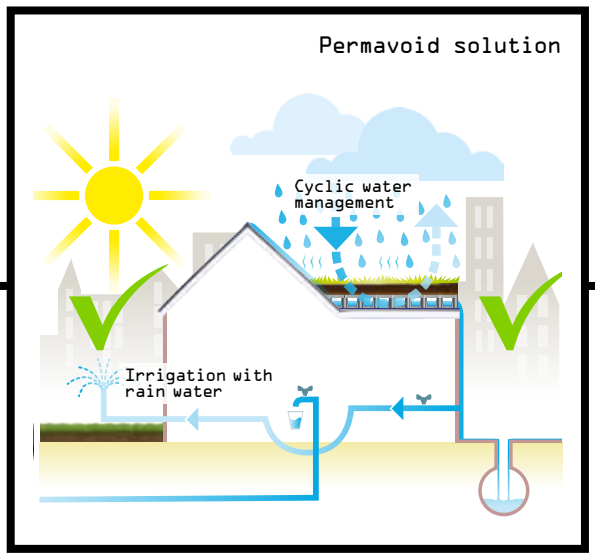


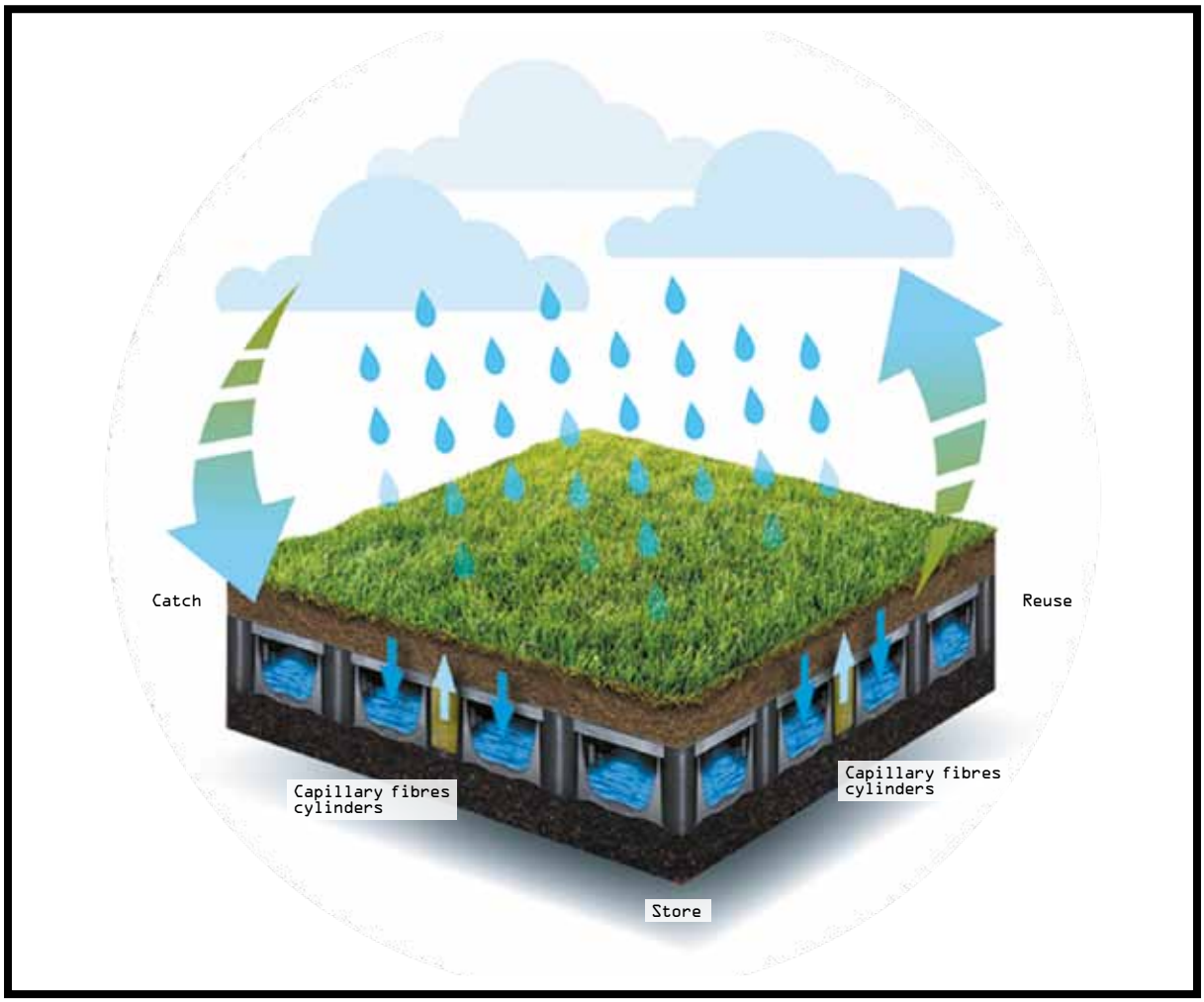
PERMAVOID BLUEGREEN SOLUTIONS

The Permavoid Blue-Green systems are based on circular on-site water management.

