

Living with Rainwater

a guide to working with nature to make neighbourhoods along
the River Wandle more resilient to climate change

5

simple ways to
reduce your local
flood risk



London
Wildlife
Trust

Protecting London's
wildlife for the future



Welcome

Along with many places around the world, Britain is seeing changes to its weather. Hotter summers are being interrupted by bursts of intensely heavy rain and winters are getting wetter and warmer. This can bring both flooding and drought to the urban areas that we - and a lot of wildlife - live in. There are things that we can do to become more resilient to the effects of climate change. This guide gives an introduction to some practical ways to help you save and use rainwater and make your local environment a more comfortable, beautiful and healthy place to live.



The Wandle Rain Gardens project

Led by London Wildlife Trust, the Wandle Rain Gardens project is working with communities along the course of the River Wandle to raise awareness of the impacts of climate change on the river. We are also working with local people to create practical ways of using rainwater to prevent flooding and improve the environment for both people and wildlife. This project is part of the wider HLF funded Living Wandle programme which aims to connect local people with their river.



Living Wandle
Landscape Partnership



Wandle's water

The River Wandle is fed by the water-holding chalk aquifers that lie beneath London and the North Downs. These are vast underground reserves, but they hold less water now than they once did because we pump water out via boreholes to meet the increasing demands of homes and businesses. Because of this, the river's historic springs and headwaters are often dry. In fact the upper river is sometimes only kept flowing by pumping water out of the river at Goat Bridge and recirculating it back upstream to Carshalton Ponds. Further downstream the river is topped up again with water from Beddington Sewage Treatment Works that has been filtered and cleaned.

The aquifers can be refilled naturally by rainwater that seeps through the earth into them but when it rains heavily most of this valuable supply is lost by running off the streets into drains and out into rivers and the sea, rather than soaking back into the earth.

You can find out more about the river at www.wandletrust.org.



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London Wildlife Trust is the only charity dedicated solely to protecting the capital's wildlife and wild spaces, engaging London's diverse communities through access to our nature reserves, campaigning, volunteering and education. London Wildlife Trust is one of 47 Wildlife Trusts, forming the UK's largest voluntary organisation dedicated to conserving wild habitats and species in the countryside, in cities and at sea.

www.wildlondon.org.uk

Registered charity number 283895

What's the problem?



Flooding along the Wandle

URBAN AREAS are at greater risk of flooding caused by rainfall than rural areas are because rain falling on roads and pavements can't drain naturally into the ground and enters the drains instead. When a lot of rain falls in a short period of time the drains can't carry it away quickly enough. This is when flooding occurs in our streets.

HEAVY RAINFALL can wash pollutants off the roads and into rivers, harming fish, plants and the important insect life that plays a vital role in the river's food chain.

HIGH FLOW LEVELS in the river damage the habitats of birds and animals that live in the river bank and the fast flowing water can wash smaller species downstream.

Overstretched drains

London's Victorian sewers date from the mid-19th century and the system has been added to as London has grown in size. In much of central London, including the areas at the northern end of the River Wandle, historic 'combined sewers' take both waste water and sewage from our homes as well as rainwater from the streets. These sewers now have to contend with a much higher inflow of waste water from our modern homes -washing machines, dishwashers, power showers- as well as dealing with the increasingly heavy rainfall that we are experiencing. When the system is at its fullest, the sewers are designed to overflow into the nearest river. This causes pollution and harms wildlife and is happening more and more often.

In areas along the Wandle that were built after the 1920s, drains tend to have separate systems: one for sewage (which goes to the Sewage Treatment Works) and another for rainwater (which is fed straight back into the river). In this system it is vitally important that household waste water is plumbed correctly into the sewer and NOT the rainwater drain, to prevent polluted water finding its way into the River Wandle.

Check whether your drains are connected right: www.connectright.org.uk

Hotter and drier summers

London's roads and buildings hold onto the sun's heat and turn the city into a giant storage heater. This is called the 'urban heat island' effect and contributes to poor air quality and localised thunderstorms. London can be 10°C hotter than surrounding areas and stays warmer well into the night which can be uncomfortable and dangerous to health.

When rain is scarce, our gardens dry out and we turn to using drinking water to water them. This puts extra pressure on the River Wandle as more water is pumped out of the chalk aquifer and less enters the river.

In times of drought and during heatwaves the river's level drops and the water warms up. This leads to lower levels of dissolved oxygen in the water and excess growth of algae which can distress and kill fish and other aquatic species.

