

Sustainable Drainage Systems (SuDS)

A Briefing for the Committee for Regional Development
Chair and Vice Chair on 01/06/15

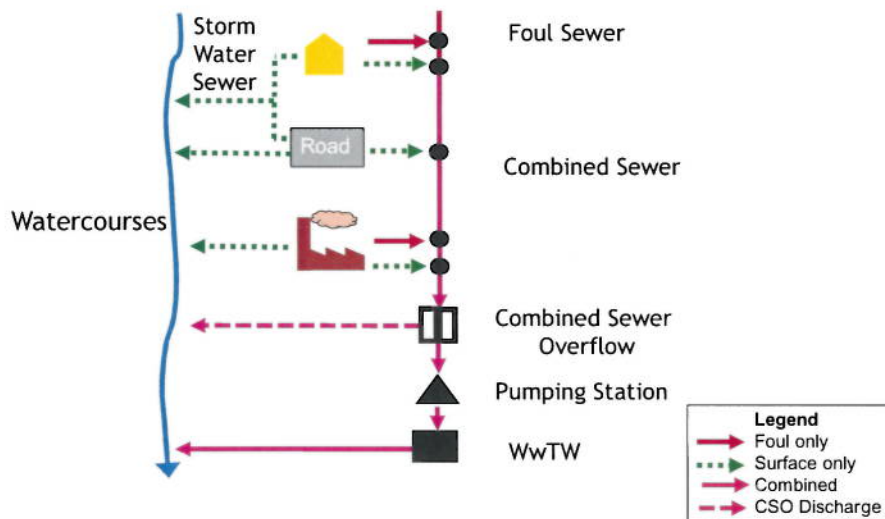
Prepared by: Paddy Brow

V1 01/06/15

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- 1) Investment Drivers for Storm Separation and Utilisation of SuDS
- 2) Retrofitting SuDS
- 3) SuDS in New Developments
- 4) Conclusions

Typical NI Urban Sewerage Infrastructure Schematic Diagram



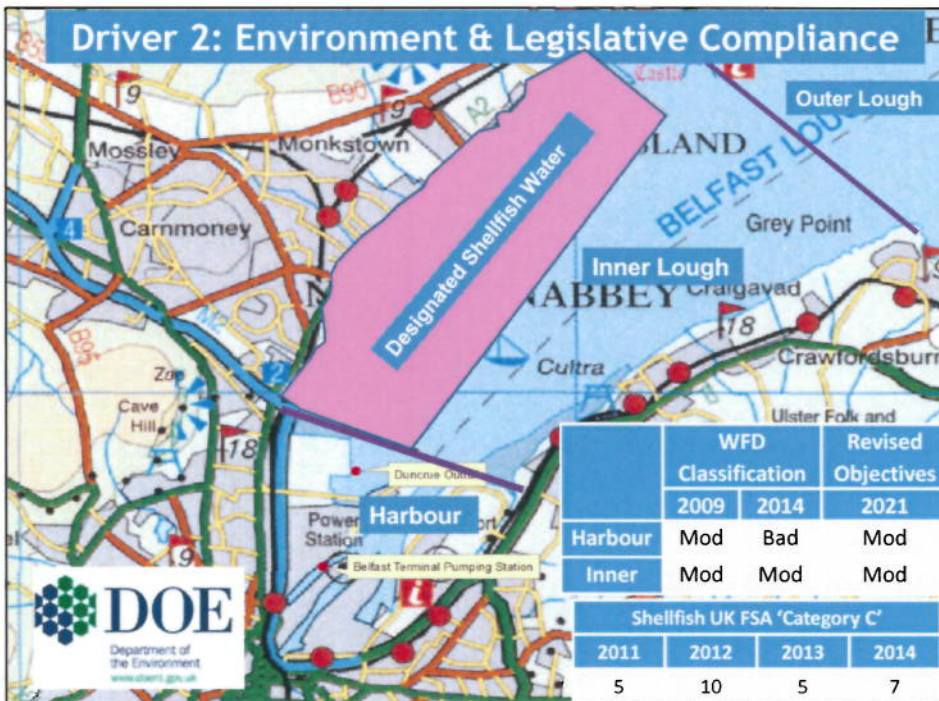
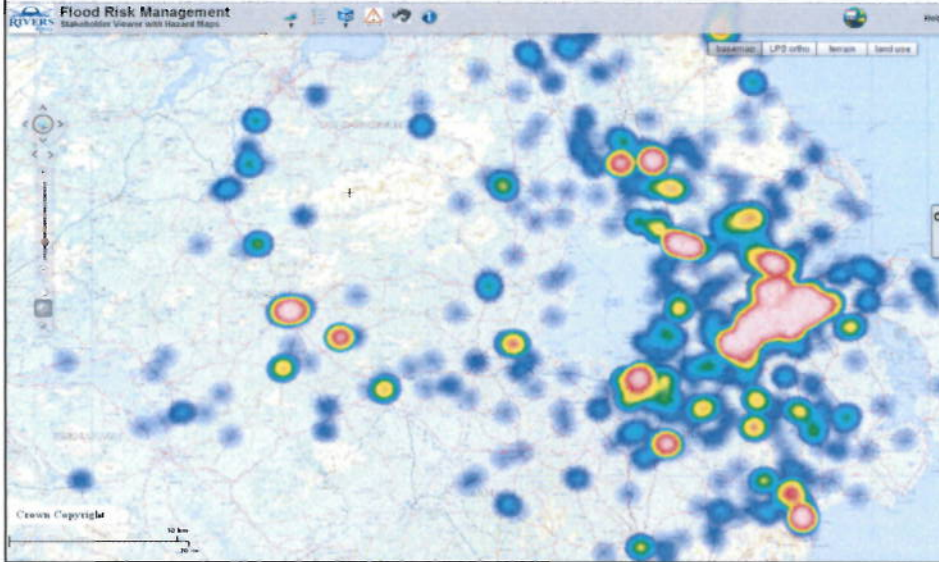
Key Drivers for Storm Separation & Use of SuDS

