

BARRIERS TO THE SUCCESSFUL PROJECT MANAGEMENT AND IMPLEMENTATION OF SUSTAINABLE DRAINAGE SYSTEMS IN NORTHERN IRELAND

Dissertation for
MSc in Construction & Project Management

Literature Review

Stakeholders

- The use of non-structural SuDS may be necessary including education and incentives to modify human behaviour (Stovin & Swan, 2007)
- Portland, Oregon, USA, the City's Bureau of Environmental Services offered domestic and commercial customers \$53 per downspout disconnected

Incentives

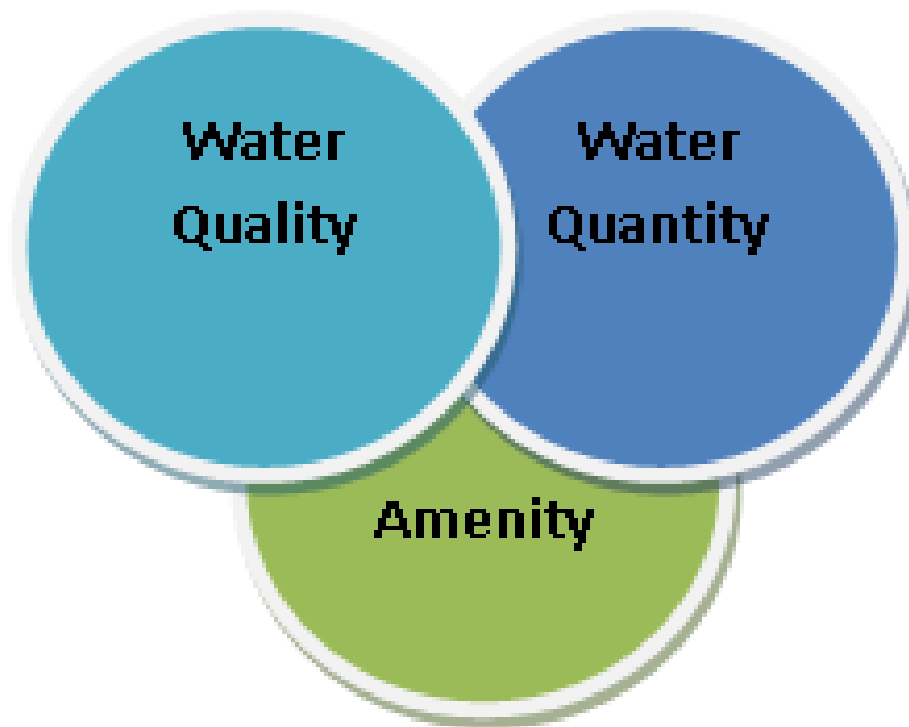
- Treebate which offered up to \$50 off utility bills to residents who plant a tree in their yard
- Cycling tour which encouraged citizens and visitors to visit 21 SuDS sites throughout the city (Schofield, 2012)

Issues surrounding SuDS

-Legislation	-Legal
-Adoption	-Homeowners role
-Affordability	-Pressure to develop
-Retrofit	-Land
-Water Quantity/Quality & Amenity	-Guidance
-Proprietary Systems	-Tools
-Funding	-Maintenance

(Executive, 2001)(Hydro, 2013)(Jones & Macdonald, 2007)

Environment



Organisational Barriers

- Lack of clear, strategic responsibility for surface water flooding
- Lack of clear identification of institutional leadership and responsibilities for local surface water flooding (especially for wet weather exceedance pluvial flooding)

Organisational Barriers

- Information and data sharing between stakeholders; need to understand how the physically integrated surface water drainage system, but organisationally fragmented, system works
- Local Authorities resource capabilities and organisational capacity; intra- and interdepartmental consultation procedures

Legal Barriers

- Definition of 'sewer' and inclusion of SUDS within standard definition
- Restrictions and confusion on sewer design levels and standards
- Right-to-connect to public sewer system for new urban development

Legal Barriers

- Extension of impermeable surfaces and urban 'creep'
- Adoption of SUDS drainage systems