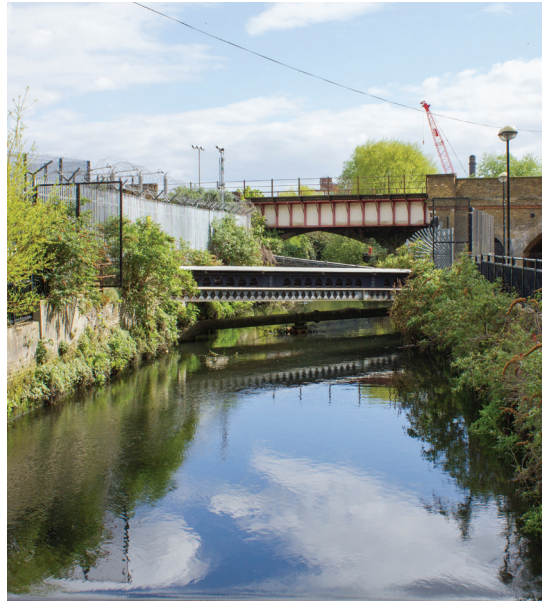
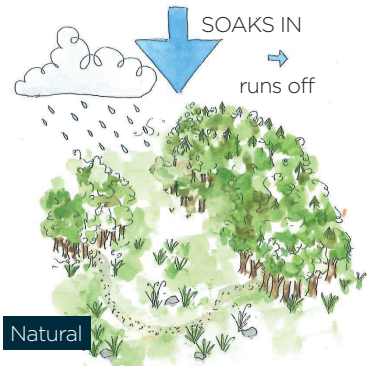
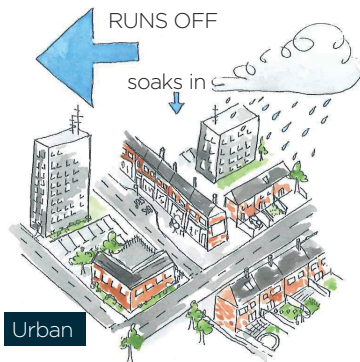


Photo: Tetramesh

Solutions

The solution lies in turning our urban areas from grey to green and allowing soil to naturally soak up rainfall. We can slow down the flow of rainwater entering our drains by capturing it in wildlife-rich gardens and other green features instead. Doing this will help to:

- 🌱 Reduce local flood risk
- 🌱 Improve the area's tolerance of drought
- 🌱 Improve the quality of water in the River Wandle
- 🌱 Preserve and improve wildlife habitats
- 🌱 Reduce the urban heat island effect that makes London hotter than the surrounding countryside
- 🌱 Improve air quality as plants



- 🌱 produce oxygen and filter out airborne pollutants
- 🌱 Provide attractive outdoor places for us to enjoy
- 🌱 Increase people's access to nature and improve their wellbeing
- 🌱 Save money, as rain gardens are significantly cheaper than pipes, tunnels and hard engineering!

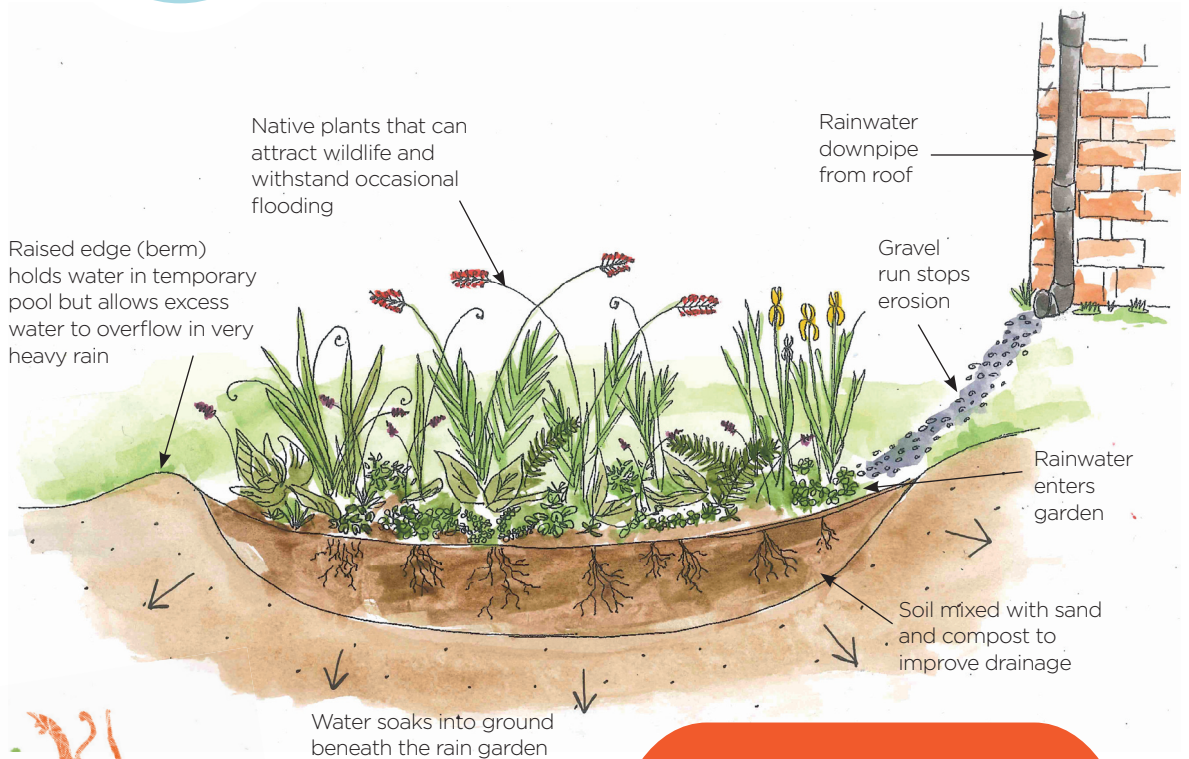
The following pages provide an introduction to things that you can do in your local area to reduce local flood risk and make your neighbourhood more resilient to climate change.

