

SuDS: Good Outcomes for Business, Environment and Society

February 2017

Executive Summary:

Sustainable Drainage Systems (SuDS) provide us with the opportunity to celebrate our most abundant natural resource: water. In using SuDS to their potential we can improve our environment, protect our people from flooding and create better spaces to live, work and play.

However, in order to make the most of our water we must adopt Vision E5, which recognises the following factors:

- **Enabling:** we are able to plan, deliver, construct, adopt and maintain SuDS
- **Environment:** we value our water and environment
- **Enforcement:** appropriate controls are in place to ensure SuDS are put in place
- **Economics:** whole life benefits and costs are understood
- **Everybody:** benefits to society are clear

Vision E5 was developed by Climate NI Infrastructure Group (led by ICE) following consultation with stakeholders in the SuDS sector at an event in October 2016. It demonstrates the multi-faceted nature of SuDS, meaning that its benefits can only likely be achieved as agencies from across the public, private and third sector work together. Water is our greatest natural resource – we must make the most of it for the sake of our people and our environment.

In order to deliver Vision E5, Climate NI Infrastructure Group makes the following recommendations:

1. The Stormwater Management Group becomes the SuDS Champion for Northern Ireland, with membership extended beyond government to include one representative from each of the following key SuDS stakeholders (engineers, landscape architects, developers, planners and local government)
2. The Stormwater Management Group to review cost-benefit, approval, adoption & maintenance arrangements of SuDS
3. Local development plans to encourage the uptake of appropriate SuDS and their implementation into the functional landscape.
4. ICE to develop *Water for Life*, an initiative to help Key Stage 2 children and their parents to better value water.
5. Annual SuDS conference organised by Climate NI and ICE to showcase SuDS and develop capacity and capability across sector

Background

Given recent changes in legislation in Northern Ireland regarding the mandate and adoption of some components of SuDS, Climate NI and ICE hosted an event to bring together clients, building control, government officials, planners, engineers, architects, landscape architects and local government to discuss the challenges in developing a widespread SuDS approach in Northern Ireland. A full list of attending organisations is listed in Appendix 2.

Event

The event showcased government policy, cross-departmental working, SuDS design and implementation from the perspective of developers, planners and engineers:

- Richard Kirk, Lead, Climate NI Infrastructure Group
- Peter May, Permanent Secretary, Department of Infrastructure
- Paddy Brow, Stormwater Management Group
- Anthony McCloy, McCloy Consulting
- David Magee, Antrim Construction
- Sam McKee, Turley
- Darragh Aiken, Waterman Moylan

The key points from each speaker are listed in Appendix 3.

Following the presentations ICE hosted a session using the ‘Delphi Method’ which sought to gain consensus from policy makers, planners, building control officers, developers and designers on the matters of importance. In this session the workshop attendees separated into 7 groups to discuss the various risks and opportunities for SuDS in an NI context. Each group brainstormed five issues for a SuDS roadmap in NI and fed these back to other workshop attendees. The groups were asked to consider enablers, blockers, risks and opportunities. In total there were 25 topics.

Findings

Following a further round of breakout discussion this list of 25 topics was reduced to a top 7 and there are listed below. These topics were then used to guide open discussion among all workshop attendees. (The 25 risks from which the final 7 were priorities can be found in Appendix 5.)

1. Who will adopt and maintain various SuDS
2. Lead role needs to fall to councils to co-ordinate through planning
3. Local development plans represent an opportunity to get early buy-in
4. Legislation not aligned to promote soft SuDS
5. PR problem – how to promote/sells SuDS
6. Need for an overarching body to lead on SuDS
7. Need more local examples/pilot schemes to demonstrate benefits

The recommendations made in this report are synthesised from a pre-event survey, discussion and outcomes on the day and a post-event survey (See Appendix 4).

Discussion of findings

Following the formal consensus session using the Delphi model the conference had the opportunity to discuss the findings. The following are the key issues which were raised.

