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Working with water

SuDS Hydraulic Criteria

Richard Kellagher

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Drainage Criteria…. Keeping it in perspective

This talk

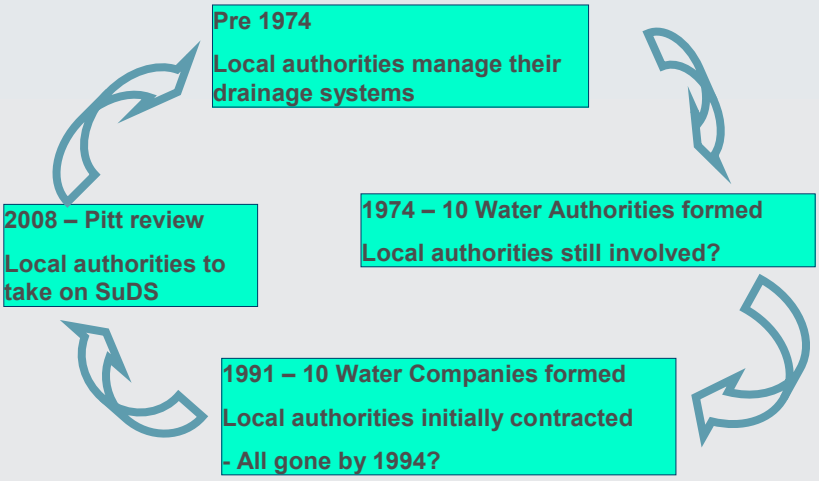
> Setting the scene, the journey….

> Understanding the Principles

> Current criteria (the National Standards)

> A moving goal - future aims.....

What goes around…….



..the journey…..

> From:

- sub-surface
- piped
- rapid conveyance and disposal **to** the environment

> Towards:

- surface-based systems
- Protection **of** the environment

...the challenge.....

"The future will be green, or not at all. This truth lies at the heart of human-kind's most pressing challenge: to learn to live in harmony with the Earth on a genuinely sustainable basis"
Sir **Jonathan Porritt**.

What do we need to achieve?

> Minimise negative impact of surface water drainage on the receiving environment:
- Hydraulic
- Water quality (pollution)

> Surface water drainage appropriate for an uncertain and transitional future
- Flexible capacity
- Exceedance design
- Low risk failure implications
- Robust
- Easy maintenance
- Economic to manage

What is the vision?

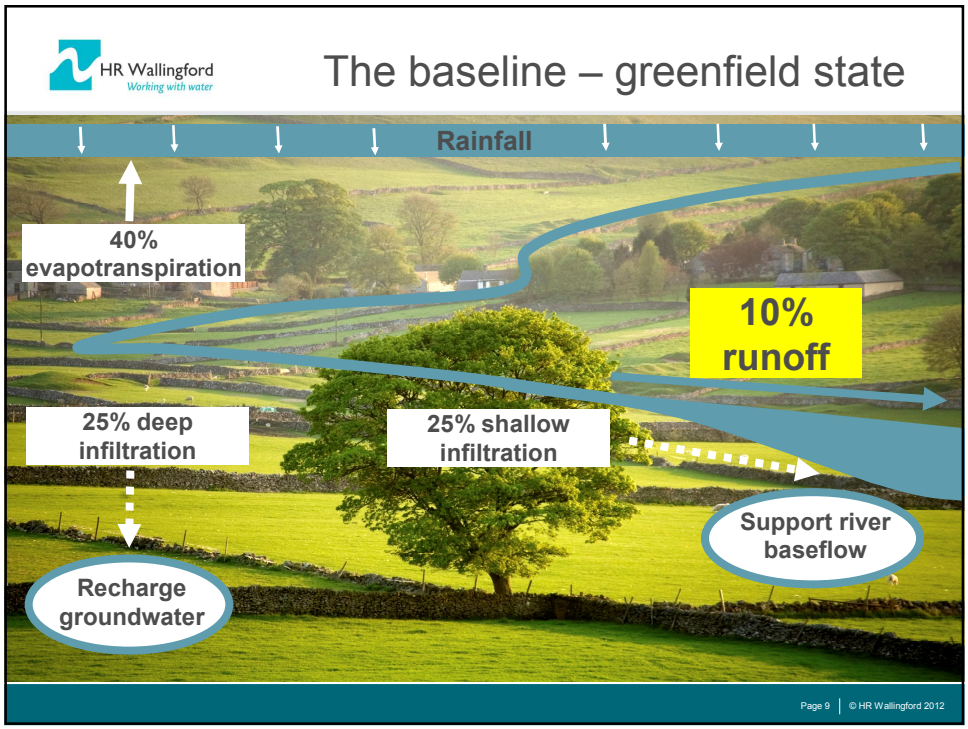
- Stormwater runoff a valuable resource
  - Rainwater harvesting
  - Biodiversity support
  - Urban cooling