Rain gardens

divert rainwater from buildings and hard areas into wildlife havens

WHAT ARE THEY?

Rain gardens are shallow planted basins that allow water to drain naturally into the soil. When it rains, water that falls on hard surfaces such as paving and rooftops can be diverted into rain gardens where it can soak into the ground or be absorbed by plant roots. Rain gardens provide simple, attractive and wildlife-friendly ways to reduce flood risk and improve our urban areas.



TOP TIPS

01

Do an infiltration test before you build your garden to know whether you need to make the soil more permeable

02

Think about an overflow system so that your rain garden doesn't fill up more than you intend it to! There is plenty of advice at raingardens.info

03

Keep your rain garden 3m away from buildings to protect their foundations. Keep well away from trees to prevent damaging their roots while digging. Depending on the species, roots can extend at least as far as the height of the tree and can be close to the surface.

FAQs

Useful resources
UK Rain Garden Guide
raingardens.info

What's the difference between a rain garden and a pond?

Ponds are full of water most of the time, whereas rain gardens are usually dry. They can tolerate occasional spells of flooding but this usually drains away a few hours after a storm.

Will it attract mosquitoes?

No – mosquitoes need standing water for over a week to successfully reproduce, whereas a rain garden will only contain water for a few hours

following most storms.

What can I plant in it?

You can really make it your own. It is a good idea to plant taller plants at the centre of the garden with a variety of species to create dense and resilient planting. Planting native species that are nectar rich will encourage bees and other pollinators into your garden, but avoid plants that are better suited to dry conditions such as lavender or those susceptible to root rot.

What about maintenance?

The only maintenance that rain gardens need is occasional weeding, and watering in dry weather when the garden is first planted to allow the plants to become established – not a lot!

Not enough space?

You can also make a rain garden in a large planter, watered by the overflow from your water butt or directly by a downpipe.

IN PRACTICE



Hackbridge rain gardens

The Heart of Hackbridge project set out to improve the environment around the town centre. One of the biggest complaints of the town's shopkeepers and customers was the localised flooding that occurred whenever it rained, making access to some shops impossible after a deluge. The team, led by Sutton Council with support from the Wandle Trust, installed five rain gardens around the town centre which capture rainfall and allow it to soak away slowly and naturally, preventing large puddles in the high street. The project team chose hardy, drought resistant plants to reduce the need for maintenance.



Baltic Close rain gardens

In Colliers Wood, Merton Council and Transport for London created a new pedestrian route to Wandle Park from the high street complete with a rain garden to tackle the local flooding problems. The garden comprises low planters and permeable paving made of timber sets bedded into the soil to allow rainwater to soak into the earth. Excess water from the planters flows into a drain that is connected to a rain garden in Wandle Park which can hold large amounts of rainwater and help to stop flooding in the town centre.

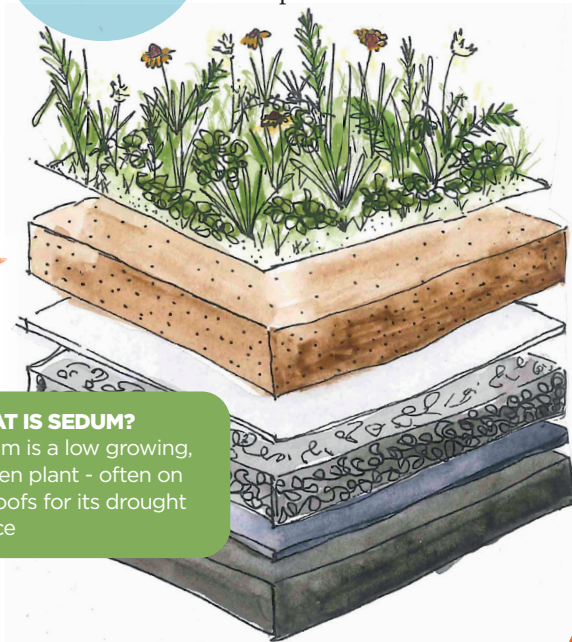
These are bigger and more technical rain gardens than you might make yourself but they are great examples of how rain gardens can achieve so much for local communities—helping to prevent flooding as well as enhancing the look and feel of an area.