Technical Barriers

- Responsibility for modelling and mapping extreme wet weather pluvial (exceedance) flooding
- Lack of local/regional surface water management plans (SWMPs)

Planning Barriers

- Coordination and integration of planning process in relation to flood risk

Public Involvement Barrier

- Lack of community perception and awareness of flood risks

Qualitative Analysis

SuDS Masterclass 2014

Opportunities

- Management-train
- Integrate Regional, Site and Source Controls
- Prevention: minimising paved areas and sweeping surface debris from car parks
- Source control: rainwater harvesting, green roofs, soakaways and pervious pavement
- Site Control: soakaway or infiltration basin
- Regional Control: detention ponds or naturally occurring wetlands.

Barriers

- Politicians & Policies
- Resistance to Change
- Missed Opportunities
- Cost
- Lack of Knowledge

Strategies

- Integration & Utilisation of Land
- Collaboration & Stakeholder Buy-in
- Risk Management
- Legislation, Policies and Politicians
- Innovation & Adaptation

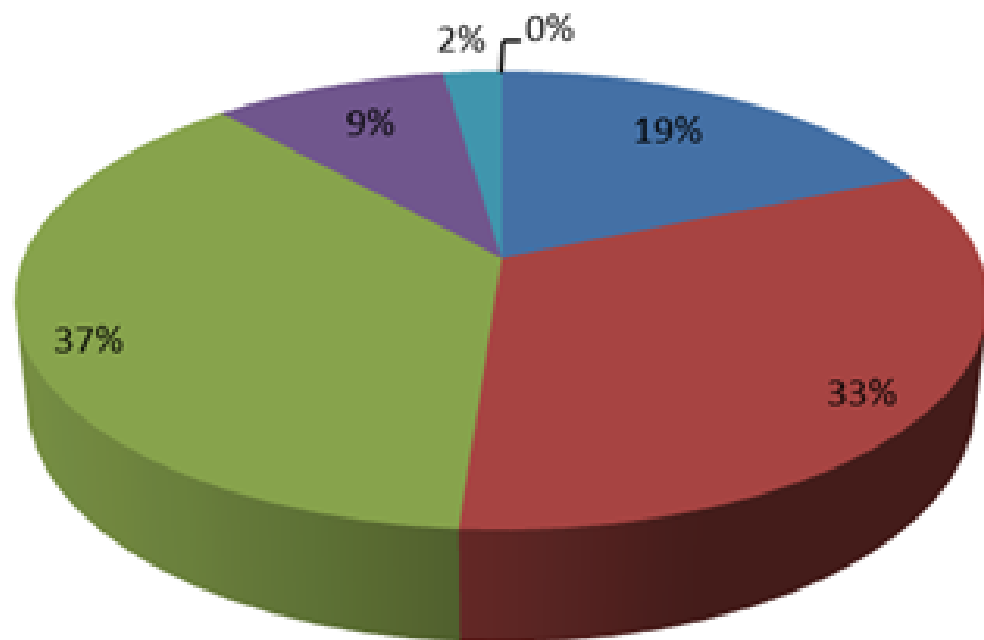
Drivers

- Environmental
- Financial
- Legislative & Legal

Quantitative Analysis

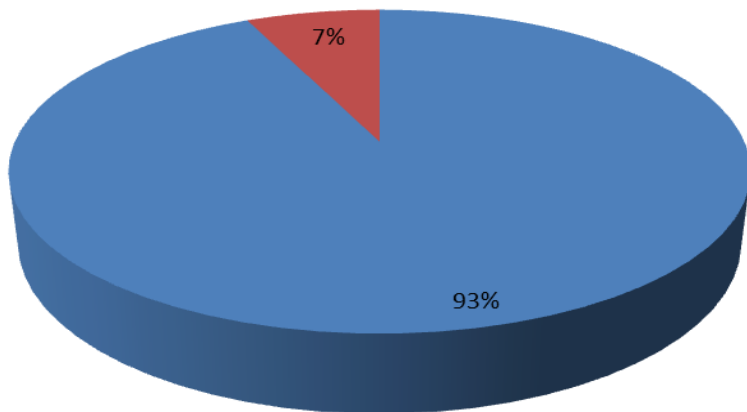
- Questionnaire
- 43 Respondents
- 35 with SuDS Experience
- 8 without SuDS Experience

