

First Steps in Urban Water – Managing Water as a Resource.
Held on 15th November 2023. Questions, comments and references
Partners: CIWEM, CIRIA, WRE

First Steps in Urban Water: Managing Water as a Resource (Held online)



Agenda

Chair: Cllr Katie Thornborrow, Executive for Planning, Building Control & Infrastructure, Cambridge City Council

Overview of the document and why we need a wholistic approach

Pete Stevens, AJS Flood Risk Consulting Ltd

Natural flood management

Amanda Crossfield, NFM Programme Manager at Yorkshire Dales Rivers Trust

SuDS – getting it right

Ian Titherington, Senior Adviser – Sustainable Drainage, Welsh Government

Partners: Chartered Institution of Water and Environmental Management (CIWEM), Construction Industry Research and Information Association (CIRIA), Water Resources East (WRE)

TDAG's new guide can be found here: <http://epapers.bham.ac.uk/4284/>

QUESTIONS, COMMENTS AND REFERENCES BY TOPIC (AS FAR AS POSSIBLE!)

NB. Questions and comments are anonymised unless answered in the chat by one of the speakers.

Rainwater harvesting, greywater etc

What about rainwater harvesting for use in flushing toilets and other cleaning opportunities?

How do we encourage clients to take on and cost for SUDs, sustainable water use, rainwater harvesting etc in the absence of incentives such as BREEAM 'points' to be gained?

- I have worked in planning for 16 years and never yet persuaded a developer re rainwater harvesting...
- So interesting that 3 of us posted about rainwater harvesting and developers within seconds of each other! Evidently top of our minds...

Reedbeds

Reedbed systems to help reduce phosphates?

- Ian Titherington: Reedbed systems are only limited in terms of phosphate control and can be challenging to maintain. However, constructed wetlands are being used and adapted to try to target phosphate as well as nitrates.

Bioretention systems

I design a lot of bioretention systems and am a firm believer in the potential of these systems to be used at scale (where appropriate!) - bioretention systems do have one flaw, which is the tendency to leach nutrients, especially immediately after installation. Does the panel see this as a major flaw in these systems or do the benefits outweigh the need for mitigating against this?

- Ian Titherington: They shouldn't do if designed properly. The key as with all bioretention systems is a design that leads to relatively low maintenance. If there is high maintenance, then it will not be maintained
 - Thanks Ian, yes understood and agree with maintenance. I think this is more straightforward to avoid with the maintenance of the vegetation through appropriate species selection. Do you also mean maintenance to the bioretention medium / substrate? If so, would really appreciate your thoughts on this as my main aim is to find the optimum substrate that can
- Ian - do you have a link to the research of bioretention systems and capturing pollutants as you referred to?
- Hold nutrients available for planting but avoid leaching. I see biochar as particularly promising in this regard
 - Biochar incorporated into soil looks to work as a filter being a positive ion and honeycomb structure and is both hygroscopic/phyllic
- Ian Titherington: Annual removal of detritus is important along with weeds and annual growth, as otherwise too many nutrients can be eventually passed on. We are still learning about how long the soil is viable before requiring replacing, but it does appear that many of the pollutants get locked in the first few inches of soil.
- Are there any recommendations for what to do with the arisings and detritus as presumably couldn't be composted?

Overheating

Additional benefits to reduce overheating as well as flooding in urban areas and highways?

Calculating natural flood management benefits

Amanda - Can you not calculate the benefits from reduced flooding downstream (where there are more properties)?

- Yes, you could, but only the ones that are nearby downstream due to the premise that NFM is most effective within 5km of those properties.

Land use

It is forecast that by 2030 climate change will cause much of East Anglia to be flooded from The Wash. How much of a disaster will that be?

- Can you explain a little more? Is this from the UKCP18 climate change projections? Is it coastal flooding during storm events?
 - It is mapping by Coastal Climate Central - <https://coastal.climatecentral.org/>

- It is always interesting to notice how often church buildings are not flooded in flooding events...did they know something that we have forgotten?
 - Very true Sue. Where I grew up, there has been regular spring flooding associated with local springs in the Downs. Rural homes were therefore traditionally often built higher with stepped access as people knew that the springs would burst every year. Modern houses by contrast often built on lower ground, where existing marsh grasses, goat willows etc 'warn' us not to build.
 - Also, management of land - many flooded areas were drained & managed by monks.
 - Historic cores of settlements often make use of slightly higher ground, not least because the streets doubled up as sewers/drains and required a downwards flow to get their contents away
- The Regional Flood and Coastal Committee are struggling with existing priorities let alone the accelerating impacts of climate change.
- Our communities and businesses own these risks from endless global warming as we plan for 2C+ and they have skilled capacity to help.