- Key factors to soft / vegetated SuDS structures and hard permeable surfaces being implemented are the buy-in of councils and the creation of local exemplars.
- Range of SuDS needs to be defined, eg. vegetated structures, filter strips, permeable pavements, basins, swales, ponds, rills, channel, pipework, flow controls, tanks etc.

- Developers need incentives – current lack of adoption stumps benefits economic savings.
- “Integrated design process” is key from the outset. Implementation of the SPPS needs to focus on good design and place-making in order to influence local development plans. Is there a possibility.
- Good local examples are key: government ministers could serve as champions. The education authority in England highly promote SuDS but there is an incorrect perception of there being associated health and safety issues in NI.
- The fact that councils came so high was concerning – there is a need for an oversight body such as the Stormwater Management Group to facilitate discussion and provide consensus. It should interact with developers and external interests since it does not have experience of delivering SuDS itself.
- SuDS can be good for Business, Environment and Society, and although at the moment there are more ‘barriers’ than ‘enablers’, identifying the issues and opportunities is a good step towards creating a roadmap and rectifying the problems.
- The CNI Infrastructure Group can be a useful contact point for anyone seeking further discussion, input or information.

Conclusions

Based on the issues raised the Climate NI Infrastructure Group has developed **Vision E5**, which focuses on the following areas:

- **Enabling:** we are able to plan, deliver, construct and maintain SuDS
- **Environment:** we value our water and enhance our environment
- **Enforcement:** appropriate incentives and controls are in place to ensure SuDS are established
- **Economics:** whole life benefits and costs are understood
- **Everybody:** benefits to society are clear and everyone plays their part

It demonstrates the multi-faceted nature of SuDS, meaning that its benefits can only likely be achieved as agencies from across the public, private and third sector work together (benefits in line with Programme for Government are included below in Appendix 1). Water is our greatest natural resource – we must make the most of it for the sake of our people and our environment.

Recommendations

In order to deliver Vision E5, Climate NI Infrastructure Group makes the following recommendations:

1. The Stormwater Management Group becomes the SuDS Champion for Northern Ireland, with membership extended beyond government to include one representative from each of the following key SuDS stakeholders (engineers, landscape architects, developers, planners and local government)
2. The Stormwater Management Group to review cost-benefit and adoption & maintenance arrangements of SuDS
3. Local development plans to encourage the uptake of appropriate SuDS and their implementation into the functional landscape.
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Appendix 1

Draft NI 2016-21 Programme for Government Indicators	Benefits of SuDS
We prosper through a strong, competitive, regionally balanced economy	Investing in where we live and work will improve the lives and mindset of citizens in their daily lives
We live and work sustainably – protecting the environment	Embracing natural drainage and celebrating water.
We have a more equal society	Revitalise traditionally ‘grey’ urban areas with blue and green space.
We enjoy long, healthy, active lives	Certain SuDS features will create green space and influence wellbeing through social amenity
We are an innovative, creative society where people can fulfil their potential	Bringing creativity and inspiration to the spaces where we live and work through
We have more people working in better jobs	High quality design practice and redesigning urban areas
We have a safe community where we respect the law and each other	Central amenities can create community cohesion
We care for others and we help those in need	Improving drainage infrastructure for those most affected
We are a shared society that respects diversity	Shared green spaces can positively impact wellbeing and cohesion. Diverse design of streets and spaces add a sense of place to communities.
We are a confident, welcoming, outward-looking society	Vibrant communities can be enhanced through designing a place people are proud and excited to live in.
We have high quality public services	Inclusion of SuDS measures can enhance drainage and should cost less than conventional infrastructure.
We have created a place where people want to live and work, to visit and invest	Exciting urban areas will generate investment and attract new ideas
We connect people and opportunities through our infrastructure	Strong SuDS policy will stem from good collaboration between government bodies and could create opportunity for urban redesign and renewal.
We give our children and young people the best start in life	A well-designed urban environment that embraces nature and provides social amenity.