Permavoid BlueGreen Roof Solutions provides a nature based solution in which rainwater is caught and stored in a 3.35" (85mm) or 5.91" (150mm) high drainage layer underneath the vegetated roof system. The Permavoid system replaces standard drainage layers, stores more rainwater, and more importantly, is capable of returning stored water to the vegetation by way of natural capillary irrigation using capillary fibre technology; all without the use of pumps, hoses or energy.


Current situation
Irrigation with drinking water
Urban flooding
Overloaded sewer


Permavoid solution
Cyclic water management
Irrigation with rain water


Catch
Reuse
Capillary fibres cylinders
Capillary fibres cylinders
Store

Different examples of succesful projects. Installation and end result pictures are shown.

CASE STUDIES


Installation


End result


Installation


End result

Installation

Installation

Installation

End result

TECHNICAL ADVANTAGES SUMMARIZED

- *Because of the water storage capacity there is no need for drainage outlets to be taken through the deck. Water can be taken to the edge of the slab where rainwater down pipe connections are easy to make (overcoming many of the key design, construction and cost issues)*
- *Reduced leak potential - eliminates the need for outlets through the deck*
- *Multifunctional - acts as a combined drainage and attenuation system*
- *Easily integrated into overall SUDS strategy*
- *Maximizes space - increases deck area and eliminates the need for pipe work*
- *Load bearing system - strong enough to carry traffic loads*
- *Reduced time, labour and materials on-site*
- *Quick & easy to install*

KEYS TO SUCCESS

WATER MANAGEMENT

With an actual water level in the Permavoid units it is possible to accurately manage water in the system. The water level is normally controlled passively, with a maximum elevation (0.04"- 0.30") set to match the designed load bearing capacity of the roof.

PASSIVE IRRIGATION

As long as there is water in the system, plants are properly irrigated through the capillary fibre cylinders that bring water from storage in the units to the soil above. This is also known as wicking. The wicking capacity of the used fibres surpasses daily evaporation rates by a factor of 10 or more, so water is no longer a growth-limiting factor. Visual inspection is easy and replenishing water during prolonged droughts is even easier; water can be added at any point and will disperse itself over the entire surface without unsightly driplines or maintenance prone valves on the surface.

WATER SAVINGS

Because capillary irrigation does not experience surface evaporation losses, the total amount of water needed for irrigation can be reduced without hampering plant growth. Examples are applications in sports turf fields in Australia, Europe and the Gulf region that have shown irrigation water savings of up to 60%.

HARVESTING EXTRA SOURCES OF WATER

In water sensitive designs the use of drinking water for irrigation should be prevented as much as possible. The Permavoid system allows you to harvest supplemental sources of water such as washdown, HVAC condensate and treated grey water for irrigation without the installation of tanks or piping infrastructure.

ARTIFICIAL INTELLIGENCE

When water retention during peak rain events is the most important function, an electronic valve to control the water level can be installed, which, based on local weather (rain-radar) data, continuously evaluates whether to keep water in storage in the system or release it (or a portion) to the sewer or infiltration system. The system can drain itself hours before an oncoming rainstorm hits, pre-emptively maximizing storage capacity of the system.

WEIGHT

Weighing in at only 6 kg/m2 the Permavoid system allows the designer to focus the maximum allowable weight on the rooftop on retaining water on the roof, rather than gravel or soil. For comparison: the water stored to weight ratio of Permavoid is 12.5 kg H2O per kg Permavoid whereas for gravel the ratio equals 0.2 kg H2O per kg of gravel.

MULTIFUNCTIONAL USE

The Permavoid system is designed to be strong enough to support landscaped designs with soil up to 6 feet deep and hardscaped designs with brick, concrete or asphalt paving (specific design specifications apply). If traffic loading is desired, an even stronger version of the Permavoid unit can be fitted underneath the driveway in order to maintain a continuous water management surface on top of the entire podium deck or roof. By adding the Permalock to the system we have created a sturdy connection for everything you would like to attach to the Permavoid units. The Permalock is inserted into the unit at any of the openings and secured with a bayonet lock. The Permalock houses a standard 5/16" (8mm) steel thread, in which bolts can be screwed to attach fencing, safety-line anchors, solar panel systems or wooden decks, etc. and like everything pertaining to the Permavoid system, the Permalock can be removed almost as easily as it was installed, to be reused elsewhere.

PLANT GROWTH

Because of the continuous natural capillary feed of water from storage in the Permavoid units to the soil, plants no longer experience the extreme wet-dry cycles otherwise experienced in rooftop plantings. This creates better growth and enables the designer to use the same plants in shallower (lighter) substrate layers in rooftop designs because the soil no longer acts as main water storage medium.

BIODIVERSITY

The more reliable capillary availability of water underneath the vegetation enables the landscape architect to choose from a wider array of plant species. Depending on the envisaged water management regime in the Permavoid system, water is no longer a growth limiting, or species limiting factor.

With the ABT Permavoid range of products we are capable of creating circular, nature based solutions for sustainable water management in metropolitan areas. Solutions usable for urban trees, Blue-Green roofs, podium decks, gardens, sports pitches and SUDS when aiming at water-sensitive design. We make sure no water goes to waste by the catchment, storage and reuse of water where it falls. For more information about our solutions please contact us or visit www.abtdrains.com

OTHER SOLUTIONS BY

permavoid

Sports and recreation

Urban tree solutions

Structural subbase

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