How do we achieve cultural change in land use?

- Interesting q from Sue James as many Welsh farmers feel Welsh hill farms are being bought for tree planting and offsetting
 - Yes, and this is totally unacceptable...because the driver is this unacceptable offsetting...not restoring lost rainforests which is what the Welsh hills used to have!
 - Indeed. An FOI request has revealed that more than £4m of tax payers' money may be paid to orgs with addresses outside Wales as part of a drive to plant trees on Welsh farmland. Info via <https://nation.cymru/> website although this concern about outside orgs was dismissed by Welsh minister Lee Waters as 'pantomime villains'. This concern about offsetting and who is driving policy re conflict of interests is a common concern. It makes behavioural change v difficult as it impacts trust.
- As with many things, we can achieve multiple goals in one (restore native vegetation, hence biodiversity and carbon offsetting, while protecting homes and more valuable farmland), or we can (unfortunately) just focus on one thing (the any tree will do approach... missed opportunity!)
- While I have significant reservations about some of these schemes, we also have to recognise we import 80% of our timber with an increasing demand. We can do a lot better.
- Timber harvesting of appropriate native trees (e.g., oak/beechn for construction, birch for firewood) through methods such as continuous cover forestry can help us reduce our wood imports (and hence potential damages elsewhere) while maintaining (albeit slightly reduced) biodiversity. The more drivers for tree planting the better, especially when long-term management is considered as part of the planting scheme
- Tree planting to restore temperate rainforests etc (Guy Shrubsole *The Lost Rainforests of Britain*)
 - We need remove artificial drainage off the hills and reduce grazing/ grouse shooting etc.

- Also, some of the hills should be bogs which are fantastic habitats. There are some SSSI well managed bogs in Yorkshire, they are fantastic with great plant biodiversity
- Peat bogs obvs not suitable for tree planting
- Uplands- also shooting industry is very damaging

Land owners

One of the push backs from landowners against using land for biodiversity rather than agriculture is that it adversely changes the inheritance tax status of that land. Has developing NFM schemes on farmland come across the same issue or is it still deemed to be primarily agricultural land?

- Good consultation responses from the Rivers Trust including
The Rivers Trust response: Consultation on taxation of environmental land management and ecosystem service markets
<https://theriverstrust.org/about-us/our-position-statements> (scroll down the page for this one)
- HM Treasury: <https://eciu.net/media/press-releases/2023/proposed-inheritance-tax-reforms-could-unlock-green-schemes-for-tenant-farmers#:~:text=The%20Treasury%20and%20HMRC%20are,England%20leaves%20the%20EUs%20Common>

RE farmers becoming foresters - DEFRA have increased the funding and time scales paid to farmers/landowners for planting trees (15 years and £5,250/hectare) which would help cover the cost of hiring foresters to run this enterprise

<https://www.gov.uk/government/news/improved-funding-for-land-managers-and-farmers-to-grow-more-trees>

- Would be great to see NFMs designed into these plans - making better use of the low yield areas and creating riparian zones
- If you look at medieval field patterns, still evident in our countryside, you can see how they historically drained their fields using banks and ditches with smaller field areas generally. We've evidently lost this skill, with these previous bank and ditch hedgerow systems lost and waterlogged sites - a common sight when undertaking LVIA field trips!
- My own grandfather was a ditch digger on Romney Marsh - so many ditches now not maintained.

Flood water and pollution

Would welcome views on channelling floodwater through previously polluted sites e.g., landfill sites containing uncontrolled waste which is being proposed as part of River Thames Scheme. Concern is that floodwater will become polluted should concrete channels fail, introducing leachate, which will then be released back into rivers/other waterbodies creating catastrophic pollution event. I wonder if this is being proposed/has been the solution for other parts of UK?

Natural Flood Management references

Innovation is proven to come from communities and business. Our community has justified a catchment restoration project, instigated 12 large are NFM schemes and

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planted 34,000 free trees. We have almost the lowest woodland cover in the UK and we flood. We follow our heroes -
Slow the Flow has some NFM and SUDS case studies <https://slowtheflow.net/case-studies/>

Natural Flood Management UK

https://www.facebook.com/groups/657389065657045/?ref=share_group_link

Note from Bruce Durham:

Our team have instigated 12 large area NFM schemes so far and justified a river catchment restoration project on our neglected River Welland catchment to identify the priority locations for NFM and NBS. We are involved with LNRS, Midland Engine' Midlands Forest Network and now cage rattling to help UK Nature Recovery Network as we're convinced that innovation comes from communities who own the land and businesses as we help our underfunded specialists. There's an army of skilled community capacity working through their friends of friends to find opportunities that excite our landowners and the specialists. They are dynamically motivated by their children's future as we face a 40% increase in flood risk (EA) and a 25% reduction in water availability (WRE).