Appendix 2

Organisations in Attendance

Organisation
Amey
Antrim and Newtonabbey Borough Council
Antrim Construction Company
Ards and North Down Borough Council
Armagh City, Banbridge & Craigavon Borough Council
Atkins Global
Belfast City Council
Causeway Coast and Glens Borough Council
Climate NI
DAERA
Department for Infrastructure
Graham
Henry Brothers
ICE Northern Ireland
Irwin Aggregates
KH Chartered Consulting
Landscape Institute Northern Ireland
McCloy Consulting
McCullough Totten Architect's Studio
Mid and East Antrim Borough Council
Mullan Consulting Engineers
Newry, Mourne and Down District Council
NI Housing Executive
NI Water
NIRBC Ltd
Northern Ireland Environment Link
RPS Group
Transport NI
Triangle Housing Association
Turley
Ulster Angling Federation
Utility Regulator
Waterman Moylan

Appendix 3

Presentations

Peter May, Permanent Secretary, Department for Infrastructure – Opening Comments

Key Points:

- SuDS “can make a real difference both in terms of stopping bad effects from flooding and in terms of promoting measures which will improve the quality of lives and the environment.”

Context

- The second Climate Change Risk Assessment stated a “present and increasing threat” posed by climate change to Northern Ireland. The most urgent of these is flooding, and Northern Ireland has experienced “significant flooding events in 5 of the last 10 years”.
- “We need to think differently about managing water so as to reduce the risk; to adapt our infrastructure so that society is more resilient”.

The Role of the Department

- The Department for Infrastructure now includes all the statutory authorities that have a key role relating to drainage, including Rivers Agency, NI Water and Transport NI, as well as the strategic planning division.
- The vast majority of planning is now devolved to local councils so the daily processing of planning applications by local councils is one of the key ways towards a more systematic approach to SuDS.
- “The new Programme for Government encourages all to focus on working together to achieve the right outcomes”.

Benefits of SuDS

- “SuDS are more than a flood alleviation tool;” they can be designed to help improve water quality and provide social amenity.
- “Experience both here and in other parts of the UK has shown that consideration of SuDS during early design stages can provide the optimum solutions”.

Progress

- An important part of the work that Climate NI does is to bring together all relevant sectors to participate in finding solutions to issues which affect Northern Ireland’s resilience to climate change.
- This event builds on two previous Climate NI events, which “have been instrumental in bringing together the main stakeholders”, to inform the work of the Stormwater Management Group to increase the use of SuDS.
- Since the last Climate NI SuDS event, legislation has changed. The Water and Sewerage Service Act 2016 means that NI Water is now able to adopt hard components of SuDS. It also has new powers that enable it to require consideration of SuDS in all new developments, and to refuse connection if there is a suitable alternative means of dealing with surface water than a conventional connection.

Outcomes

- “We need to help the construction industry to understand the potential appropriate use of SuDS so they can be used to deliver the maximum benefits for their business, for the environment and for wider society”.
- We must move towards an environment where SuDS are routinely considered from project conception. This brings challenges to policymakers and the construction industry that can only be solved through a collaborative approach.

- It is very important that the change in legislation does not result in an over-reliance on hard engineering solutions when in many cases, inclusion of soft SuDS components could be better for all concerned.
- We know what good looks like – it is now a question of mainstreaming this approach.

Paddy Brow, DfI Living with Water Programme

Key Points:

The combined sewer system in place across much of the UK is not the system that would be used if it were redesigned today. Watercourses and sewers are at capacity.

Benefits of SuDS:

1. Reduced Flood Risk

In addition to reducing peak flow through attenuation, many types of SuDS also reduce the total volume of water (through infiltration & evapotranspiration).

2. Improved Water Quality

- Reduced Combined Sewer Overflows spills
- Settlement & filtration of surface water before discharge

3. Facilitation of Economic Development

For example, Carrowreagh industrial estate geo-cellular tank provided cost saving of £230,000 over conventional drainage.