Green roofs

plant cover on roofs to catch rainwater and create new wildlife habitats

WHAT ARE THEY?

Quite simply, green roofs are rooftops that have been deliberately covered in plants. They act as a sponge, soaking up the rain and also providing important wildlife habitat for pollinators and insects, supporting the birds that rely on them. They also help to cool urban areas and increase both air and water quality - an impressive CV!



- ← Planting
- ← Soil layer
- ← Filter layer to stop soil from washing through
- ← Drainage layer
- ← Waterproof liner (like pond liner)
- ← Original roof

Q: WHAT IS SEDUM?

A: Sedum is a low growing, evergreen plant - often on green roofs for its drought tolerance

DID YOU KNOW? Intensive green roofs are essentially rooftop gardens, containing thick soil with plants and trees. Extensive roofs have much thinner soil and are not usually intended for public access

Types of green roof



LIGHTWEIGHT EXTENSIVE

- the simplest green roof type!

Planting: sedum

Value:

- 🌱 Light and low maintenance
- 🌧️ Thinner soil layer = holds less water
- 🐦 Support less wildlife

Cost: £



EXTENSIVE - our favourite!

Planting: mixture of sedum and wild flowers

Value:

- 🌱 Support more wildlife than sedum alone
- 🌱 Deeper soil = holds more water
- 🌧️ Heavier and need occasional watering if very dry

Cost: ££



SEMI-INTENSIVE - more like a garden than a green roof!

Planting: mixed - ornamental planting, herbs and small shrubs

Value:

- 🌱 Excellent wildlife habitats
- 🌱 Hold a lot of rainwater
- 🌧️ Very heavy and complex to install
- 🔧 Require routine maintenance

Cost: £££

Photos: E.Dronkert and Centre for neighborhood

FAQs

More information:

The DIY Small Scale Green Roof Guide is available at greenrooftraining.com

Can I green my roof?

There are a few things you need to think about before you can build your green roof. Firstly, you need to make sure the building will be strong enough to hold the extra weight of a green roof. Supports and reinforcements can be used to increase the loading weight of a roof. You also need to think about the roof's slope. Flat roofs and those with a slight slope are simplest to green but you can create

green roofs on those that slope up to 45 degrees with a little more thought.

Do green roofs need watering?

In general they don't need watering and will bounce back from dry periods. Remember that you're dealing with nature - if grasses and flowers go brown in summer they will recover with rainfall, just like they would in a meadow or lawn! However if

you'd rather it didn't go brown you can water your green roof easily by incorporating a simple irrigation system into its design.

Who can build a green roof?

It's up to you! There is a lot of help and information available about how to build your own green roof but there are also plenty of qualified installers that will happily do it for you, depending on your preference (and budget!).

IN PRACTICE

Green roof on bike shed—Morden Hall Park



A small garden shed at the back of a Victorian stableyard in Morden Hall Park boasts a beautiful green roof and demonstrates how even small structures can be used to create valuable habitats for birds and insects and reduce rainwater run-off. The roof is home to a variety of plants including sedums and different wildflowers to support a wider range of wildlife than sedums would alone. Any surplus water is collected via a gutter into a rainwater butt.

This is part of a larger project which refurbished the stable yard complex to create an ingenious, low-energy building that the National Trust completed in 2011. The centre's toilets flush using both water collected from the roof's gutters (which is stored in tanks under the surface of the courtyard) and by reusing the water collected from the handwashing basins. Have a look in the stableyard discovery centre to find out how it all works!

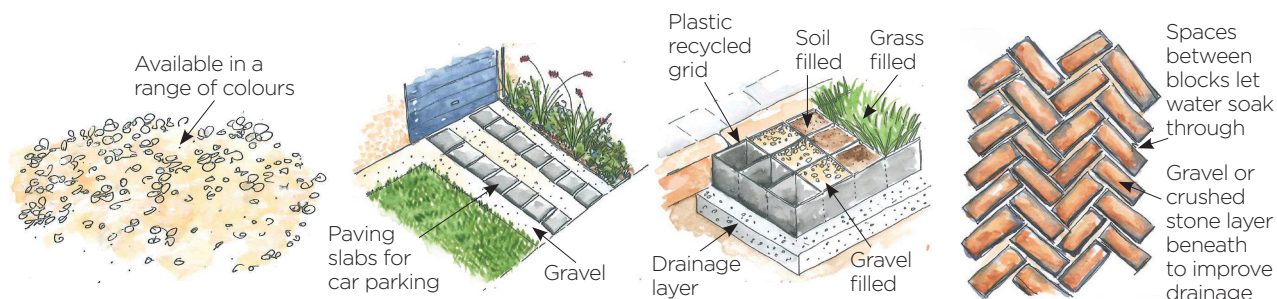
Photo: National Trust

Depaving

take up hard paving to allow water to soak through into the ground beneath



Depaving is the process of removing impermeable surfaces such as tarmac, concrete and paving slabs and replacing them with alternative materials that will allow water to pass through to the soil beneath, such as gravel, soil and grass. It can also be the process of getting rid of unnecessary tarmac to create new green spaces for people to enjoy and wildlife to thrive. It aims to counteract the problems caused by the mass-paving of London's urban gardens and can create not just permeability but attractive, healthy places for people to enjoy.