Occupation



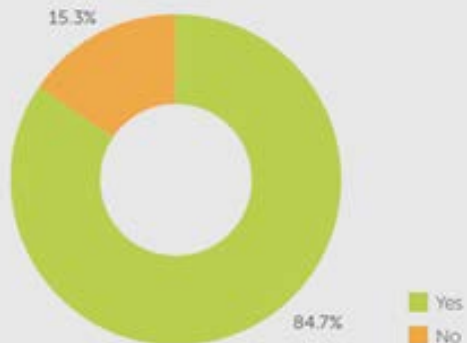
- Contractor
- NI Water Employee
- Consulting Engineer, Architect, Specifier
- Project Manager
- Local Authority
- Developer

- Do you believe that legislative drivers such as those proposed in the Long Term Water Strategy (2014-39) for Northern Ireland will help make more effective progress with SUDS than the rest of the U.K.? Yes
- Do you believe that legislative drivers such as those proposed in the Long Term Water Strategy (2014-39) for Northern Ireland will help make more effective progress with SUDS than the rest of the U.K.? No



Question 7

Do you believe that the legislative drivers have helped Scotland to make more effective progress with SUDS than England and Wales?



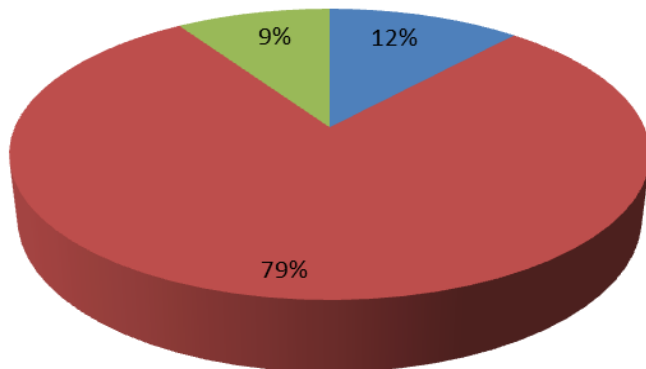
There was strong agreement that legislation has enabled Scotland to implement SUDS and to progress further than its neighbours in England and Wales.

84.7% of respondents agreed that legislation had supported successful SUDS implementation in Scotland.

Commenters agreed that success through various elements of regulation had been achieved, but were clear that Scotland could not rest on its laurels.

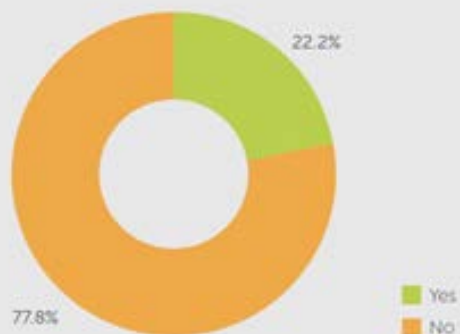
Many comments pointed out that more can still be done, and highlighted some barriers to further progress.

- Do you believe there is adequate funding available for the adoption and maintenance of SUDS in Northern Ireland? Yes
- Do you believe there is adequate funding available for the adoption and maintenance of SUDS in Northern Ireland? No
- Do you believe there is adequate funding available for the adoption and maintenance of SUDS in Northern Ireland? Don't Know



Question 12

Do you believe there is adequate funding available for the adoption and maintenance of SUDS in Scotland?



The overwhelming majority (77.8%) believed funding for adoption and maintenance was inadequate.