- 1) Reducing Flood Risk
- 2) Environmental & Obligations under EU legislation
- 3) Facilitate economic development
- 4) Adapt to climate change
- 5) Mitigate against increasing operational costs





Driver 1 - Flooding (Flooding Hotspots)



Driver 3 - Facilitate Economic Development

Development and new connections:

- Increase foul flow
- Increase impermeable area – therefore increasing runoff & storm water flow rates

However:

Flooding:

- Already **88** Belfast properties on NI Water's Out of Sewer Flooding (DG5) Register
- And refer to Rivers Agency flood maps

Belfast Storm Tunnel Terminal Pumping Station (TPS)

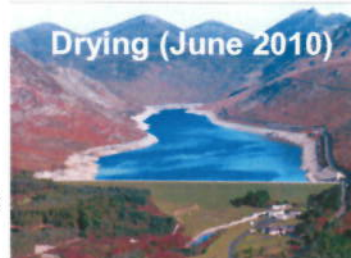
- Design: Estimated spill less than **15** times per year (200,000m³)
- (Required frequency for intermittent discharges to Shellfish Waters is **10** spills)
- However spills are significantly in excess of this

Belfast WwTW

- Design capacity: 300,000 PE
- Current loading: 358,525 PE and under review (Total Nitrogen and hydraulics under strain)
- Current consent: BOD 30, SS 50, TN 10
- Inadequate funding currently available to upgrade the works (could cost £200m+)

EU Infraction or Non-compliance of the WwTW could lead to restrictions in development

Driver 4 - Adapt to Climate Change



Driver 5: Mitigate Against Increasing Operational Costs



Current* costs: Electricity £32m + CRC £2m = £34m

*2013/14

Projected** 2020: Electricity £40.m + CRC £2.5m = £43m (+ 26%)

**In 2013/14 terms

transportni

Year 2015 contribution towards road drainage £20m pa.
This will increase with NI Water pumping costs.

Policy Context - NI Executive draft Long Term Water Strategy

FTMD Policy 3A: Establish a strategic overview for flood risk management and integrated drainage

Key proposed measure: Develop a [strategic drainage infrastructure plan](#) to manage flood risk across Northern Ireland and inform future investment decisions.

FRMD Policy 3B: Reduce the amount of rainwater in combined sewers

Proposed Measures:

- Implement a prioritised [long-term programme to separate surface water drainage systems](#) (in recent developments) from the combined sewers
- Implement a [long-term programme of combined sewer separation to facilitate growth and reduce flooding, pollution and wastewater costs and facilitate growth.](#)

WWS Policy 1C: Transform Water and Sewerage assets and infrastructure through sustainable solutions

Sustainable storm water management is 'about managing storm water locally through land management, urban design, the use of sustainable drainage systems (SuDS), [stormwater separation](#) and sewer infiltration reduction rather than providing progressively larger sewerage systems'.