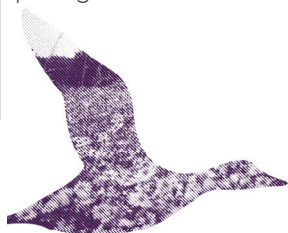


Gravel – in many ways the simplest and cheapest permeable surface! However it is prone to spreading and forming ruts so may need a little maintenance to keep it in the right place and isn't suitable for very steep driveways or wheelchairs.

Cost: from £45 for a bulk bag (0.85 tons)

Wheel tracks – only pave the section that you actually need to drive on! Using planting and gravel in between wheel tracks is cheap, easy, attractive and better for wildlife.

Cost: about £5 per paving slab



Grass and gravel reinforcement –

Using a grid of strong recycled plastic that can be driven over provides a permeable surface that grass and tough low-growing plants can be grown through. Gravel can also be used for a low maintenance option.

Cost: £16-20 per square metre

Brick pavers – looks like traditional block paving but gaps between bricks let water soak through to a layer of improved drainage below. Low maintenance but needs to be installed by a specialist contractor. Needs to be installed on compacted aggregate to allow water to soak through.

Cost: £16-£18 per square meter

Gardens are an important part of our city's natural flood prevention capabilities. They cover nearly a quarter of the land area in Greater London but are under pressure from car parking and paving. Research by the Royal Horticultural Society (RHS) indicates that half of London's front gardens have been paved over for car parking; a 36% increase in hard paving between 2005-15. And the greatest loss of front gardens in the UK in recent years has been seen in London. But there's lots we can do to combat this! The Wildlife Trusts and RHS have teamed up to provide advice on turning your gardens into green oases which provide sanctuary for wildlife in the city. You can find lots of practical ideas at www.wildaboutgardens.org.uk and sample designs for greener front gardens at www.rhs.org.uk.

DID YOU KNOW? Every year, an area of London two-and-a-half times the size of Hyde Park is paved over in people's private gardens – a huge loss to London's wildlife which increases the city's flood risk

MORE INFORMATION

Royal Horticultural Society guidance on permeable paving at rhs.org.uk
All about depaving at depave.org

How to depave – step by step

Although it is a relatively straightforward process, it is important to have a plan when conducting a depave project.

- 1 Make sure you know the whereabouts of pipes and cables before you start digging
- 2 Consider how rainwater naturally flows in the area in order to avoid soil erosion and messy runoff when it rains
- 3 Suit tools to the thickness of the surface that is being removed – choose either manual or mechanical
- 4 Remove waste and arrange for its removal and recycling or disposal
- 5 Once the area is clear, lay your chosen materials (gravel etc.) or if using the area for planting add compost with lots of organic matter
- 6 Finish as you wish (e.g. planting, sow grass seed, create vegetable patch)

IN PRACTICE

Depaving a front garden – Wandsworth



Removing paving from part or all of your front garden has instant benefits and is a brilliant way of reducing flood risk and brightening up your street. Instead of concrete or tarmac in your front garden, colourful plants can provide food for butterflies, birds and other animals and can even help to filter out air pollution and reduce the heat island effect. If you want to use your front garden for parking, laying special permeable or cellular paving means you can have a garden and still park a car on top of it!

Water butts

stop clean water from being lost to the sewers and protect water resources at the same time

One of the easiest things to do to help your neighbourhood become more flood proof is to fit a water butt. They work by storing the rainwater that falls on buildings which you can reuse to water the garden, wash the car or clean your windows.

Advantages

- Reusing rainwater reduces pressure on precious water resources, especially in areas of water stress such as South East England.
- Having a water butt can save you considerable amounts of money on your water bills, especially in summer when water consumption in the garden can rise to 50% of household use.
- Biologically, rainwater is better for plants than chemically treated household water so they'll thank you for it too.



100 litre water butt - good for fitting into a tight corner if you're short on space. Available from savewater.savemoney.co.uk - reduced price £19.99.

DID YOU KNOW?

By installing a water butt you could also cut your carbon footprint as each household has half a tonne of water treated and pumped to their door every day! (Waterwise)

190 litre water butts - the most popular size - £29.99.



FAQs

What about mosquitoes?

Some people encounter problems with mosquitoes breeding in their water butts but it can be easily stopped by adding a thin layer of vegetable oil onto the water's surface to stop them from laying eggs.

Are they easy to fit?