We have a lot of NFM case studies available on our website

<https://thefloodhub.co.uk/nfm/>

Amanda Crossfield

Some more NFM case studies here: <https://www.ydrt.org.uk/what-we-do/projects/past-projects/>

<https://theriverstrust.org/our-work/working-with-nature/natural-flood-management>

Re modelling/tools see this road run off tool with suds solutions (London based)

<https://mapapps.bgs.ac.uk/road-pollution-solutions/>

FCRIP programme <https://engageenvironmentagency.uk.engagehq.com/innovation-programme>

Will be interesting to see the projects funded for Natural Flood Management programme

<https://www.gov.uk/guidance/natural-flood-management-programme>

Biodiversity Net Gain (BNG)

Biodiversity Net Gain - will this also support tree planting and other habitat planting in the urban environment?

- It should but there are limitations on BNG - particularly with the management
- ...and BNG only requires to be in place for 30 years...how do we retain the net gain in perpetuity - so it is real and permanent net gain?

Sustainable Drainage Systems (SuDS)

Schedule 3 of the Flood and Water Management Act

<https://www.gov.uk/government/news/new-approach-to-sustainable-drainage-set-to-reduce-flood-risk-and-clean-up-rivers>

<https://geosmartinfo.co.uk/2023/03/understanding-schedule-3-of-the-flood-and-water-management-act-2010/>

- Has it been implemented in Scotland?
 - Not yet

- (Without Schedule 3), I find in my LLFA that getting developers to design in SuDS very early in the process is incredibly difficult, particularly for treatment criteria

Tree species and SuDS

- I have searched widely for tree species selected for urban retrofit SuDS and the reasoning for that selection - this is difficult to find - possibly on the basis that designers must follow the right tree right place principles. I would however love to be part of a community that shares specific case studies on trees and SuDS. Given the relatively recent uptake of SuDS, our understanding of what trees will survive on the long term is minimal. We are talking the, sometimes, random conditions created in SuDS drought to deluge!
- Ian, can you tell me what trees were used and why? Are they thriving in Greener Grangetown?
- Would you be able to give us list of trees & shrubs they perform well in raingardens?
 - TDAG has a tree species selection guide: <https://www.tdag.org.uk/tree-species-selection-for-green-infrastructure.html>
 - You may be familiar with it already but the SuDS section of the 'TDAG tree species selection guide' as linked is very useful.
- Amanda Crossfield:
We are using alder and willow on a metal mine bioremediation project up on the old lead mines in Teesdale - these trees seem quite tolerant to heavy metals.
- Italian alders are in the John Lewis rain garden:
<https://www.nigeldunnett.com/ajohn-lewis-rain-garden/>

SuDS and Health and Safety

Any thoughts on Health and Safety and SuDs?

Apparently RoSpa has new requirements to have fencing around play areas near to SuDs, which we like to avoid.

- Tip- bring in RoSPA early to review designs! Then ask them out again at end of project
- Dutch kids survive water bodies not being fenced off. Educate and supervision is key.

Design for Exceedance

Delighted to hear "Design for Exceedance" being mainstreamed in today's presentation for today's audience refs found at CIRIA

<https://www.susdrain.org/delivering-suds/drainage-exceedance/Encouraging-uptake/Background-outputs>

Lots of good resources here too <https://www.susdrain.org/>

Contamination from highway water:

Ian spoke about the low quality of water that drains into highways SuDS features. Does the soil become contaminated and are there any implications for leaching into the groundwater, or even handling of soil for horticulturalists/GM contractors?

- Microbes will breakdown many hydrocarbons within the rhizosphere
- We've seen in ponds hydrocarbon contamination from road resurfacing runoff that cleared up in a few years without intervention

Green roofs and walls?

Do we foresee any incentives for SuDS employing vertical spaces in dense urban areas? like green walls or rooftop garden, instead of deploying on the lateral or ground surfaces that are often restricted by land constraint?