NI Executive Long Term Water Strategy (LTWS) Future Focus: Sustainable Shared Solutions

Firstly:

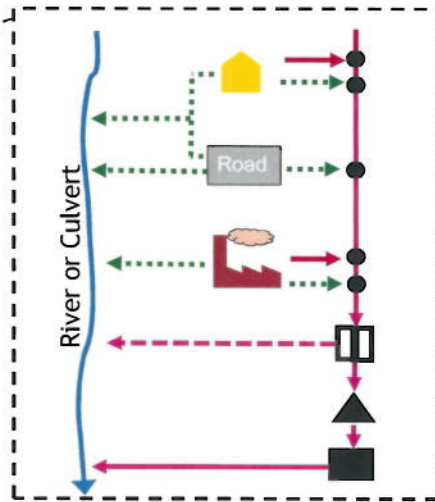
- Resolve ownership & capacity of un-adopted assets
- Storm water separation
- Infiltration reduction
- Increase capacity of culverts

Then, if necessary, implement conventional solutions.

Investment drivers are much wider, shared by:

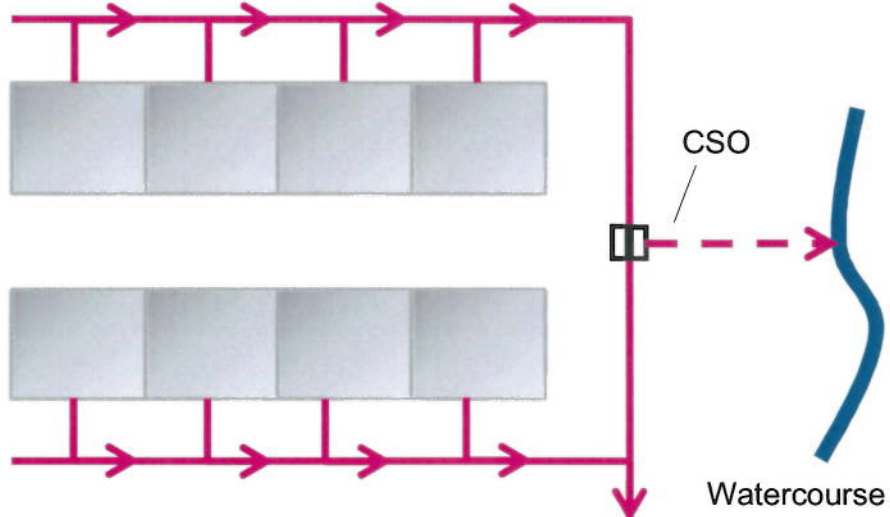


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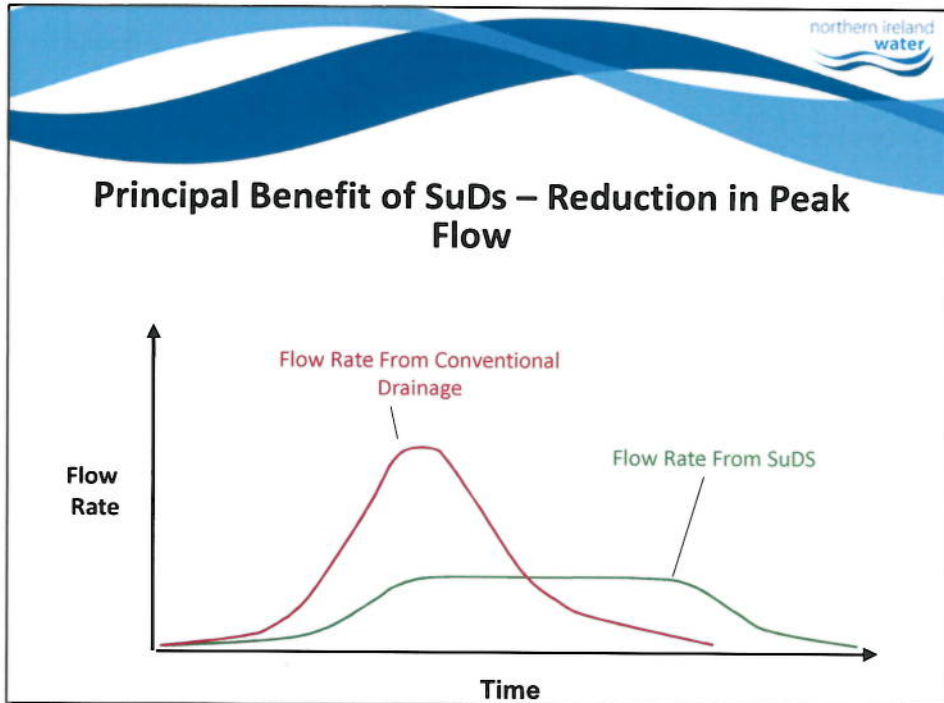
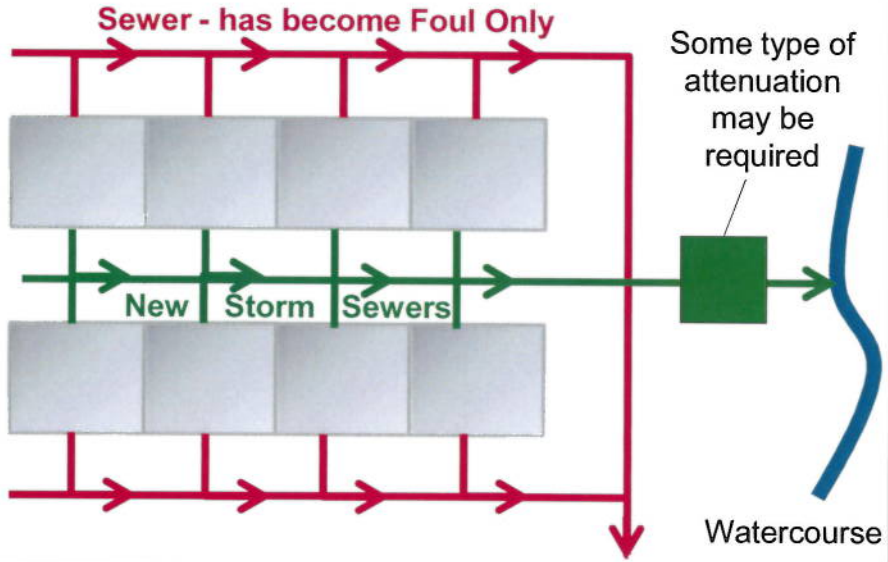


Proactive Storm Separation Example: Victorian Terrace Housing - Before

Existing Combined Sewers



Proactive Storm Separation Example: Victorian Terrace Housing - After



Types of SuDS (1 of 2)