There are two simple ways to fit a water butt. Using a hacksaw you can cut away a section from the plastic downpipe and place the water butt directly beneath it. This will overflow when full so only do this if you will use the water regularly! Alternatively, fit a diverter to the downpipe that will carry water from the pipe to the water butt. When the butt is full the flow diverts back to the drain. For more information see the water butt page of waterwise.org.uk.

Connecting to cast iron downpipes

This is harder but not impossible. Special diverter kits are available that require a joint in the pipe to be removed and replaced with one with an inbuilt diverter. Another method is to drill a notch and install a diverter kit through this hole.

Do they need to be maintained?

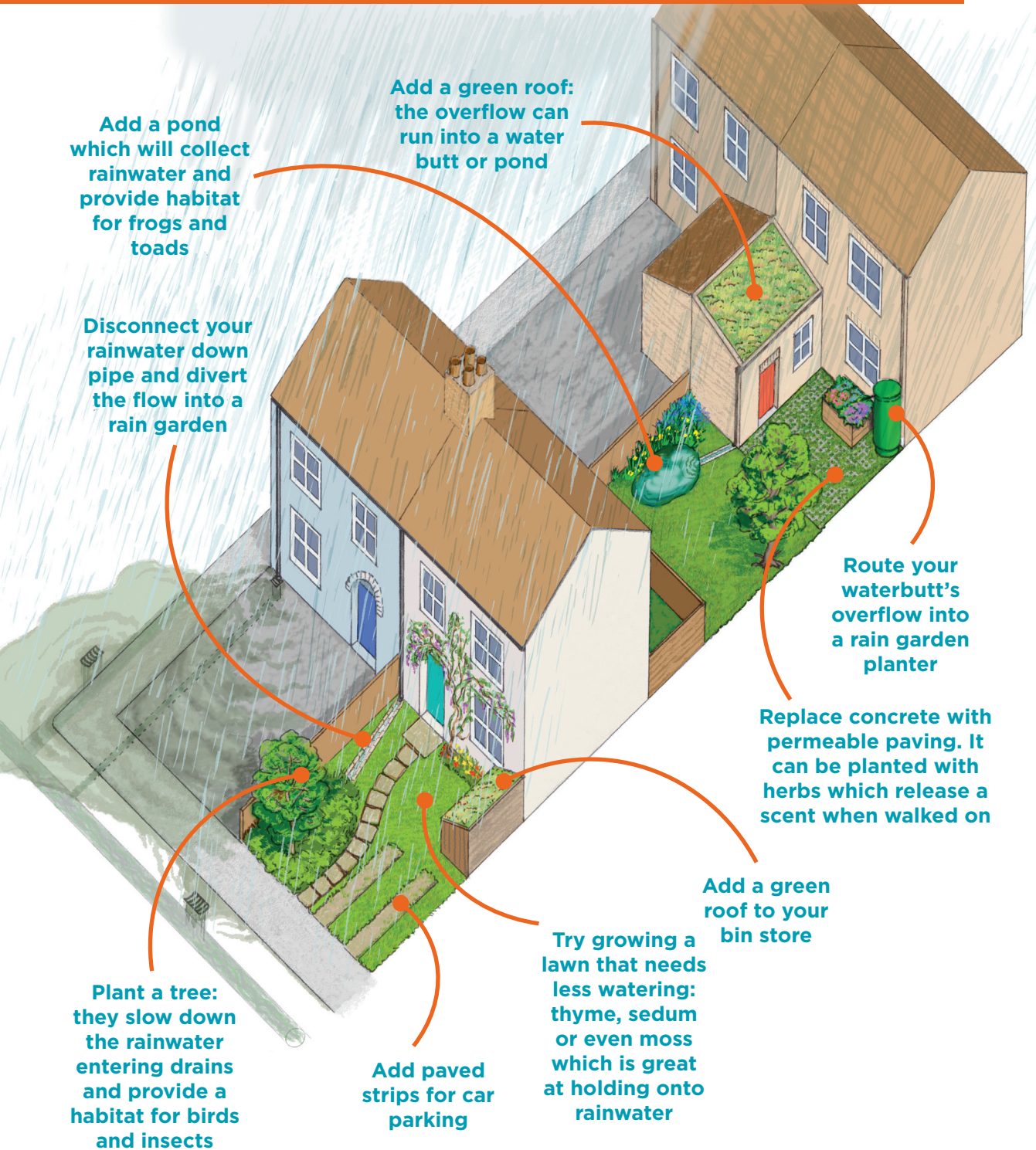
Water butts should be covered with a solid top or fine mesh to stop leaves and small animals from falling in. Occasionally you may need to empty your water butt to prevent algae growing but generally maintenance is minimal.

WHERE TO GET THEM Thames Water and Sutton and East Surrey Water companies both offer discounts to their customers on water butts and other water saving devices. Check their websites for current offers!

www.waterplc.com
www.thameswater.co.uk

Every action helps slow the flow:

what can you do locally?