Current policy from Rivers Agency and NI Water specifies the following:

Rivers Agency:

- **New (Greenfield) developments:** Restricts discharges from these sites to that equivalent to 'greenfield' runoff rate (10 litres / second / hectare) where the receiving watercourses have known flooding and / or capacity issues.
- **Brownfield developments:** Restrict discharges from these sites so that there is no increase in the current rate of discharge.

NI Water policy:

- Only permits stormwater discharges to combined sewers in exceptional circumstances, and then the use of storm attenuation to prevent pollution and out of sewer flooding

4. Adaptation to Climate Change

The combined effects of climate change, growth and urban creep will lead to a **median increase in 1:10 year sewer flood volumes of 51% by around 2040** compared with current predicted flooding.

5. Provision of Amenity Value

- The optimum SuDS solution may utilise both soft & hard components and by working together, Planners, Developers and Designers can facilitate the best overall outcomes.

Anthony McCloy, McCloy Consulting

Key Points:

- The biggest challenge to widespread usage of SuDS is preconceived ideas. “We need to re-engage with water as part of the urban environment.”
- “When you approach design correctly, you get amenity and biodiversity by default.”

- SuDS should be considered from outline planning stage for optimal use, not as an afterthought at the detailed planning stage, which is when it becomes more expensive.
- Rethinking our approach to managing rainwater – integrated landscape design.
- Planners have power to influence design – understanding and communication between various disciplines and stakeholders is required.
- Adoption is the key challenge.
-

Residential Developer - *David Magee, Antrim Construction Company*

Key Points:

- This is what the new legislation ‘really’ states:
 - 1) We must consider alternative ways of dealing with storm water to avoid discharging into an existing storm system
 - 2) This will remove the need for NI Water to upgrade systems or provide infrastructure to service developments
 - 3) The concession to developers is the word ‘reasonably’ - unfortunately all this really means is that developers are now almost totally responsible for all costs associated with providing new houses.
- The cost of SuDS at present is probably costing us on average £1,500 per property – I would suggest this is dependent on development size and is based on a hard engineered solution.
- At a development in Sixmilewater, Antrim Construction Company are unable to amend a flood plain nearby. This is a good example of how SuDS need to be considered as part of a larger team, working with government for greatest benefit.
- Cost is an issue for developers and for SuDS to flourish in NI, NI Water, TransportNI and Rivers Agency need to combine their thinking.

Planning Consultant – *Sam McKee, Turley*

Key Points:

- Push for an integrated process at the early stage in each project.
- The Benefits
 - Minimise flood risk – reduction in surface water run off rates into watercourses.
 - Provides a habitat for wildlife and biodiversity.
 - Landscape features – aesthetic value.
 - Water quality – reducing pollution and protecting the quality of receiving waters.
- The Barriers
 - Resistance to adoption from statutory authorities.
 - Time – Pressure to secure planning permission as swiftly as possible to realise investment.
 - Presently no legislative or regional policy impetus to push soft SuDS schemes within new developments.
- Opportunities?
 - Department for Infrastructure – Roads adoption starts in the planning process – why could this not be the same for SuDS?
 - Future – A Long Term Water Strategy for NI (2015 – 2040) – Policy FRMD 1B *Make space for surface water management in development plans.*

Maintenance and risk – *Darragh Aiken, Waterman Moylan*

Darragh Aiken discusses his experiences and highlighted the following issues that were addressed during the project.

Key Points:

- Honeypark Lake - Commenced November 2011, completed April 2012

Local Authority

- SuDS requested at early stage and council bought-in before planning
- Operation and Maintenance manual requested through planning process

Funding and Management of Lake

- Client managing lake prior to adoption (4.5 years so far)
- Contributions requested through planning process
- €12.8 million contributions for 880 units or €14,500 per unit
- Division of contributions between Parks and Drainage are under review by Council

Maintenance Costs to date

• Petrol interceptors, 5% full of silt in 4.5yrs >>> 50 yr. life	€0 / yr.
• Hydrobrake manhole, 1% fill of silt in 4.5 yrs >>> 50 yr. life	€0 / yr.
• Vegetation, trimming reed beds, 3 men half day 3 times /yr.	€1,100 /yr.
• Clearing lake of rubbish, 15 man days / yr.	€3,400 / yr.
• Preventing algal growth, use black additive	€200 / yr.
• Feed ducks grain in winter	€100 / yr.