Permeable Paving (Marks & Spencer, Abbey Centre, NI)



Man made lakes / retention basins (England)



Swales (A8 Larne-Belfast, NI)



Modular Storm Tank (Carrowreagh, Dundonald, NI)

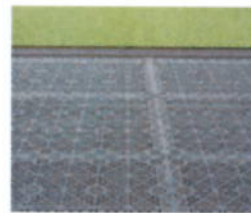


Swales / permeable surface / downpipe to swales, rain gardens within verges (Wales)

Types of SuDS (2 of 2)



SuDS Pond



Porous Playing Field



Tree Pit / Porous Paving retro fitted to roadway



Grass Swale to attenuate & route surface flows



Water Butt to manage water at a local level

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Belfast Storm Separation Potential



Belfast Storm Separation Potential Castlereagh/Montgomery Road Industrial Estate



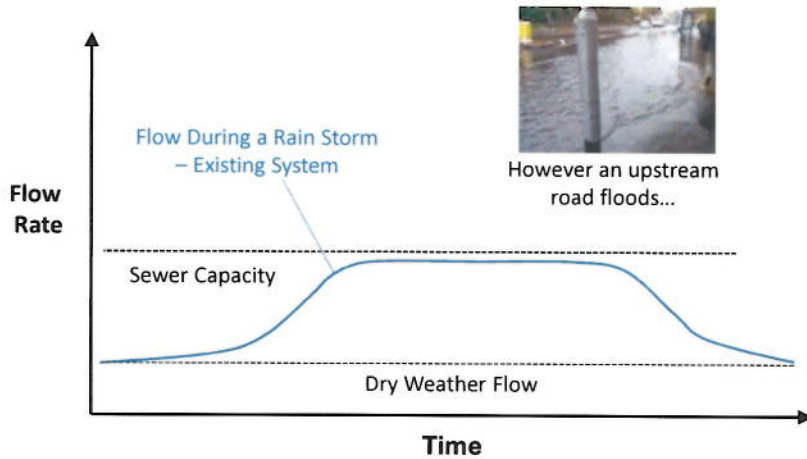
Potential area: 350,000 m³ rain water runoff removal