Be water wise

WATER EFFICIENCY IN SUTTON

The Grange Bar & Restaurant in Beddington Park saved £2,700 worth of water per year with an environmental audit, delivered by Bioregional on behalf of Sutton Council. Water leaks were fixed, flow restrictors were fitted and flow rates adjusted to make taps more efficient. These simple steps reduced the Grange's water usage from 7m² per day to just 1.4m², saving half a tonne of CO₂ and £2,700 in water bills.

WHY SAVE WATER?

Water is a precious resource, essential for all forms of life on earth. There is plenty of water on the planet but almost all is salty sea water, with less than 1% being fresh water that we can drink and use in our homes and neighbourhoods. Our demand for this limited resource is high and the sources of our drinking water (from rivers and aquifers) are depleted due to our heavy usage. London currently uses water more quickly than it is

being replaced by rainfall and this situation is expected to get worse unless we change the way we use water. In addition, our increasing use of water in the home now exceeds the capacity of London's sewer system, causing more frequent overflows of raw sewage and household pollutants into the Thames. Reducing the amount of water we use reduces the load on the sewers and prevents potentially disastrous sewage overflows.



WATER SAVING IDEAS

Here are some ways that you can reduce the amount of water you use

In the house

- 💧 Take shorter showers—ideally around four minutes!
- 💧 A third of the water we use at home is flushed down the loo— dual flush toilets and flush bags in the cistern help cut this amount
- 💧 Turn the tap off while brushing your teeth
- 💧 Keep a jug of water in the fridge rather than waiting for it to run cold from the tap
- 💧 Wash dishes—and muddy vegetables—in a bowl of water before rinsing, rather than under a running tap. You can then give the muddy water to thirsty houseplants!
- 💧 Check your home for leaks—a dripping tap can waste 60 litres of water a week—enough to fill a small bath
- 💧 Fully load your washing machine and dishwasher—one full load uses half the amount of water as two smaller loads

In the garden

- 💧 Fit a water butt and you may collect enough water to fill 500 watering cans a year. As well as your roof, add gutters and down pipes to sheds, greenhouses and bike stores
- 💧 Wash your car with rainwater rather than drinking water!
- 💧 Use a watering can rather than a hose and only water where it's needed
- 💧 Water plants in the early morning or evening to minimise the amount of water that is lost through evaporation
- 💧 Water the earth under your plants and not their leaves to maximise the amount of water getting to the roots
- 💧 Use bark, pebbles or manure as a 'mulch' to keep moisture in the soil and reduce evaporation by up to 75%
- 💧 Design paved areas so that rainwater runs off into the soil rather than into a drain, or use permeable paving



Hints & tips



FUNDING

- Funding is available for a huge range of community projects including creating rain gardens, green roofs and making new green spaces in communal areas. You can apply as a community group, residents' association or you can start up your own group for a project
- Here are a few to try:
 - *Sutton Community Fund*
 - *Affinity Sutton Community Grants*
 - *Wandle Community Grants*
 - *Wandsworth Grant Fund*
 - *Mayor of London*
 - *One Stop Carriers for Causes*
 - *Greggs Environmental Fund*
 - *Galaxy Hot Chocolate Fund*
 - *Veolia Environmental Trust*
 - *Biffa Awards*
 - *Suez Communities Trust*
- You could also find others to join forces with via forums like Sustainable Merton, Wandsworth Environment Forum, One Planet Sutton or Project Dirt