- Total yearly running cost €4,800 / yr.
- Input labour not specialised
- Bulk of yearly expense attributable to rubbish removal and landscaping

Maintenance requirements

- Monthly maintenance of grass height on pond edge and reed bed banks
- Yearly trimming of 25% of reed beds to base every one to three years and clearance at outfall and inlets
- Sediment removal (when 50% full) and replacement of reed beds every 5-7 years. Estimated cost of €15,000 to replace two reed beds
- Remove sediment from attenuation pond when storage volume reduced by 25%, approx. every 25 years.

Appendix 4

Agenda

SuDS: Good for Business, Environment and Society?

Tuesday 18th October 2016

174 Trust, Duncairn Centre for Culture and Arts

09:00 – 13:00

Climate NI and ICE invite you to a half-day workshop which aims to bring together the Northern Ireland construction community to discuss the risks and opportunities of implementing SuDS, showcase best practice, and to develop a roadmap toward conditions in which SuDS can flourish.

- **Event Purpose:**
To demonstrate that SuDS are good for business, environment and society
- **Event Vision:**
Appropriate use of SuDS on all projects in Northern Ireland which include surface water management
- **Event Objectives:**
 - To establish the current state of SuDS in NI
 - To showcase good practice and the conditions in which SuDS can flourish
 - To explore the vision for SuDS in NI and create a roadmap to get there

PROGRAMME

09:00 Registration and refreshments

09:30 Welcome – *Jane McCullough, Climate NI*

09:35 Keynote – *Peter May, Permanent Secretary, Department for Infrastructure*

09:45 What can SuDS achieve? – *Paddy Brow, DfI Living with Water Programme*

09:55 Good Practice Design Process – *Anthony McCloy, McCloy Consulting*

10:05 Case Studies

- Perspective of a Residential Developer – *David Magee, Antrim Construction Company*
- Perspective of a Planning Consultant – *Sam McKee, Turley*
- Experiences of maintenance and risk – *Darragh Aiken, Waterman Moylan*

10:35 Panel and Questions

10:55 Breakout Session 1

11.20 Break and Refreshments

11:50 Breakout Session 2 and Plenary: Next steps for SuDS in NI

12.55 Closing Remarks – *Richard Kirk, Institution of Civil Engineers*

Speaker Biographies

Peter May – Permanent Secretary, Department for Infrastructure

Peter is Permanent Secretary at the Department for Infrastructure in Northern Ireland. He is a career civil servant and has spent nearly all his time in Northern Ireland. His previous roles include Permanent Secretary in Department for Culture, Arts and Leisure, Director of Safer Communities in the Department of Justice and Business Transformation Director in the Water Service.

Paddy Brow – DRD Living with Water Programme Manager

Paddy joined NI Water in 2007, and was seconded to the NI Department for Regional Development in July 2015 as Programme Manager for the 'Living With Water Programme'. His first role at NI Water was Programme Manager for development of the PC10 Business Plan. From 2010 he was the 'Head of Strategy', during which time he initiated the development of NI Waters Asset Standards, Asset Strategies, Climate Change Mitigation and Adaptation Plans. For PC15 he managed NI Water's input to DRD's PC15 Social & Environmental Guidance and was Project Manager for the capital elements of the PC15 Business Plan. He also coordinated NI Water's input to the NI Executives Long Term Water Strategy, which was published in March 2016. Prior to joining NI Water Paddy worked as a Consulting Engineer on large projects for six UK Water Companies and the Environment Agency. Paddy is a Chartered member of CIWEM, a Fellow the Institution of Civil Engineers, and a Board member of the UK Water Industries Research Company 'UKWIR'.

