Collaboration…..

…the Holy Grail

Arboricultural Association
September 2015

illmanYOUNG™

Illman Young Landscape Design Ltd

- A landscape and environmental practice specialising in:
  - Masterplanning and site design
  - Landscape appraisals and environmental assessments
  - Project planning through to site inspection
- Our ambition:

  To create innovative, practical and sustainable landscapes

SuDS Research

- Illman Young in partnership with the University of Gloucestershire
- Completed 2 year research project
- Research into the design of SuDS that are functional, attractive and ecologically sound
- Investigation of existing schemes within the UK and abroad
- Development of Good Practice Guidelines and SuDS Training
- SuDS Pilot projects
- Ongoing relationship with university

The bigger picture

- Role of the professions now and in the future
- Complexity of working - sustainability
- Need for mutual respect and understanding
- Need to understand how each can contribute
- Need for collaboration to be effective

'But if there is a theme, it is that institutions in the future will be judged not by what they claim for themselves, but by what they contribute to others; not by what they have come to expect, but by what they commit to. And if there is a single message, it is that their future will be more successful if addressed collectively.'

Paul Morrell

Our problem

LACK OF A SUSTAINABLE APPROACH TO WATER MANAGEMENT

- Droughts and potential lack of potable water
- Potential lack of water for agricultural, commercial and industrial processes
- Flooding of agricultural land damaging crops
- Development in inappropriate locations
- Flooding of housing and businesses, and damage in infrastructure
- Limited use of recycled water
- Responsibility for water fragmented across wide range of stakeholders
- Little resilience against extreme events
- Piecemeal and knee-jerk response when disasters occur

The answer

Integrated catchment management…..

- Catchment management at all scales
- Agricultural practices
- Flood alleviation
- Flood protection
- Town planning
- WSUD
- SuDS
- Retrofitting
- Building resilience
- Water recycling at all scales

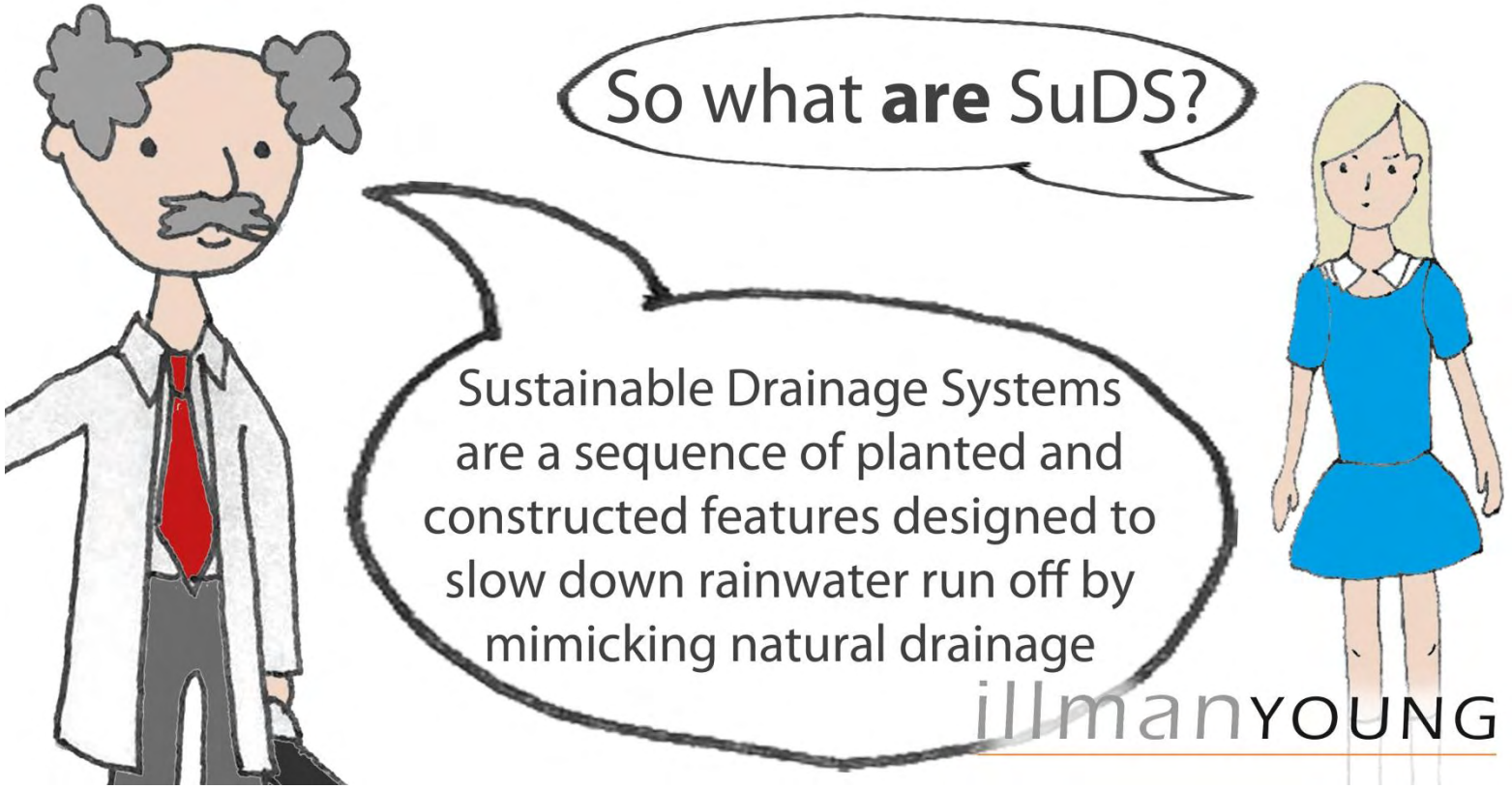
Water Sensitive Urban Design

- As the future becomes more uncertain, manage water-based risks more effectively
- Reduce the need for potable water
- Clean and recycle grey water on site
- Potential to manage black water
- Reduce risk from flooding
- Provides longer term cost certainty

'Water Sensitive Urban Design is the process of integrating water cycle management with the built environment through planning and urban design'

Water Sensitive Urban Design in the UK
CIRIA

Sustainable Drainage Systems



YouTube – Let's get Nibbling!

The background

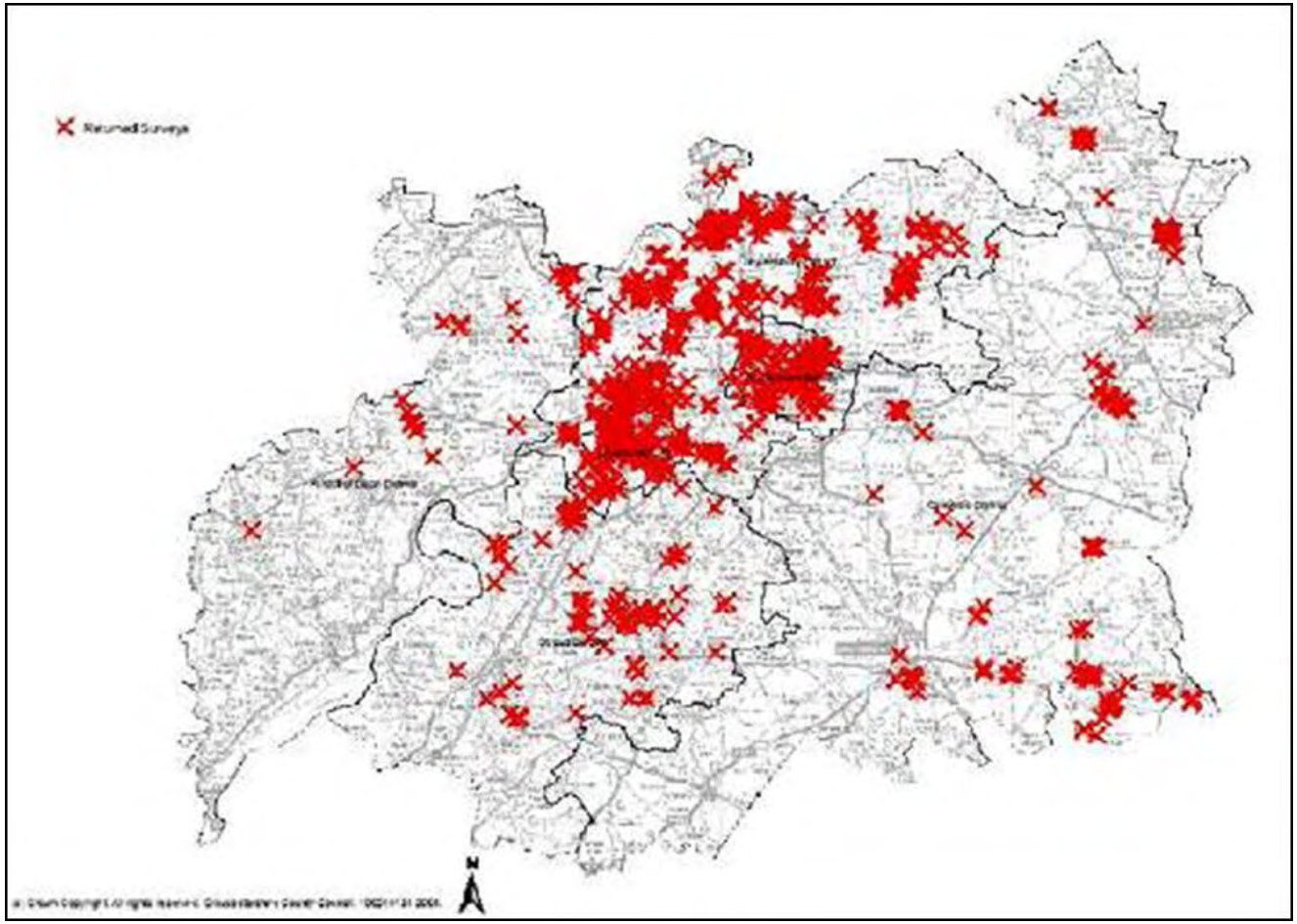
- **Early days**
- 2000 – floods in Europe
- 2004 - Foresight – Future Flooding: UK
- 2010-30, but Vision for 100 years
- 2008 – Making space for Water (England)
- 2008 – Future Water (England)