- Green walls are trendy with architects but far too often fail as the irrigation or soil pockets fail. Better to have roots in the ground!
 - Green walls take a LOT of maintenance, there is one on the recycling plant in Leeds, they have a roped access team four times a year at great cost!
 - Agree - leaving space on the ground to grow climbing plants is much better!
 - Building vegetation like green roofs and green walls will never be able to replace ground level vegetation like trees etc. They are a nice edition, but that is it. And they are rather expensive if done at a large scale
 - Roof gardens in Paris. <https://www.euronews.com/green/2020/06/28/the-world-s-largest-rooftop-garden-has-just-opened-in-paris>
 - These are commercial urban farming roof gardens. Great project
 - But worth considering wildlife benefits, e.g.,:
<https://www.bdonline.co.uk/news/green-walls-play-an-important-role-in-bug-biodiversity-rhs-study-finds/5126230.article>
 - Of course, and I do hope that more research will be done e.g., on the role of ivy as multifunctional habitat
 - Unless using harvested rain water or grey water is used, green walls are too water heavy unless they are climbers planted in the ground

Earlier SuDS schemes

Portland Oregon? Does any of the SUDs research draw on this US city which at one stage was a leader on rain gardens and green streets?

- Amanda Crossfield: Yes, I know Yorkshire water sent a bunch of folks on a study tour to Portland
- Sue James (added later) – they produced a series of guides and information is here: <https://www.oregonmetro.gov/tools-partners/data-resource-center> - although we probably have more useful practice to input since the original publication in 1997.
- The first large scale housing development I know of with SuDS in the UK was Lamb's Drove in Cambourne nr Cambridge, almost 20 years ago. It's well worth taking a look, if you are nearby.
- If you want some examples of SuDS, check out the London SuDS retrofit map <https://apps.london.gov.uk/suds>
- Folks have prob seen this already but this is such a great scheme!
<https://www.greytogreen.org.uk/>

SuDS maintenance?

- Westminster City Council maintain (via their contractor) the Marylebone rain gardens:

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https://www.susdrain.org/community/SuDSAwards2020/SuDS_Award_entries/S mall retrofit/maryebone len 2020 awards.pdf

- Ian, from your experience, have there been issues with private management companies managing the SUDs systems and is there procedures in place to bring them back under county council management and maintenance if they are failing.

Costs and commuted sums

Ian - please can we have a link to the commuted sums calculator...we need to do the same for street trees!

- I am afraid that the Wales SuDS calculator is not yet published, although several Welsh SABs use a version

Greener Grangetown

<https://una.city/nbs/cardiff/greener-grangetown-scheme>

Ian, with the improvements made in Cardiff, has anyone researched into improvements to health?

- <https://www.cardiff.ac.uk/news/view/221759-greener-grangetown-research-study-underway> (started in 2016 with outcomes here: <https://link.springer.com/article/10.1007/s40899-022-00723-z>)

Great talk as always Ian, more details on mentioned case studies can be found here:
<https://greenblue.com/gb/case-studies/wood-street-cardiff/>
<https://greenblue.com/gb/case-studies/greener-grangetown/>

'Rebrand SuDS'!

Change the name of SUDS to Rainscapes!

Tree survival

How do you ensure that trees thrive after the site has been built out and finished maintenance, we have issues with trees that are conditioned by planning to be maintained for 5 years but in reality, this rarely happens or is enforced

- Sue James – TDAG are working on this – “closing the performance gap”

Knowledge gap – where are the engineers?

How do we get engineers on board with all of this and move them away from traditional systems?

- It's problematical. The SAB or Council will often be part of the 'manco' (management company), but if it goes bust, a Council does not have the power to raise funds - leaving a funding gap.
- Currently, a Civil engineering graduate does not have to do drainage in their degree.....
- On the positive side, environmental science qualifications are increasing in colleges, which does appear to cover many issues relating to the climate crisis.
- Yes - this is what we need. Universities are accredited by external institutions like the ICE

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- Sue James: We have Teach the Future – student led climate education campaign (<https://www.teachthefuture.uk/>) and the Edge is also pressing for improved undergraduate education in the built environment (www.edgedebate.com) and is liaising with the Engineering Council and ARB as well as the professional institutions. We all need to demand better informed and competent graduates at the employment side and students need to demand better courses to enable them to be competent practitioners and at the 'client' side as the students are actually the clients for universities and training courses!
- We should all contact our professional bodies to get them behind that

Many thanks to all for your comments and helpful references. I trust that I have just about got things in a logical order!

Sue James for the Trees and Design Action Group