Anthony McCloy – Director, McCloy Consulting

Anthony first got involved with SuDS in 2003 and as a practitioner retains hands on involvement in SuDS design. He has also been delivering SUDS training throughout UK and Ireland since 2006 and has advised on the 2015 SUDS manual update. Anthony is currently involved in the design of innovative retro-fit SuDS schemes in London and is co-authoring SuDS Design and Evaluation Guidance for 15 Local Authorities across England.

David Magee – Building Director, Antrim Construction Company

David joined ACC from college in 1985 as a Trainee Site Engineer and progressed through the company as Site Engineer and later to become Contracts Manager in 1992. Following the acquisition of John Mowlem Homes NI (rebranded Down Construction Company) in 1994 ACC & DCC traded separately until a company merger in 1999 and as part of the company restructure David was appointed Building Director. David is currently chair of the CEF Private Housing Committee.

Sam McKee – Associate Director, Turley
Sam McKee is Associate Director of Planning at Turley's Belfast Office, having joined the business in 2013. Whilst working across a range of sectors including retail, commercial and leisure, Sam's primary focus is on the delivery of residential development, both social and private housing tenures through the planning process. Sam is a member of the Royal Town Planning Institute.

Darragh Aiken – Waterman Moylan

Darragh is a Civil Engineer, working with Waterman Moylan since 2004 on large infrastructural projects, mainly residential. I have extensive experience with drainage, modelling and SuDS elements for private clients. We liaise closely with the various Council's to deliver surface water management assets which will ultimately be taken into charge by them.

Richard Kirk – Regional Director, ICE NI

Richard has been the Regional Director of ICE since June 2014, having previously been the Assistant Regional Director since January 2011. He is responsible for coordinating support to the Regional Board and Committee as they undertake the work of ICE locally. Richard is also a Non-Executive Director of Colleges NI. Prior to ICE, Richard was a senior engineer with the multinational consultancy Aecom, responsible for the delivery of capital projects in Northern Ireland and the Isle of Man. Richard is a Chartered Civil Engineer and Chartered Manager and holds a Master of Business Administration from Queen's University Belfast

Appendix 5

Issues for a SuDS Roadmap in NI (after session 1)

No.	Topic	No.	Topic	No.	Topic	No.	Topic
1	Lack of engineering knowledge and expertise (1)	8	Legislation not aligned to promote soft SuDS (5)	15	Lead role needs to fall to councils to co-ordinate through planning (6)	22	Need equitable way of sharing cost and risk (2)
2	Lack of familiarisation with SuDS has negative impact on perception (0)	9	Cost (initial cost and understanding cost of soft vs hard) (0)	16	Opportunity to use open space to encompass SuDS (2)	23	Need more local examples/pilot schemes to demonstrate benefits (5)
3	No legislative basis driving developers (4)	10	Understanding of potential liabilities (1)	17	How to apportion maintenance responsibility? (3)	24	Lack of agreed design criteria (2)
4	Planning needs to be part of the early consultation process (4)	11	Who will adopt and maintain what part of SuDS? (7)	18	Local development plans represent an opportunity to get early buy-in (6)	25	Soft SuDS are perceived as a land hungry solution (1)
5	Health and safety issues hard to quantify (2)	12	Need clarity on possible use of developer contributions and how SuDS could use part of specified open spaces (3)	19	PR problem – how to promote/sells SuDS (5)		
6	Limited understanding of how to maintain SuDS (2)	13	Developers need to be able to engage with experts from NI Water, Rivers Agency, TNI and NIEA together at pre-application stage (3)	20	Need for an overarching body to lead on SuDS (5)		
7	Potentially prohibitive maintenance costs (1)	14	Communicate legal requirements to all parties (0)	21	Capacity to deliver SuDS schemes (1)		