Then… ***2007 …..the floods started…..***

- 2007 – Summer Flooding Inquiry
- 2008 – The Pitt Review in England & Wales
- 2010 – Flood and Water Management Act
- 2014 - Foresight Flooding update (UK)

The problem

- Increased development creates extensive hard surfaces
- Sealing of ground prevents rain water from percolating into the soil
- Up to 80% of total rainfall turns into runoff within developed sites
- Larger amounts of water travel faster over hard surfaces
- Localised flooding
- Runoff traditionally collected in pipes
- Directed as quickly as possible into the nearest watercourse
- Problems of flooding and pollution



Gloucestershire

Known flooded properties in July 2007

Urban runoff effects in Gloucester – July 2007

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… plus the social cost

Environmental problems

Only 27% of water bodies meet 'Good Ecological Status' standard

- 49% of the pollution related to failing water bodies due to diffuse pollution
- Priority for Defra, EA, SEPA and NRW to improve water quality

Sources of non-agricultural diffuse pollution:

- Urban Runoff
- Misconnections
- Domestic Pollution

Many small scale events therefore difficult to find and manage.

The response – and how its changed

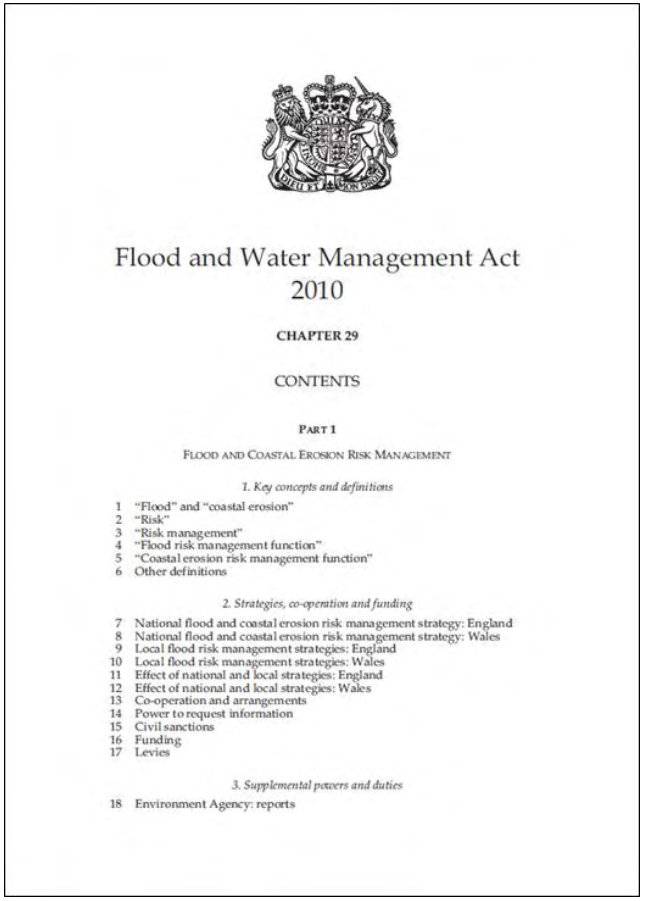
Floods and Water Management Act 2010:

- Schedule 3 of the Act covered SuDS and was outstanding, but will not now be commenced
- Replaced by approach that relies on planning authorities and Lead Local Flood Authorities

Non Statutory technical guidance :

- High level principles
- Hydraulic requirements
- …where-ever ‘reasonably practical’…
- Nothing about water quality, biodiversity or amenity

….. The guidance is solely about compliance related to water quantity – it will not deliver any multi-functional benefits



Flood and Water Management Act 2010

CHAPTER 29

CONTENTS

Current situation – April 2015

- New approach set out in Ministerial Statement HCWS 161 – 18 December 2014
- Eric Pickles and DCLG replacing Defra
- Use of planning system to secure the use of SuDS
- Expectation that SuDS "will be provided in new developments wherever appropriate"
- Local planning policies and decisions on applications relating to major development (10 homes or more and major commercial schemes) should ensure SuDS used, unless demonstrated to be inappropriate

House of Commons: Written Statement (HCWS161)

Department for Communities and Local Government

Written Statement made by: **The Secretary of State for Communities and Local Government (Mr Eric Pickles)** on 18 Dec 2014.

Sustainable drainage systems

As part of the Government's continuing commitment to protect people and property from flood risk, my Department and the Department for Environment, Food and Rural Affairs recently consulted on a proposal to make better use of the planning system to secure sustainable drainage systems. Today we are publishing our response to the consultation explaining how we will be strengthening existing planning policy. This will make clear that the Government's expectation is that sustainable drainage systems will be provided in new developments wherever this is appropriate.

To this effect, we expect local planning policies and decisions on planning applications relating to major development - developments of 10 dwellings or more; or equivalent non-residential or mixed development (as set out in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2010) - to ensure that sustainable drainage systems for the management of run-off are put in place, unless demonstrated to be inappropriate.

Under these arrangements, in considering planning applications, local planning authorities should consult the relevant lead local flood authority on the management of surface water; satisfy themselves that the proposed minimum standards of operation are appropriate and ensure through the use of planning conditions or planning obligations that there are clear arrangements in place for ongoing maintenance over the lifetime of the development. The sustainable drainage system should be designed to ensure that the maintenance and operation requirements are economically proportionate.

To protect the public whilst avoiding excessive burdens on business, this policy will apply to all developments of 10 homes or more and to major commercial development. The Government will keep this under review, and consider the need to make adjustments where necessary. The current requirement in national policy that all new developments in areas at risk of flooding should give priority to the use of sustainable drainage systems will continue to apply.

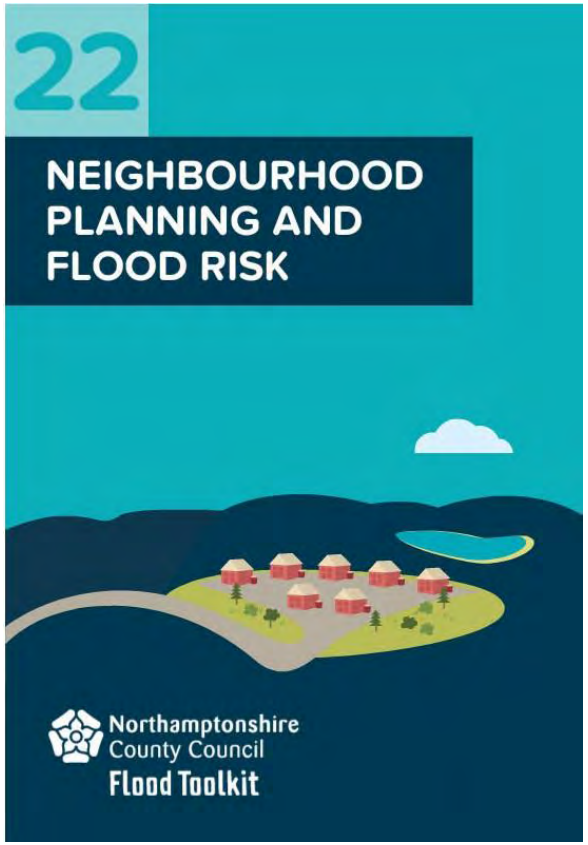
These changes will take effect from 6 April 2015. For avoidance of doubt this statement should be read in conjunction with the policies in the National Planning Policy Framework. This statement should be taken into account in the preparation of local and neighbourhood plans, and may be a material consideration in planning decisions.

To support local authorities in implementing these changes, we will publish revised planning guidance in time for the policy changes to take effect, and engage with local government on a capacity building programme.

My Department will today begin consulting on a proposal to make lead local flood authorities a statutory consultee on planning applications for surface water management; and makes changes to the statutory consultee role of the Environment Agency to better reflect the Agency's strategic expertise and reflect the new responsibilities for local flood management exercised by lead local flood authorities.