- Adding value to the urban space
  - Amenity
  - Health
  - Air quality
    - Not in the Standards

A big challenge…

Still Conveyance

- Flooding
- Water quality
  - Thames Tunnel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The baseline – greenfield state
Rainfall
40% evapotranspiration
10% runoff
25% deep infiltration
25% shallow infiltration
Support river baseflow
Recharge groundwater
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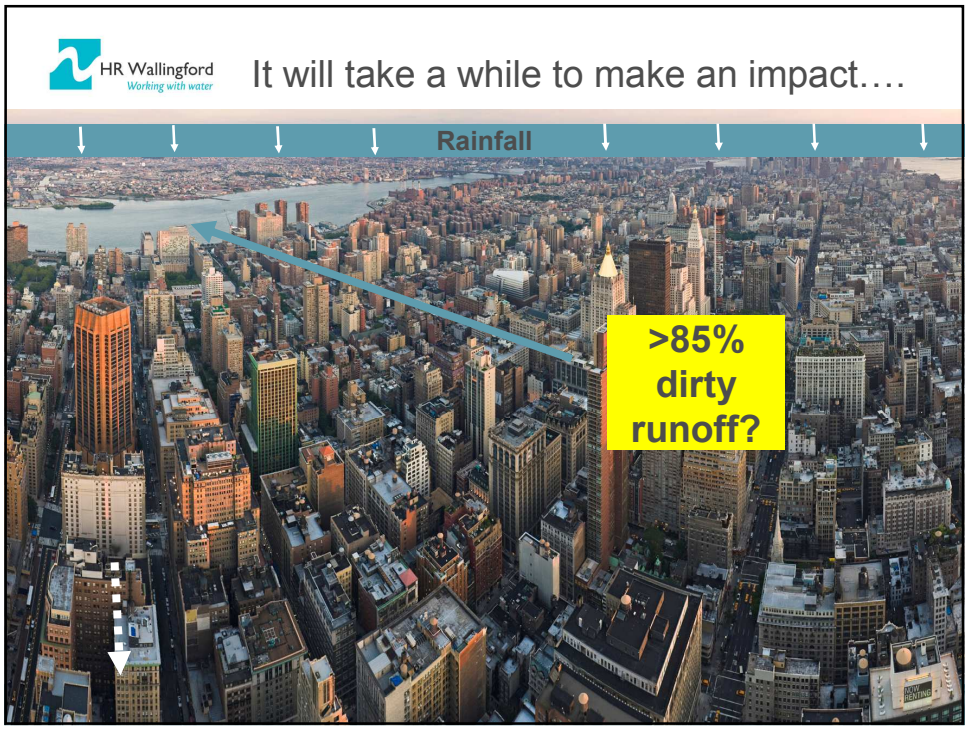
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It will take a while to make an impact….
Rainfall
>85% dirty runoff?

Standard A – Runoff destination

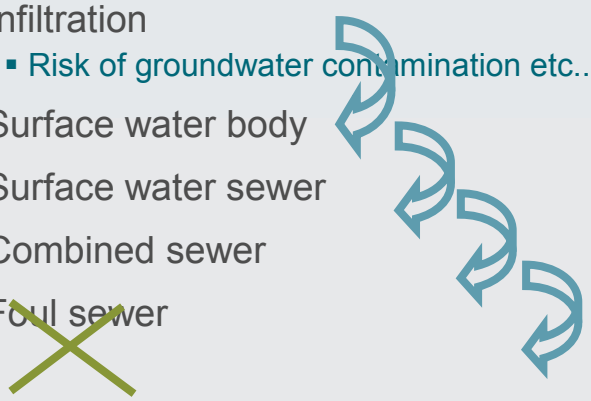
> Infiltration
  - Risk of groundwater contamination etc..