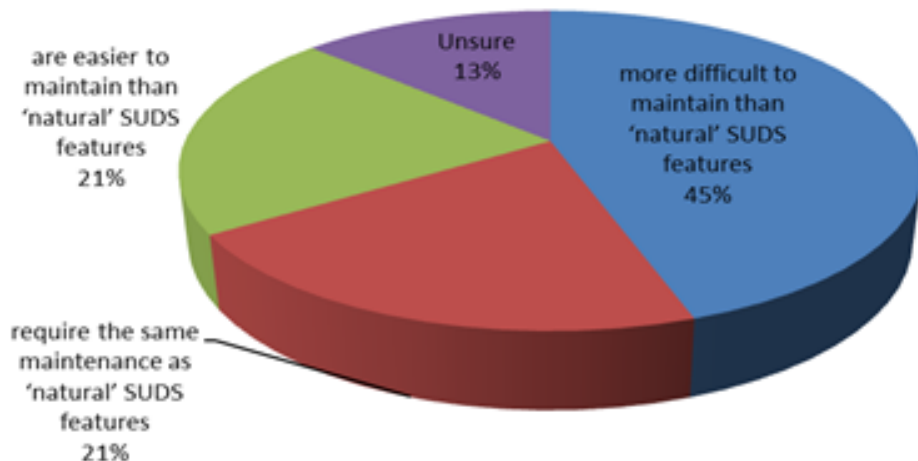
Agreement was high amongst all respondent groups and 100% in the housebuilder and developer group.

Comments suggested that both Scottish Water and local authorities could do considerably more to adopt SUDS and that responsibility for maintenance of SUDS could be falling between the two bodies.

Some felt that more funding for local authorities would help to resolve the difficulties currently being experienced.

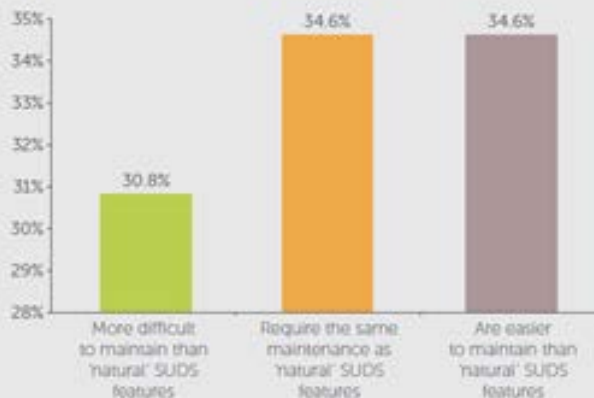
However, not all were in agreement, with some environment agency respondents suggesting that SUDS can be adopted if properly designed and that a lack of understanding amongst local authorities made them overly concerned about maintenance.

In terms of maintenance of SUDS features do you believe that proprietary systems such as vortex separators and geocellular storage crates are:



Question 15

In terms of maintenance of SUDS features do you believe that proprietary systems such as vortex separators are:

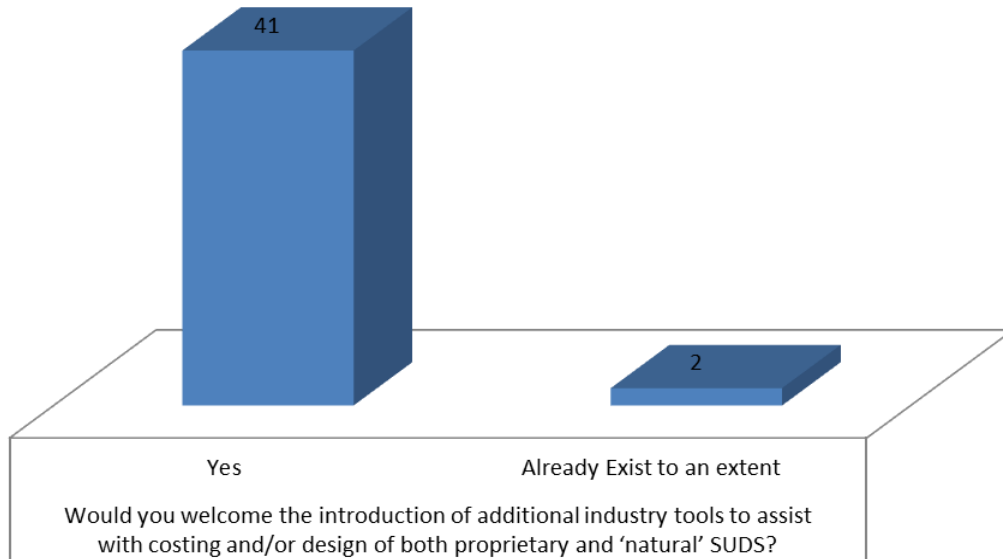


The majority (69.2%) believe that proprietary SUDS features either require the same maintenance or are easier to maintain than natural SUDS features with less than a third (30.8%) believing they are more difficult to maintain.

Some comments revealed that respondents needed more information about maintenance regimes for proprietary features. Some had a concern that underground systems might be forgotten about by the owners. However, some also pointed to disadvantages of maintaining natural SUDS features.

Amongst those most familiar with the maintenance regimes of proprietary features, comments appeared to support them for their ease of maintenance and predictable regimes.

■ No. of Respondents



Question 17

Would you welcome the introduction of further industry tools to assist with costing and/or design of both proprietary and 'natural' SUDS?

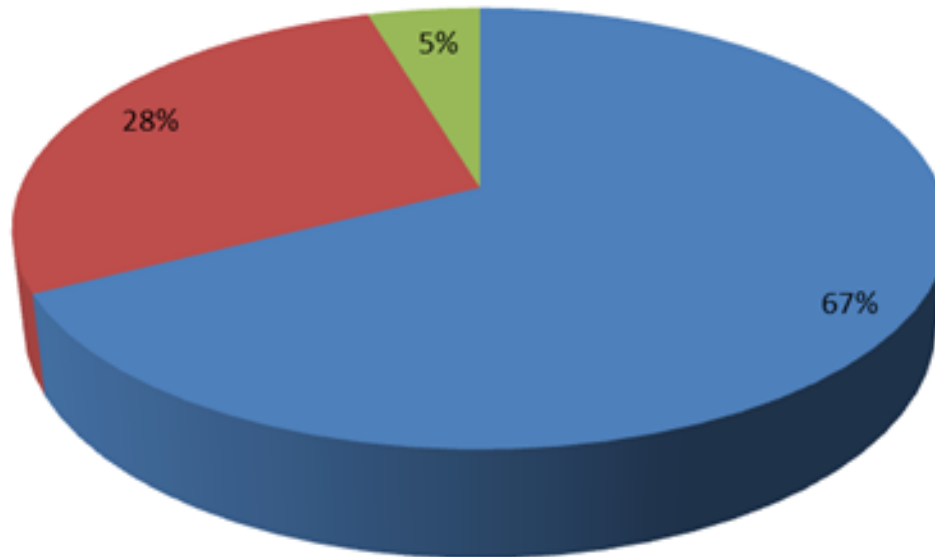


An overwhelming majority (86%) would welcome further industry tools to aid costing and/or design of SUDS features.

Comments suggested that costing models based on actual, real-life examples would be useful.

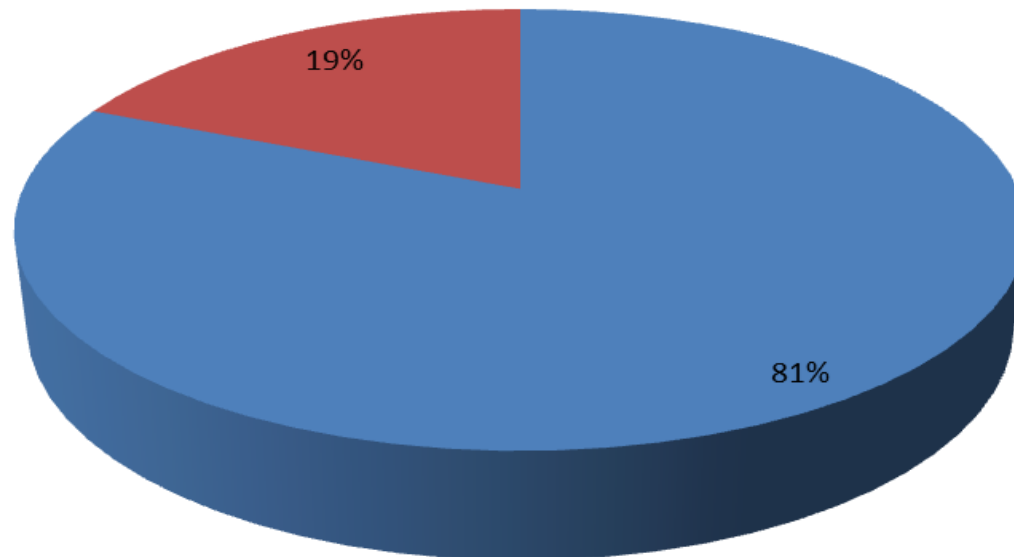
Some suggested that any tool should also rate the effectiveness of SUDS features.