Current situation – April 2015

- Requirement in NPPF that all new developments in areas at risk of flooding should use SuDS continues
- Local Planning Authorities to consult with LLFAs on major planning applications for technical advice
- Planning conditions or obligations to provide clear arrangements for ongoing maintenance



BUT ….. The LLFA can only assess schemes against the non-statutory technical guidance

The problems

- Planning Authorities must satisfy themselves that schemes are robust and appropriately maintained
- SuDS design must ensure that its operation and maintenance are economically proportionate.
- Nothing about verification of construction in accordance with the design
- Who ensures compliance with planning conditions?
- Much of the critical construction can be hidden in the ground and problems do not surface for a number of years
- Self certification of Building Regulations removes certainty of construction

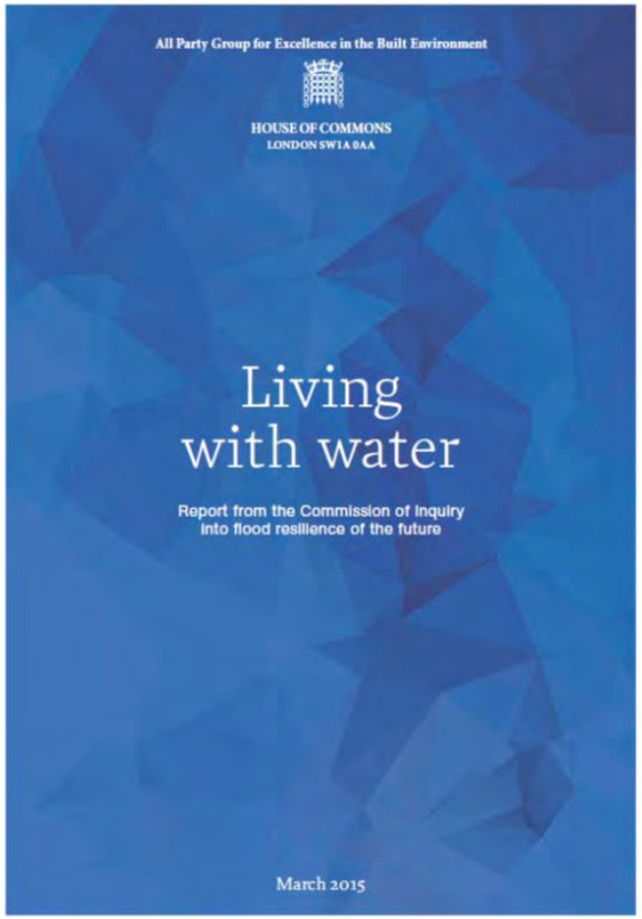
….. There is no statutory requirement for any organisation to adopt SuDS

APPG report published March 2015

Report now aimed at the new government

- Strong leadership
- Strategic land review
- Funding for maintenance
- Retrofitting for resilience
- Insurance to incentivise resilience
- Increased role for built environment professionals
- SuDS for ALL development
- Resolution of adoption issues

New Select Committee just been set up to deal with the Built Environment



How are local authorities responding?

Planners approving SuDS

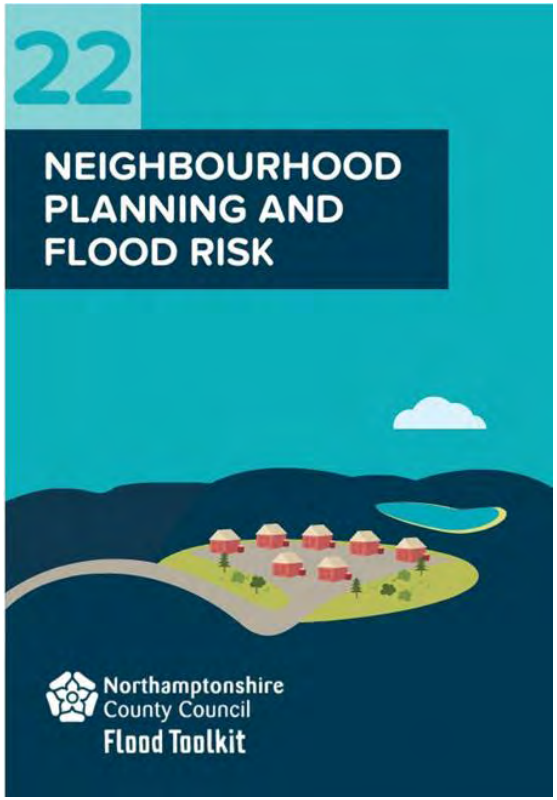
- Lack of experience and skills
- The ‘Planning mix’
- Need to educate developers

Detailed guidance by authorities

- Some counties are producing their own detailed guidance
- Not clear where this will sit in the new approach

Potential problems

- Slow start to the system and steep learning curve
- Lack of consistency in approach around the country
- Uncertainty over what is likely to be acceptable
- Adoption will still be a key barrier to using SuDS
- The get outs of what’s ‘reasonably practical’ and ‘appropriateness’



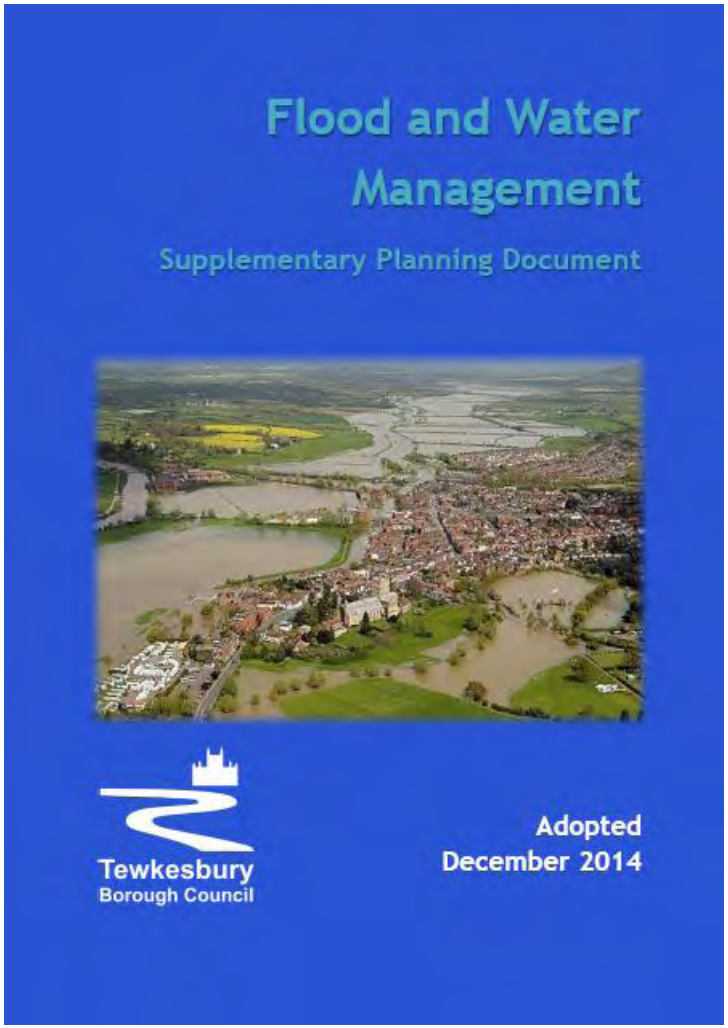
…how planning can deliver

Local Plans

- effective policy base
- inter-relate flood risk, SuDS, GI and landscape character
- consider how SuDS and POS integrate
- appropriate supplementary planning documents

Development control

- LLFA are statutory consultee joint training and understanding
- clear remit for SuDS in Development Plans and on redevelopment sites
- co-ordinated pre-app advice
- set requirements for outline and reserve matters/detailed planning
- Clear and effective planning conditions



…. but it's only new build

Why is it going to get worse?

- Towns and cities historically located on rivers
- 5.2m homes or more are currently at risk
- Urban creep and upstream development
- More extreme everts and climate change
- £1.1 billion of insured damage each year
- June 2007 floods – £3.2 billion cost
- Flood Re has limited value
- Lack of funding for flood management
- **NEITHER** legislation nor government has addressed the need for retrofitting or properly building resilience

How retrofitting can help

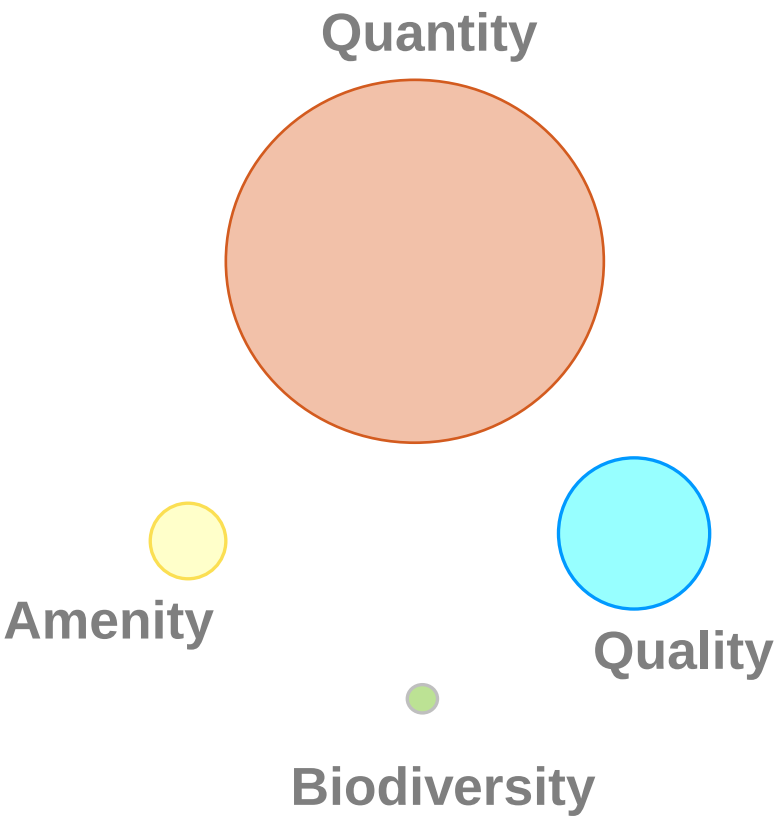
- Incremental but immediate effect
- Multiple interventions inherently build greater resilience
- Flexible application and value for money
- Develop a mindset that considers SuDS first
- Consider its application everywhere
- Aligns with other objectives around health, GI biodiversity and water quality