> Surface water body

> Surface water sewer

> Combined sewer

> Foul sewer



> No suggestion of considering use first
  - Rainwater harvesting

Standard B - Hydraulic

Peak flow rate and volume

Interception
No runoff for 5mm rainfall

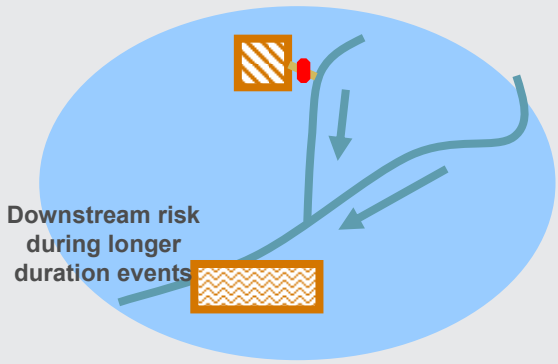
Downstream morphology
1:1 year greenfield rate

Downstream flooding
1:100 year greenfield **rate**
1:100 year 6 hr greenfield **volume**

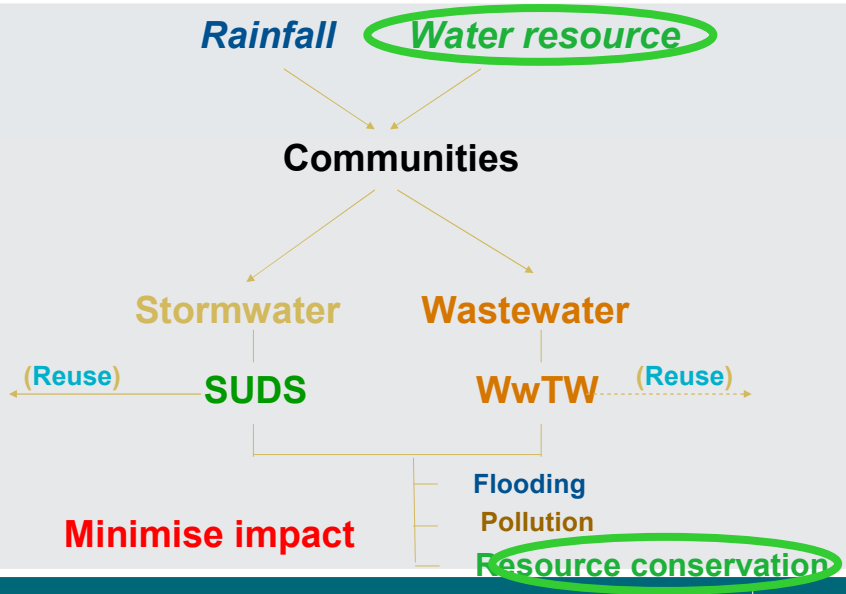
Downstream flood protection

> When downstream reaches are at risk, attenuation storage tends to be empty (for discharge controls > 3 l/s/ha)

> Volume control is required to retain runoff on site



The water cycle



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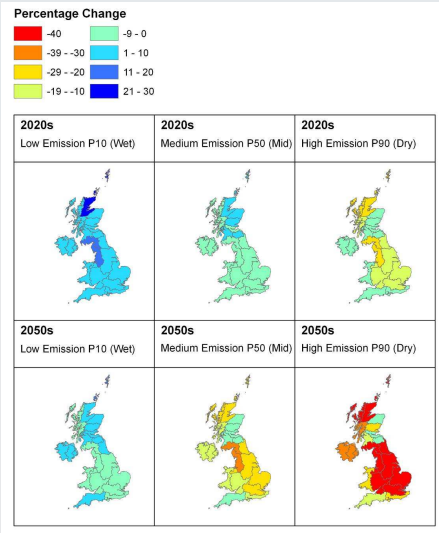
The future

Volume - Water resource management

> A water scarce future

> 'Volume' will grow as an important measure



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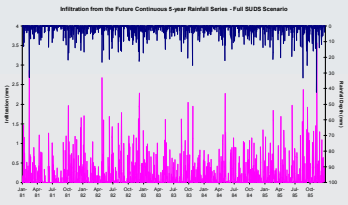
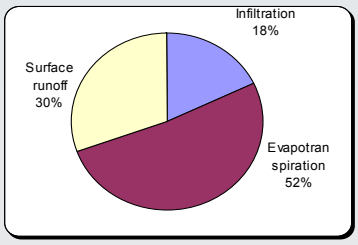
Infiltration assessment

Example of InfoWorks CS Results



Groundwater recharge



	Annual Average Infiltration (m^3)	
	M^3	mm rainfall
Greenfield	10,786	52
As Built	7,356	32
Full SUDS	13,211	63

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