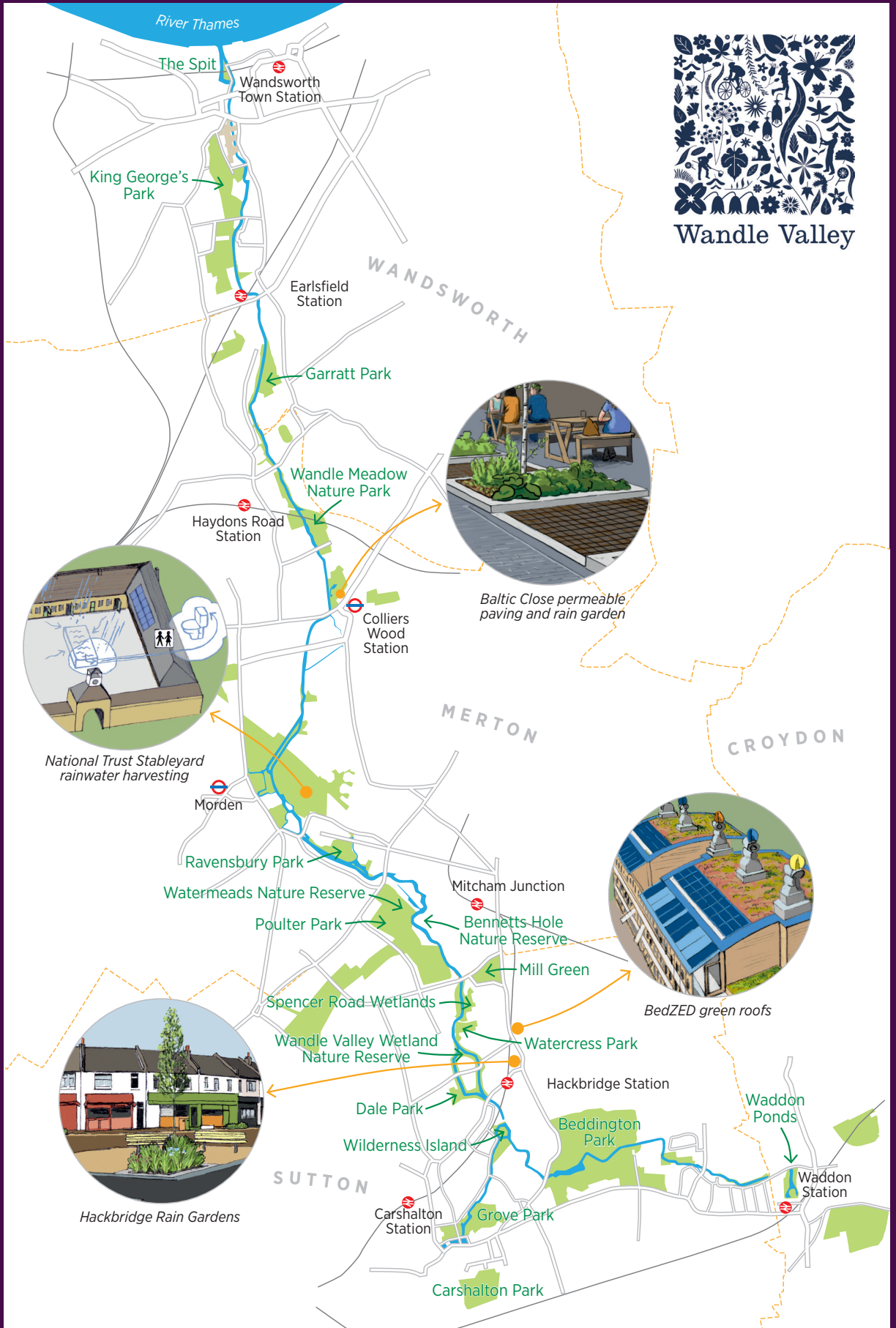
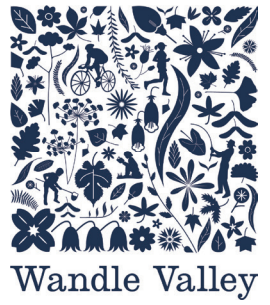
PLANNING PERMISSION

- Generally speaking you won't need planning permission for any of the projects mentioned in this guide unless they are going to significantly alter a structure that they are on. If you're unsure check with your local authority

WILDLIFE GARDENING

- A few simple considerations in how you design your outdoor space can make a big difference to the wildlife that it can support—birds, butterflies, bees, bats and hedgehogs will be helped by the additional food sources!
- Choose plants that attract nectar seeking insects – ox-eye daisy, foxgloves and cornflowers are all fairly easy to grow
- Don't forget the birds - include some plants which have berries in winter for them to eat (find plant lists at www.bto.org)
- Create a pond—even a small one will attract birds, amphibians, insects, mammals and a host of mini-beasts
- Make some shelters – a log pile, some stones or a patch of long grass all provide safe havens for wildlife to make a home
- Find out more at www.wildaboutgardens.org.uk





River Thames

The Spit

Wandsworth Town Station

King George's Park

Earlsfield Station

WANDSWORTH

Garratt Park

Wandle Meadow Nature Park

Haydons Road Station

Colliers Wood Station

MERTON

CROYDON

National Trust Stableyard rainwater harvesting

Morden

Ravensbury Park

Watermeads Nature Reserve

Poulter Park

Mitcham Junction

Bennetts Hole Nature Reserve

Mill Green

Spencer Road Wetlands

Wandle Valley Wetland Nature Reserve

Watercress Park

BedZED green roofs

Dale Park

Hackbridge Station

Wilderness Island

Beddington Park

Waddon Ponds

Waddon Station

SUTTON

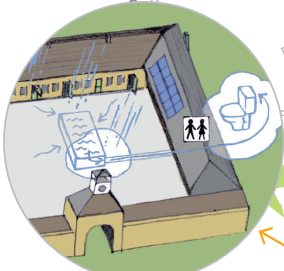
Carshalton Station

Grove Park

Carshalton Park



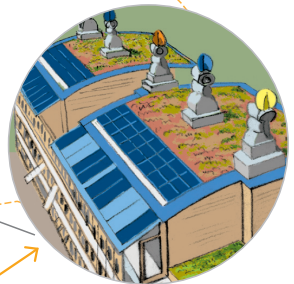
Baltic Close permeable paving and rain garden



National Trust Stableyard rainwater harvesting



Hackbridge Rain Gardens



BedZED green roofs