Belfast Storm Separation Potential Stormont Estate



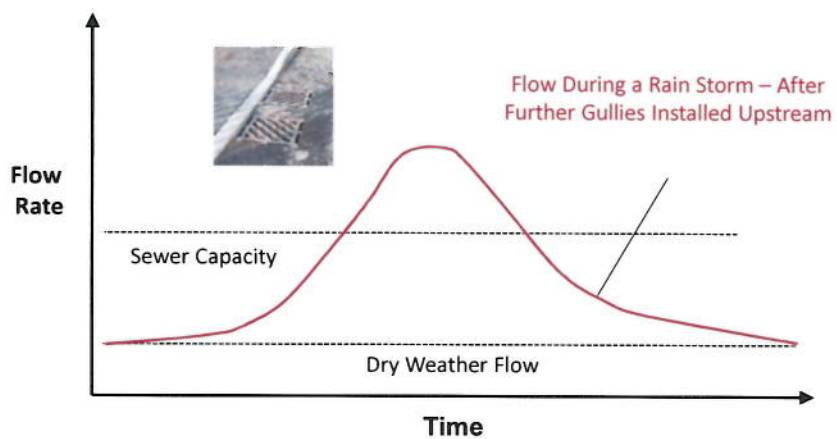
New Connections Provide an Opportunity to Progress Storm Separation

1) Combined System - Existing



New Connections Provide an Opportunity to Progress Storm Separation

2) Combined System - After Implementation of a Narrowly Focused Solution

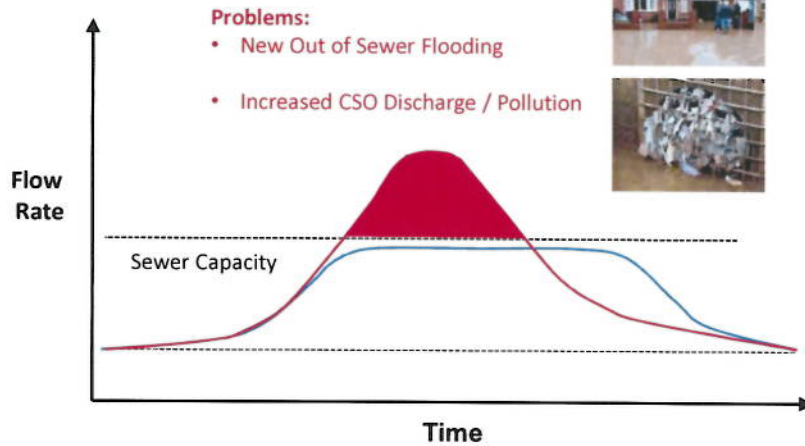




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New Connections Provide an Opportunity to Progress Storm Separation

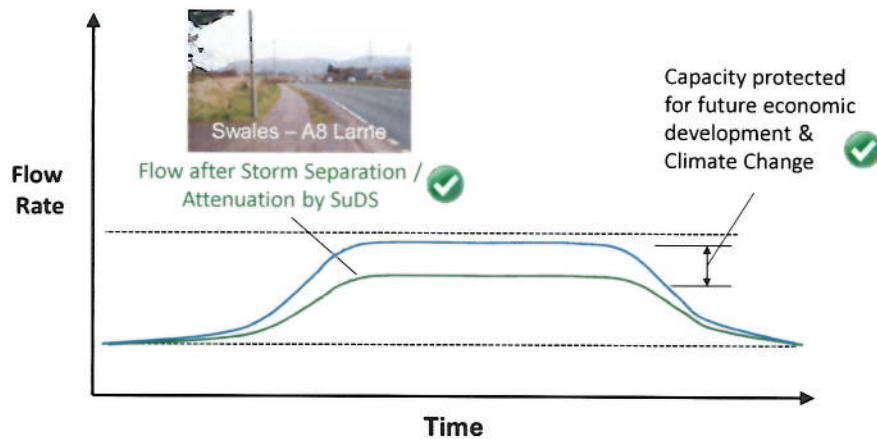
3) Combined System - The Potential Outcome of Narrowly Focused Solutions



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New Connections Provide an Opportunity to Progress Storm Separation

4) Combined System Scenario - After Implementation of a Sustainable Holistic Solution with SuDS