- **NEED TO DO…..** ***all the time ……. everywhere!***

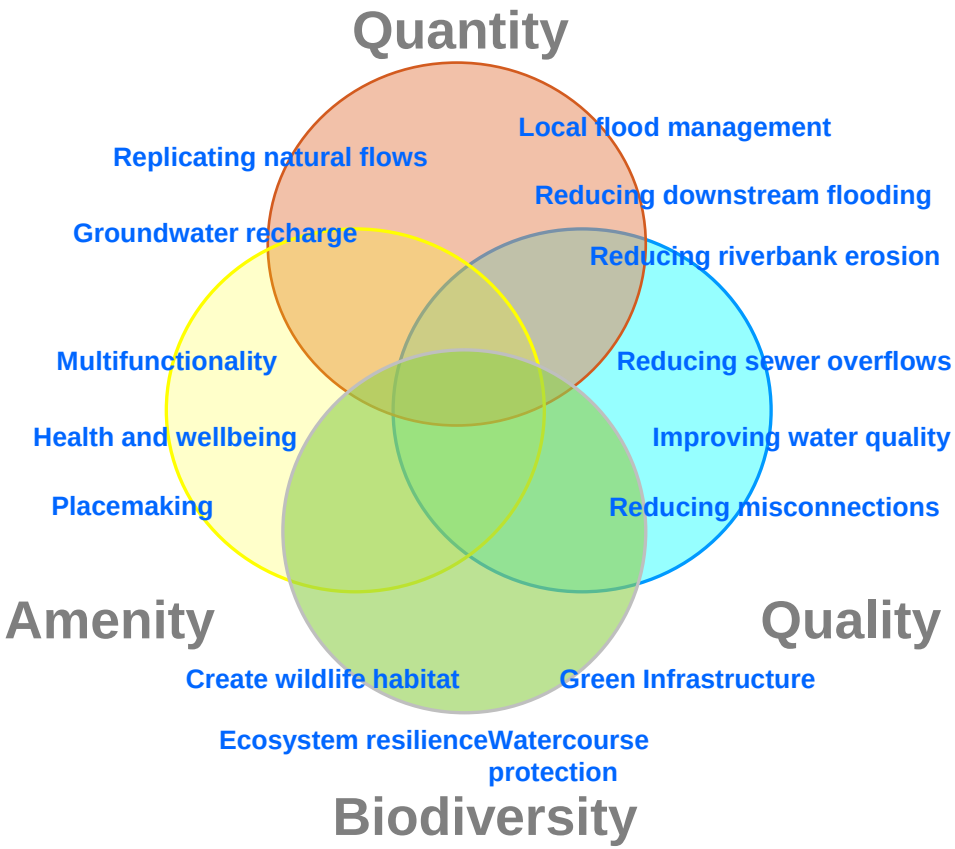
Portland – 56,000 downspouts ***Philadelphia – 25 year ongoing plan***

How it works

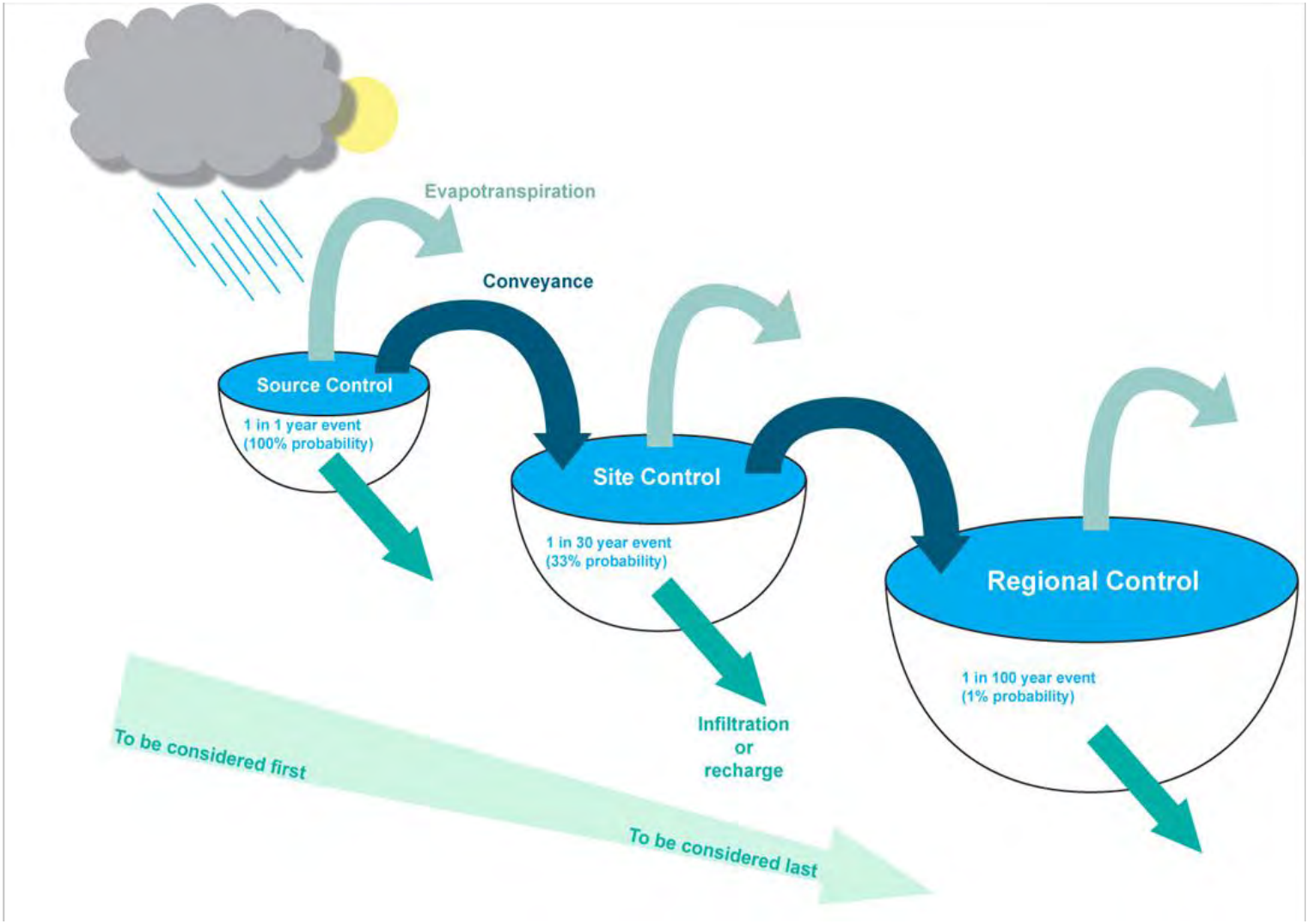
Conventional drainage systems



Sustainable drainage systems



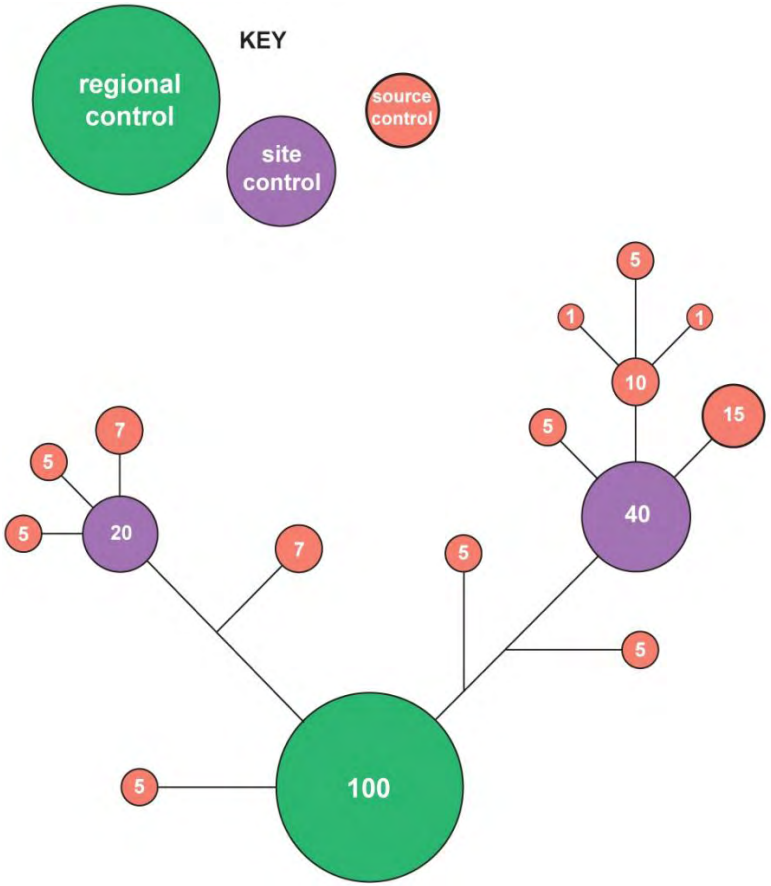
How it works


Evapotranspiration
Conveyance
Source Control
1 in 1 year event
(100% probability)
Site Control
1 in 30 year event
(33% probability)
Regional Control
1 in 100 year event
(1% probability)
Infiltration
or
recharge
To be considered first
To be considered last