- Do you believe that current sewerage and drainage legislation, regulation and standards stifle innovation for SUDS in Northern Ireland? Yes
- Do you believe that current sewerage and drainage legislation, regulation and standards stifle innovation for SUDS in Northern Ireland? No
- Do you believe that current sewerage and drainage legislation, regulation and standards stifle innovation for SUDS in Northern Ireland? Don't Know



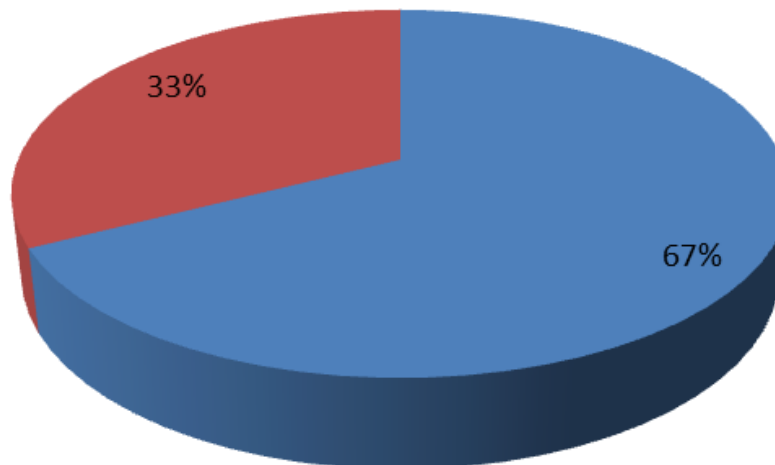
Health & Safety Risk

- In your opinion is it better to risk manage SUDS Health & Safety issues relating to drowning in ponds, swales etc. i.e. mitigate, control or reduce rather than eliminate? Yes, Risk Manage
- In your opinion is it better to risk manage SUDS Health & Safety issues relating to drowning in ponds, swales etc. i.e. mitigate, control or reduce rather than eliminate? Eliminate Risk