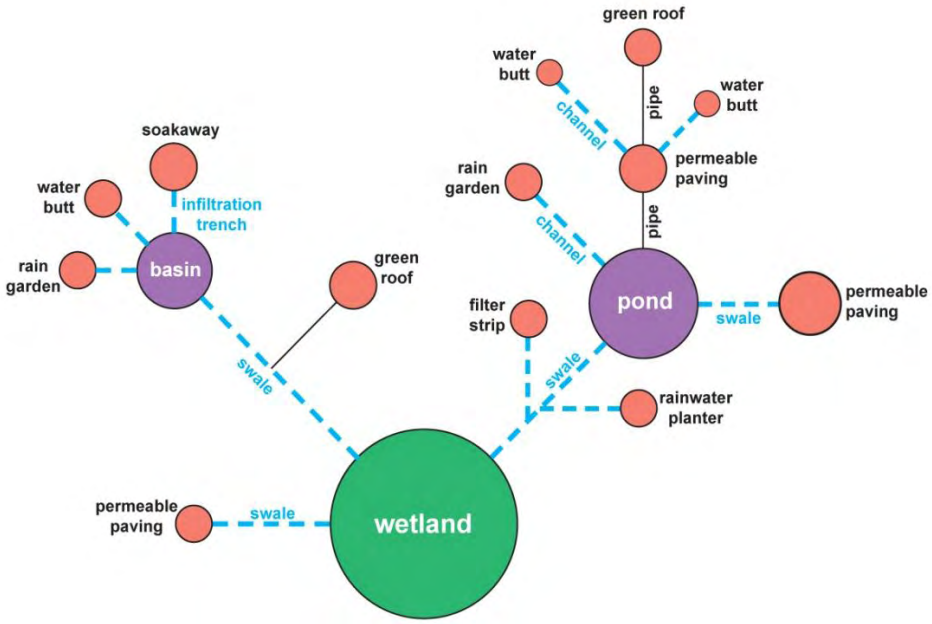
What they are

What they are

New build – developing a network

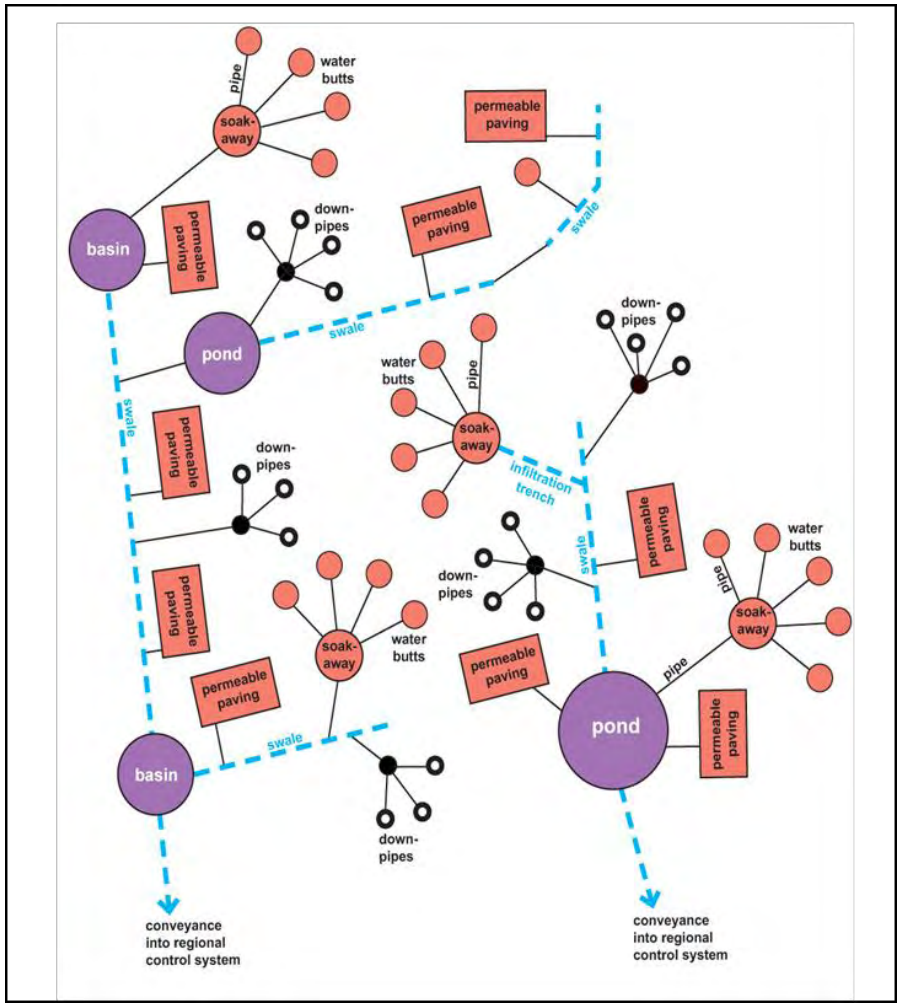


Relative capacity of features
- scheme would store 263m^3 of water



Typical arrangement of components

Interlinked SuDS network



How's retrofitting different?

- Different approach to new build SuDS
- Different site constraints – services in particular
- Design criteria decided on site by site basis
- Brownfield site redevelopment
- Engineering (and bioengineering) likely to be a key aspect
- Requires individual approach – frequently linear
- **Be opportunistic**
- ***But – can be expensive***

  - so align with other outcomes

Work in partnership

- Seek partnership funding with all stakeholders
- Consider – local authorities, water companies, EA, LEPS, BIDS, local commercial organisations, third sector organisations, radio and TV
- Its not just cash!
- You need community champions
- Community engagement is time consuming …expensive, **but essential**

- **Seek genuine partnerships… and be honest**

What you can do and where

FLAT ROOFED BUILDING

- Consider when roofs need repair or renewal
- Green, blue or brown roofs
  - weight loading determines type of green roof

ANY BUILDING

- Rainwater harvesting for internal use
- Water butts or tanks for external re-use
  - overflows back into existing system
  - can be done at any time

What you can do and where

CAR PARKS

- Repave sections with permeable paving and potentially connect to rain gardens
- Reconfigure to introduce stormwater planters
- Collect rain water for recycling on site
  - any loss of parking a key issue

SCHOOL GROUNDS

- Redesign for creative play/use
- ‘Spare’ green space invariably available
- Soft SuDS especially align with the curriculum
  - be aware of BB98 requirements

What you can do and where

TRANSPORT AND HIGHWAYS

- Resurfacing works an ideal opportunity
- Road widening/narrowing schemes
- Traffic management schemes
- Tram routes or light rail
- Parking schemes
- Pedestrianisation
- New cycle routes
- Street tree planters

DOMESTIC STREETS

- Integrate with shared surface schemes
- Consider parking issues
- Tree pit planters very useful
- Create pocket parks in left-over space
  - beware the bin men!

What you can do and where

PARKS AND COUNCIL OWNED LAND

- Parks allow larger scale features
- Can be integrated with play or biodiversity
- Create pocket parks
- Enhance ‘left over’ green space
- Consider verges for shallow swales
- Roundabouts are a great opportunity!

URBAN DESIGN

- Town centre regeneration
- Pedestrianisation schemes
- Commercial projects
- Enhance ‘left over’ urban space
- ‘Meanwhile’ projects

What you can do and where

INDIVIDUAL HOUSES

- Repave drives with permeable paving
- Disconnect downpipes
- Create rain gardens
- Green roofs on sheds
- Water butts

  - any loss of parking a key issue

FLATS AND APARTMENTS

- Disconnect downpipes and
- Redesign the communal space
- Green roofs to garages, cycle sheds or bin stores or disconnect their downpipes

What you can do - use trees!

- Uptake of water
- Interception of water
- Water quality improvements
- Air quality improvements
- Urban heat island effect
- Increase in biodiversity and opportunities for wildlife
- Species migration and GI networks
- Visual quality in the environment
- Health and wellbeing – physical and mental

…and in urban environments trees have greater all-round acceptability

An estate plan - Priors Farm, Oakley

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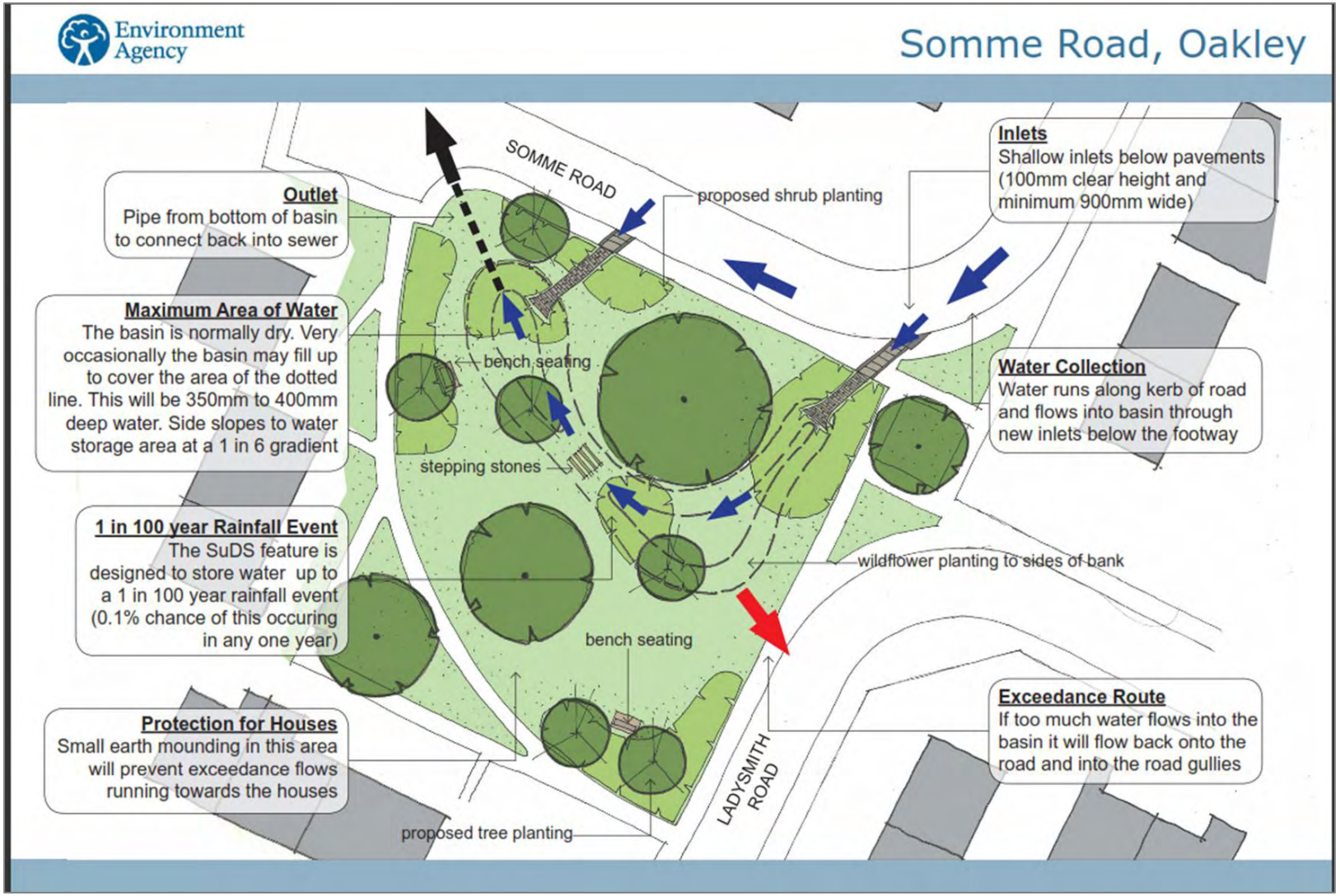
SuDS potential

Priors Farm, Oakley

Somme Road POS



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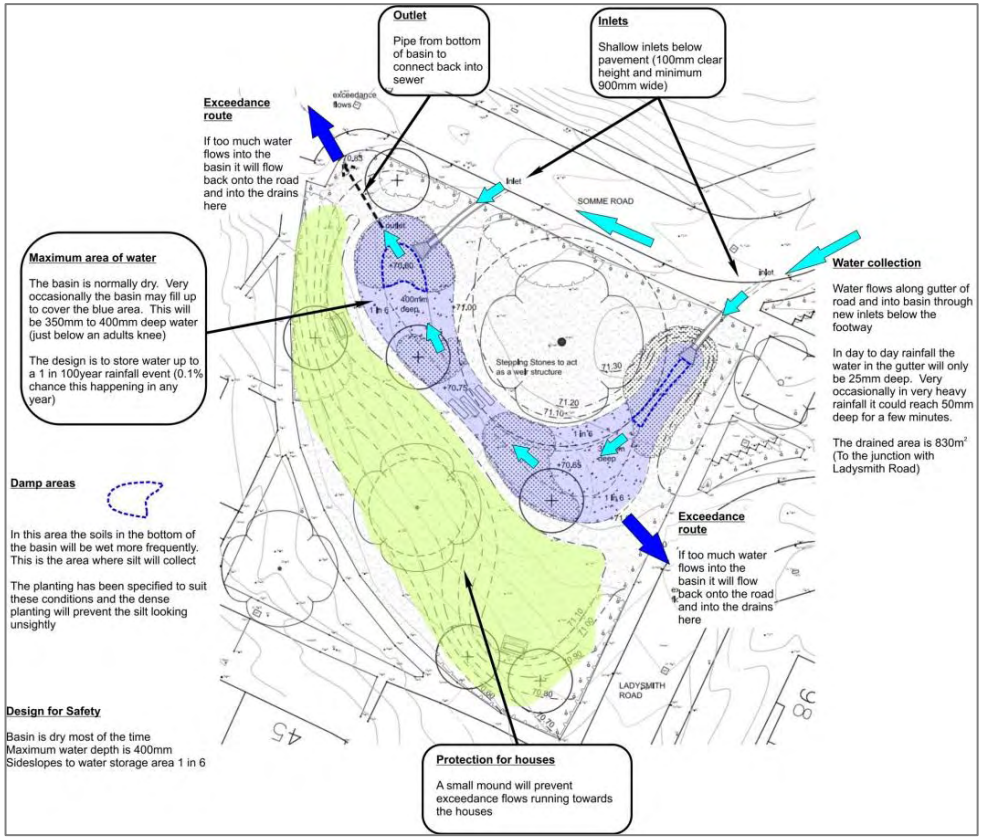
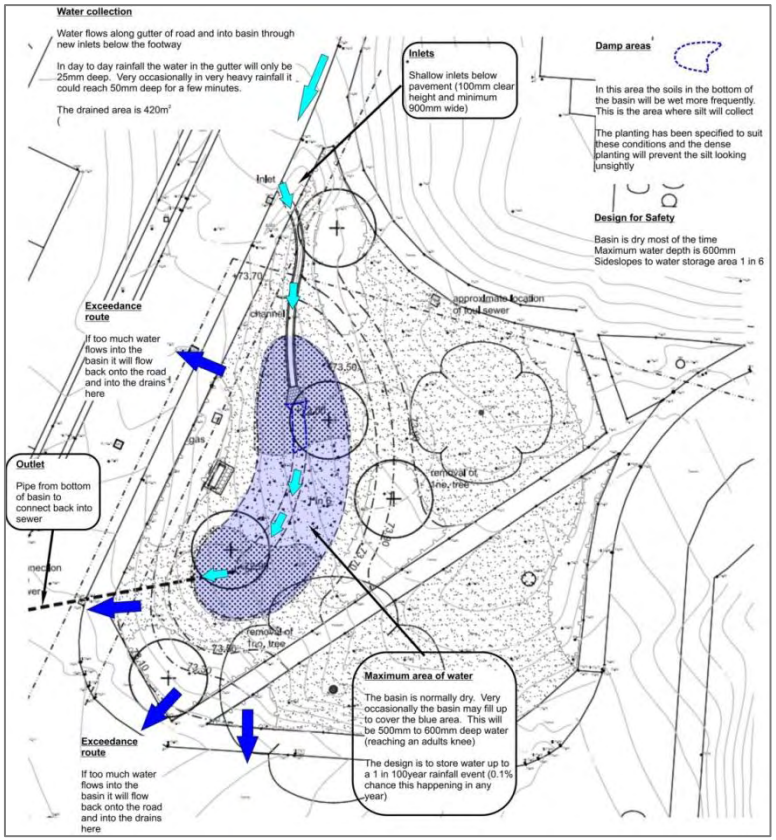
Conceptual scheme

Somme and Ladysmith Road





Raingardens

Environment Agency

Rain Gardens for Oakley

Rain Gardens for your local area

- Existing pipes cannot cope with amount of water from roofs and tarmac
- Environment Agency would like to build rain gardens in your local area to improve the situation
- Your house is suitable for a rain garden because you have a down pipe and your front garden is either flat or slopes away from your house

Attractive garden features

What are Rain Gardens?

- Similar to regular garden beds
- Shallow depression in the ground or raised bed
- Designed to capture rain water from your roof
- Your downpipe would be connected into a shallow channel or directed straight into a rain garden
- Layers of sandy soil help to slow down water entering the drainage system

Ornamental Grasses

Rain garden will be attractively planted

- Planted with plants that don't mind getting their 'feet wet'
- Ornamental grasses like sedges, snowy woodrush and chinese silver grass
- Colourful herbaceous planting like Rudbeckia, Crocosmia and Aster
- Irises

Irises

Look at design options overleaf

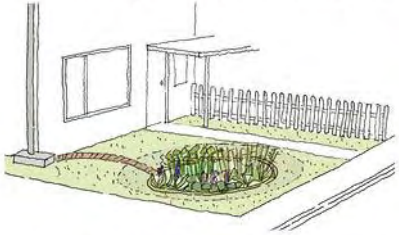
Environment Agency

Rain Gardens for Oakley

What could they look like in my garden?

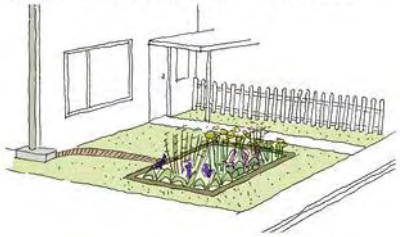
The type of rain garden suitable for you, depends on whether your garden is flat or sloping.

Option: Shallow planted depression for flat garden



Attractively planted shallow depreassion

Option: Sunken Timber Planter for flat garden



Sunken Timber Planter

Option: Raised Timber Planter for sloping garden

Raised Timber Planter

Raingardens

Environment Agency

Planting for your Rain Garden

We have created three colour schemes for you to choose from and a variety of plant choices.
Please follow the steps below to design the planting for your rain garden.

Step 1: Choose a colour scheme out of three options; red/yellow mix, blue mix or pastel coloured mix. Then go to the relevent mix.

Red/Yellow Planting Mix

Step 2: Choose one species of the following evergreen shrubs to be planted individually.

Spindle,
Euonymus japonicus 'Oratus Aureus', evergreen, max. height 1.5m

Japanese spirea
Spirea japonica 'Anthony Waterer' evergreen, max height 1.5m

Cherry Blossom
Prunus laurocerasus 'Zabeliana' evergreen, max height 1m

Step 3: Choose 2 species of the ornamental grasses and ferns to be planted in groups of 2-3.

Bowles' Golden Sedge
Carex elata 'Aurea' max. height 1m

Great Woodrush
Luzula slyvatica, max. 0.5m

Soft Shield Fern
Polystichum setiferum evergreen, max. 1.2m

Step 4: Choose one species of the herbaceous plant to be planted in groups of 2-3.