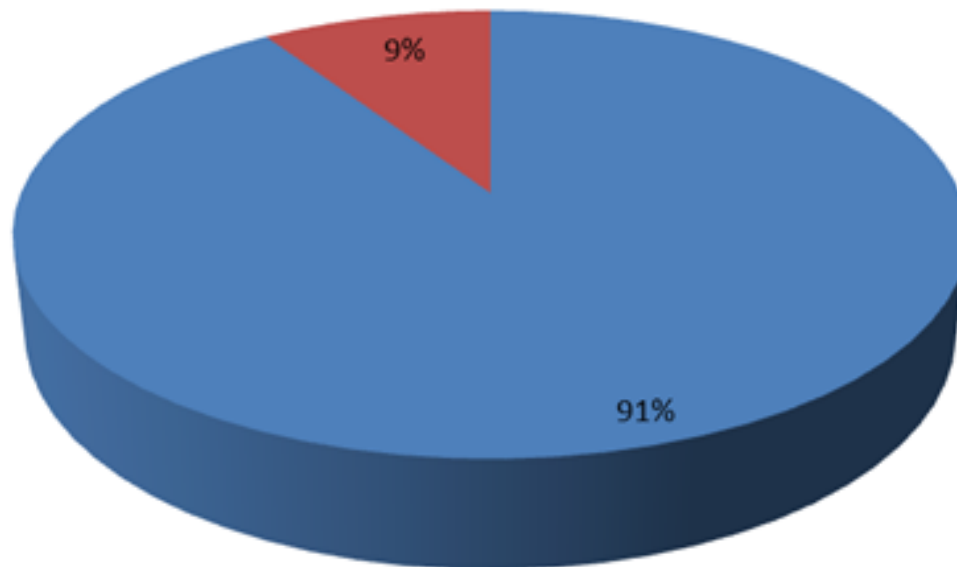
Land-take

- Do you believe that a SUDS design automatically means additional land-take compared to traditional design or do believe that with integration of SUDS features at project inception land-take is not an issue? Land-take is an Issue
- Do you believe that a SUDS design automatically means additional land-take compared to traditional design or do believe that with integration of SUDS features at project inception land-take is not an issue? Land-take is not an issue



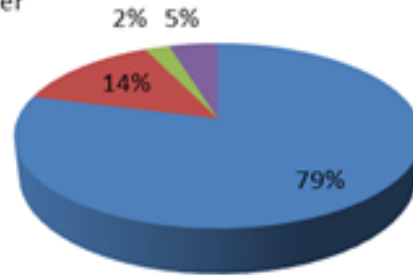
Stakeholder Engagement

- Do you believe that there is a need for engaging with stakeholders such as property owners to get their buy-in on SUDS features for their area and raise awareness? Yes
- Do you believe that there is a need for engaging with stakeholders such as property owners to get their buy-in on SUDS features for their area and raise awareness? No



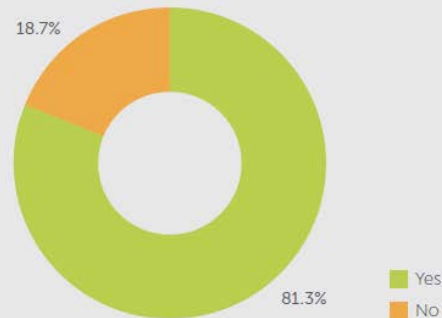
Retrofitting

- Do you think more effort should be put into retrofitting SUDS to manage water at the source rather than at catchment level? Yes
- Do you think more effort should be put into retrofitting SUDS to manage water at the source rather than at catchment level? No
- Do you think more effort should be put into retrofitting SUDS to manage water at the source rather than at catchment level? Don't Know
- Do you think more effort should be put into retrofitting SUDS to manage water at the source rather than at catchment level? Other



Question 6

Do you believe that more could be done to retrofit SUDS in Scotland?



There is broad agreement amongst practitioners from all professional disciplines that more could be done to retrofit SUDS in Scotland.

81.3% agreed that more could be done to retrofit SUDS.

Many who commented believed cost could be a barrier or that retrofit needed to be enabled through greater funding.

Commenters highlighted the particular need to target water quality in urban environments.

Some suggested that more retrofit SUDS could be enabled via the planning system and others called for clear roles and responsibilities to be established for implementing retrofit SUDS.

Software Analysis: Regression

- Direct Link between Current Legislation influencing:
 - Resistance to Change
 - Environmental Drivers

Software Analysis: Sample T-Test

- Maintenance & Adoption
 - was a significant barrier
 - for both experienced and non-experienced SuDS respondents

Independent Sample T-Test

- Land take:
 - More significant barrier with respondents who had no SuDS experience
 - SuDS experienced staff are more aware of the need for integration and utilisation of land
 - Need to educate Engineers & P.M's???

Conclusions

- Misconceptions from those with lack of knowledge of SuDS
- Current legislation is barrier to SuDS but New Water Legislation Proposals could be driver for change.

Conclusions

- Incentivisation
- Cost
- Environment
- Social
- Collaboration & Stakeholder Buy-in

Thank You!

Any Questions?

E-mail: matthew.lundy@niwater.com