Coneflower 'Goldsturm'
Rudbeckia fulgida var. sullivantii 'Goldsturm max. height 1m

Sneezeweed
Helenium 'Moerheim Beauty', max. 1m

Knautia
Knautia macedonica max. height 0.9m

Step 5: Add 2 species of ground cover planting to be planted in groups of 2-5 along the edges

Lenten Rose
Helleborus orientalis evergreen, max. height 0.5m

Rock Crane's Bill
Geranium macrorrhizum 'White-ness', semi-evergreen, max. height 0.3m

Lady's Mantle
Alchemilla mollis evergreen, max. height 0.5m

Environment Agency

Planting for your Rain Garden

Blue/Purple Planting Mix

Step 2: Choose one species of the following evergreen shrubs to be planted individually.

Cherry Blossom
Prunus laurocerasus 'Zabeliana' evergreen, max height 1m

Japanese Spirea
Spirea japonica 'Little Princess' evergreen, max height 0.8m

Kelseys Dwarf Dogwood
Cornus sericea 'Kelseyi' evergreen, max height 1.2m

Step 3: Choose 2 species of the ornamental grasses and ferns to be planted in groups of 2-3.

Tufted Hairgrass
Deschampsia caespitosa, max. height 0.7m

Great Woodrush
Luzula slyvatica, max. 0.5m

Soft Shield Fern
Polystichum setiferum evergreen, max. 1.2m

Step 4: Choose one species of the herbaceous plant to be planted in groups of 2-3.

New England Aster
Aster novae-angelica 'Violetta' max. height 1.5m

Siberian Iris
Iris sibirica 'Shirley Pope' max. height 0.85m

Globe Thistle
Echinops ritro max. height 0.9m

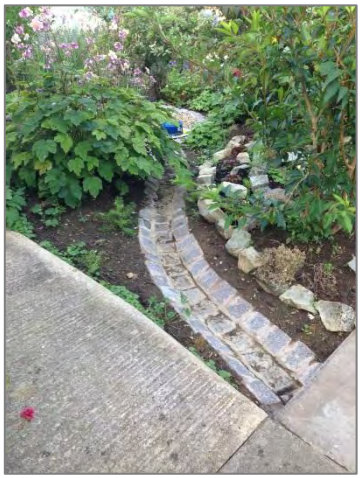
Step 5: Add 2 species of ground cover planting to be planted in groups of 2-5 along the edges

Elephant's Ears
Bergenia 'Bressingham White' evergreen, max. height 0.45m

Geranium 'Johnson's Blue'
Geranium 'Johnson's Blue', semi-evergreen, max. height 0.5m

Heuchera 'Purple Palace'
Heuchera villosa 'Purple Palace' evergreen, max. height 0.5m

Raingardens



Raingardens

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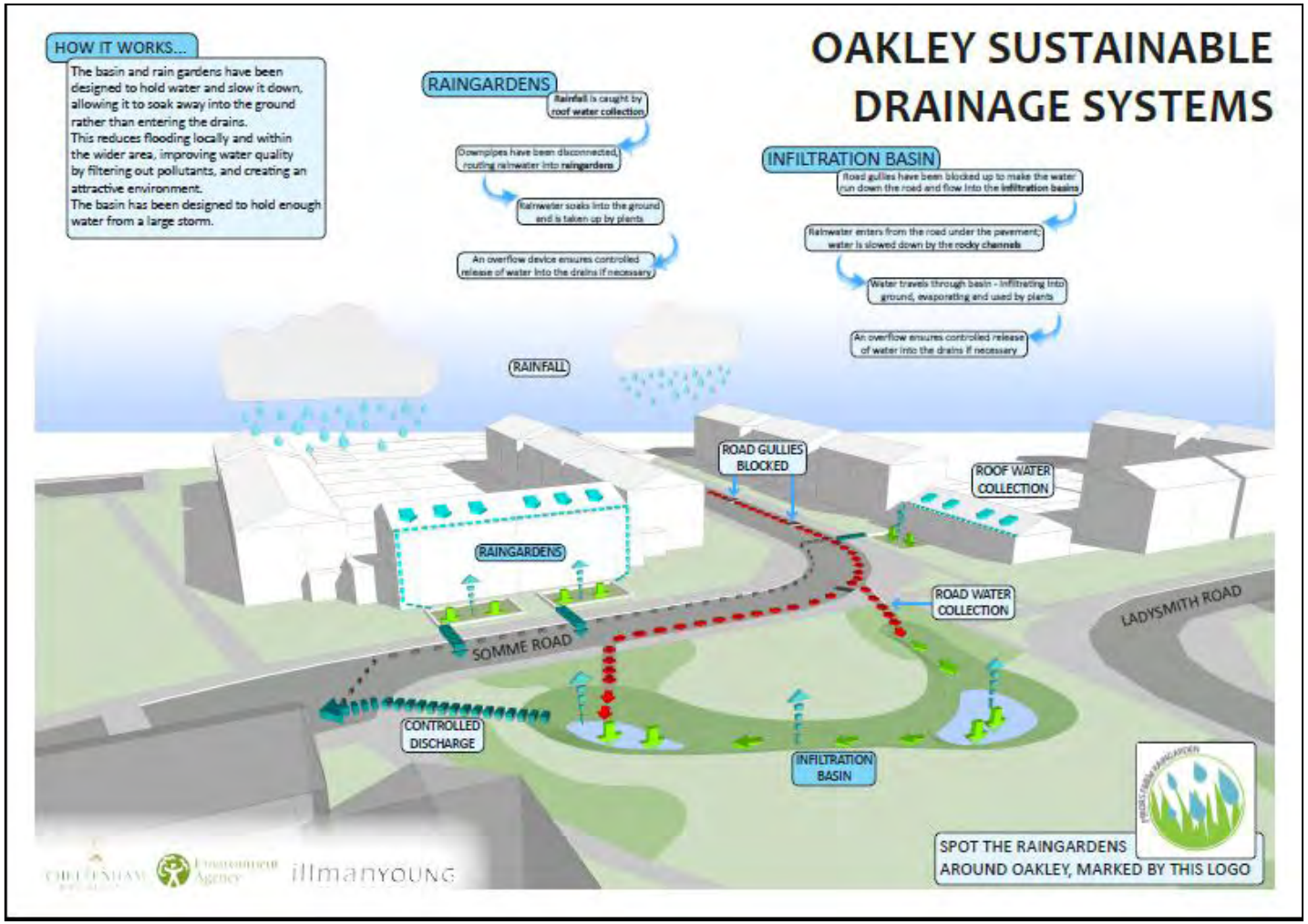
Completed garden

Promoting understanding and SuDS awareness



PRIORS FARM RAINGARDEN

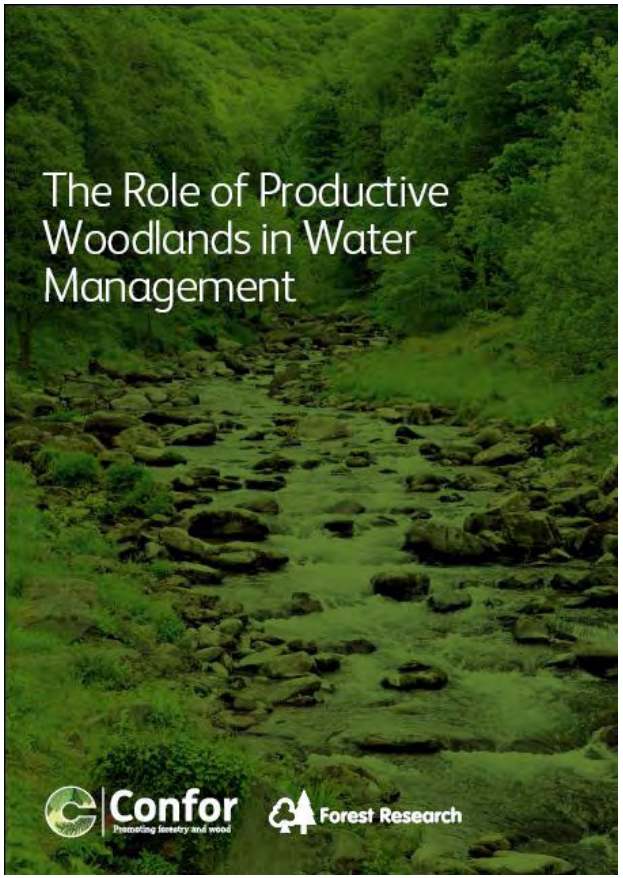
Information board and raingarden roundel

How you can do it

- Uptake of water reduces flood volumes
- Higher infiltration of woodland soils reduces rapid surface run-off of water
- Hydraulic ‘roughness' of trees, shrubs and large wood debris slows flows
- Protects soil from erosion, reducing sediment load, reduces need for dredging
- Reduces pollutants in runoff
- Larger woodlands = greater effectiveness

DELIVER THROUGH

- Stewardship schemes
- Forest Research opportunity mapping
- Forestry Grants



How you can do it

UNDERSTANDING THE TECHNICALITIES

- Engineering versus trees needs
- Dealing with structural loading
- Managing services

- SuDS requirements
- Soil conditions
- Appropriate soil system

AWARENESS OF GUIDANCE

- CIRIA and TDAG

How you can do it

TREES REQUIRE

- Sufficient space
- Appropriate soils
- Sufficient gas exchange
- Adequate drainage
- Supply of water
- Avoidance of compaction

THE SuDS SHOULD

- Drain the local area = one gulley
- Drain down within 48 hours
- Have storage below main rooting area

Bigger trees = greater rooting area = greater water storage capacity

How you can do it

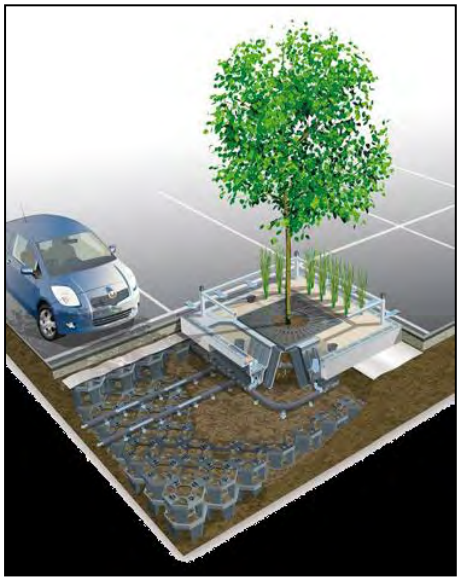
STRUCTURAL GROWING MEDIA
- Sand based substrates – tree soils
- Medium sized aggregate with soil
- Stone skeleton substrates

MODULAR STRUCTURES
- Crate systems – plastic/concrete etc

RAFT SYSTEMS
- Geo cells
- Geocellular units

TREE PLANTERS
- Bioretention systems

Permavoid geocellular units

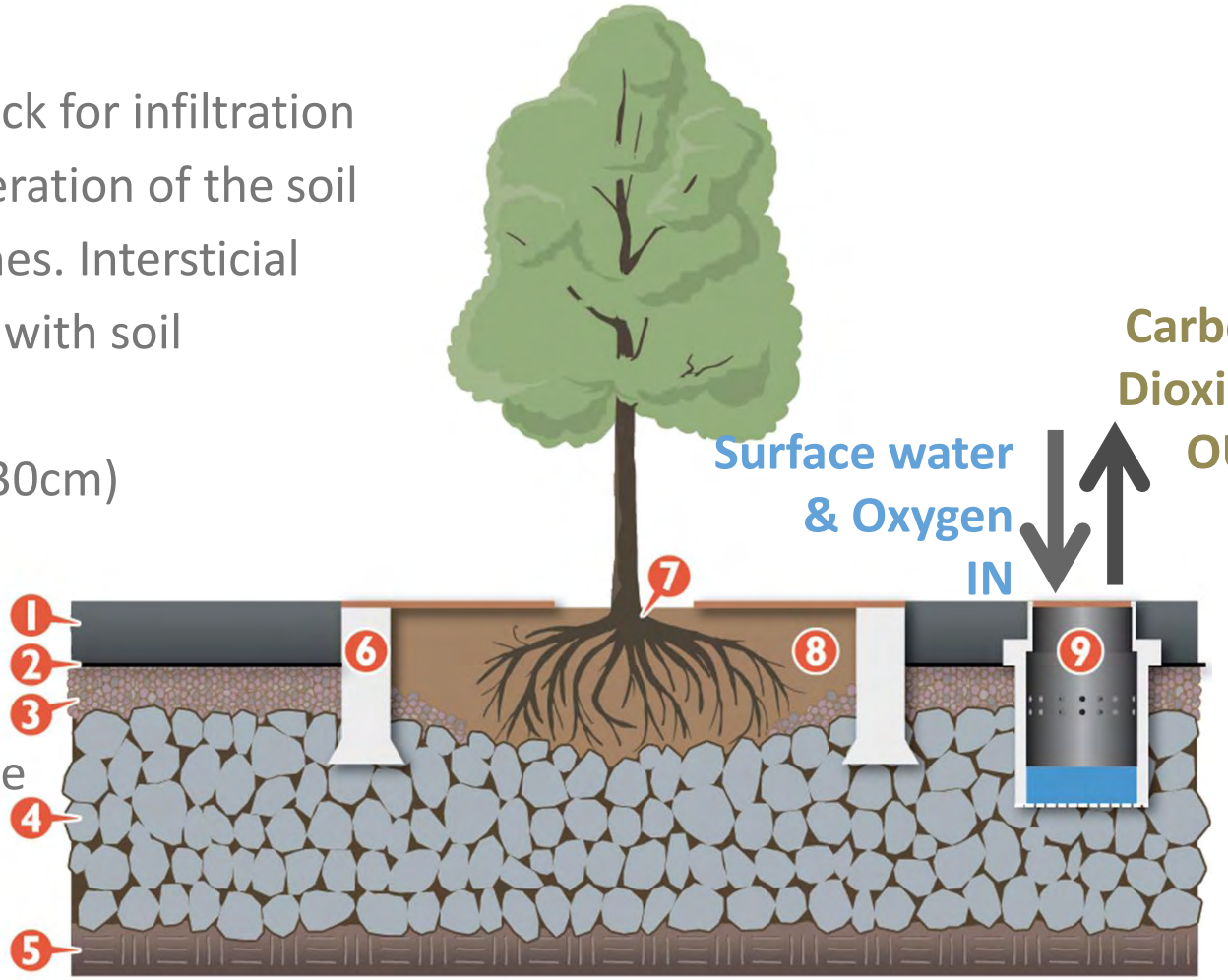


Crated system

Bioretention tree planter

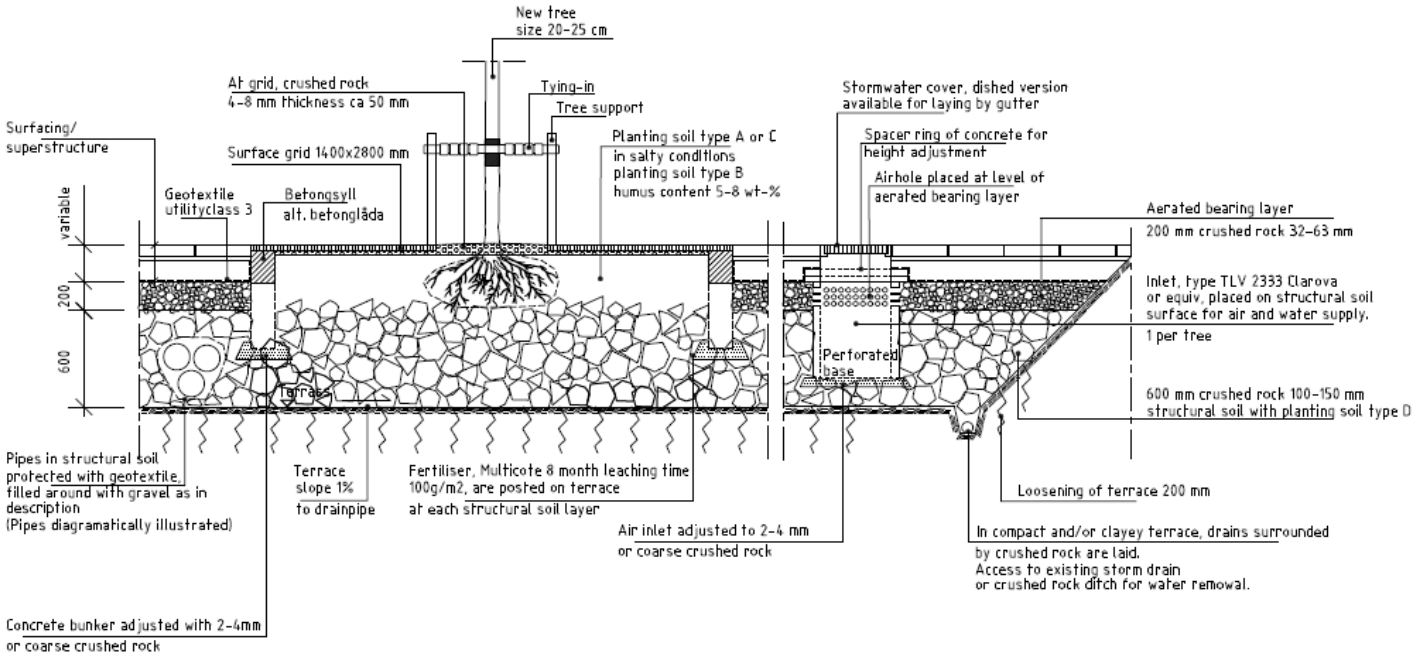
How you can do it

1. Hard surface & sub-base
2. Geotextile
3. Layer of dry crushed rock for infiltration of surface water and aeration of the soil
4. Structure of larger stones. Interstitial space between is filled with soil
5. Terrace
6. Concrete planter box (30cm)
7. Tree
8. Planting soil
9. Catchment chamber for infiltration of surface water and aeration of the structural soil



TDAG skeleton soils illustration

How you can do it



NEW PLANTING – TREE IN PAVED AREA WITH SURFACE GRID
Principle section
SCALE 1:20 (A2), 1:40 (A4)

NOTES
Soil equipment such as gratings, trunk guards, tree support are specifically adapted to the project.
Fine crushed rock must not be used in structural soil profile for adjusting air inlet or concrete bunker.
In specially constructed tree holes with narrow dimensions tree root diameter must be observed.
With increasing trunk circumference clump diameter increases, see Quality regulations for nursery plants, GRÖs Plantskolesektion, 3:e upplagan, augusti 2003.

NOTESANMÄRKNING
All data in mm unless otherwise specified.

Status TH–TYPRITNING	Datum 2009–02–23 Godkänd B.EMBRÉN
TRAFIKKONTORET Box 8311, 104 20 Stockholm, Tel 08–508 27 200	
TREE IN PAVED AREA WITH SURFACE GRID SECTION	
Skala 1:20(A2)/1:40(A4)	Ritningsnr THVB004 Foto Reg.

illmanYOUNG

TDAG skeleton soils drawing detail

How you can do it

Granit size 90-150mm

Compacting before soil is washed in to the voids

The stones need to fall into the box to get a stable construction

….and remember…

YouTube – ‘Let’s get Nibbling!’

….. Any questions?