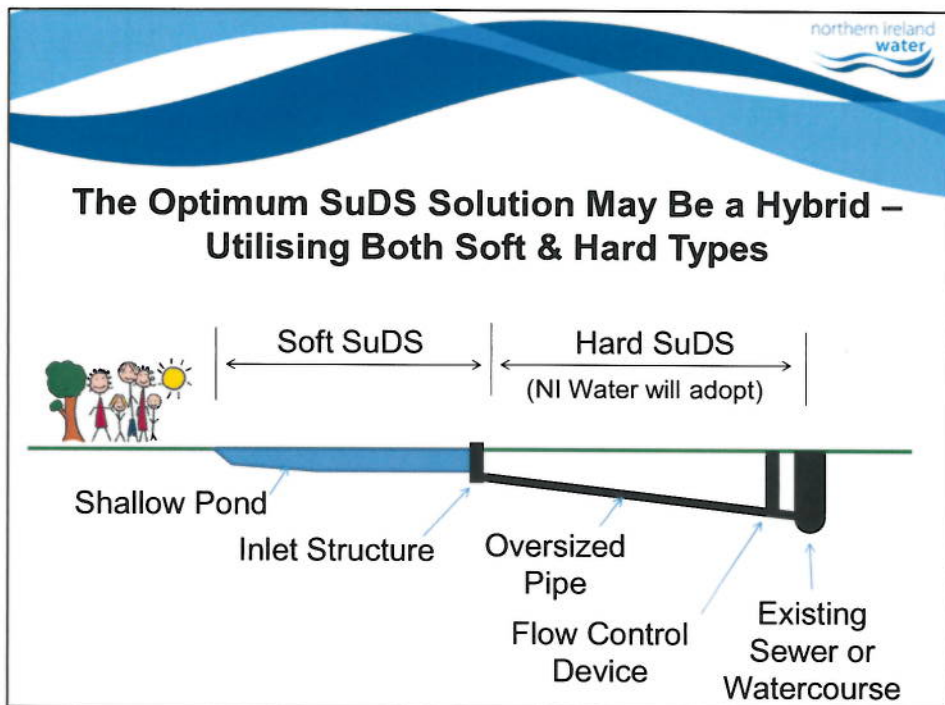
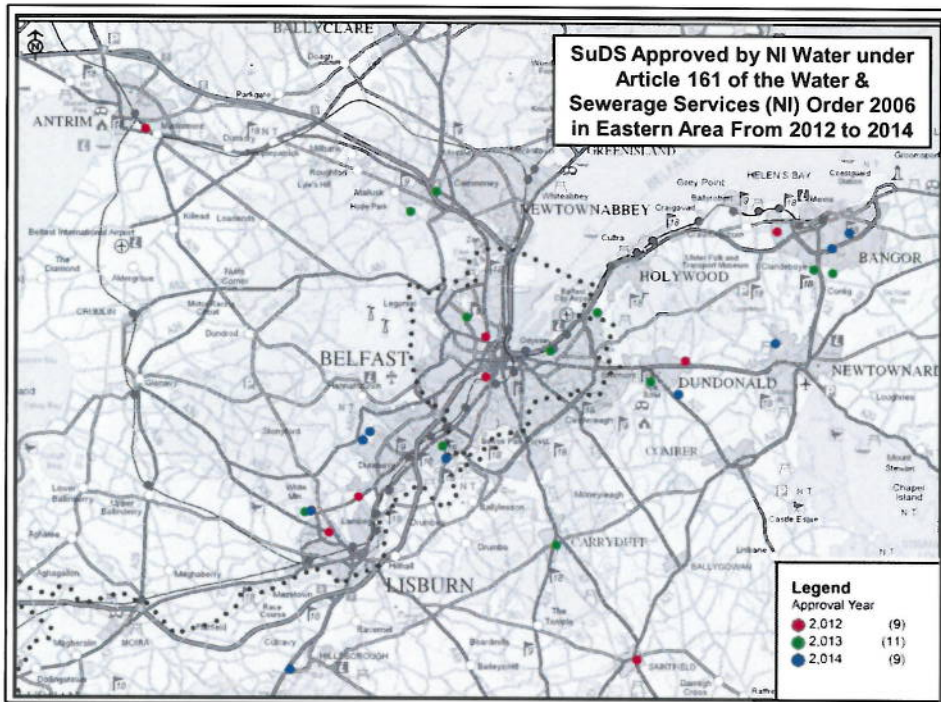


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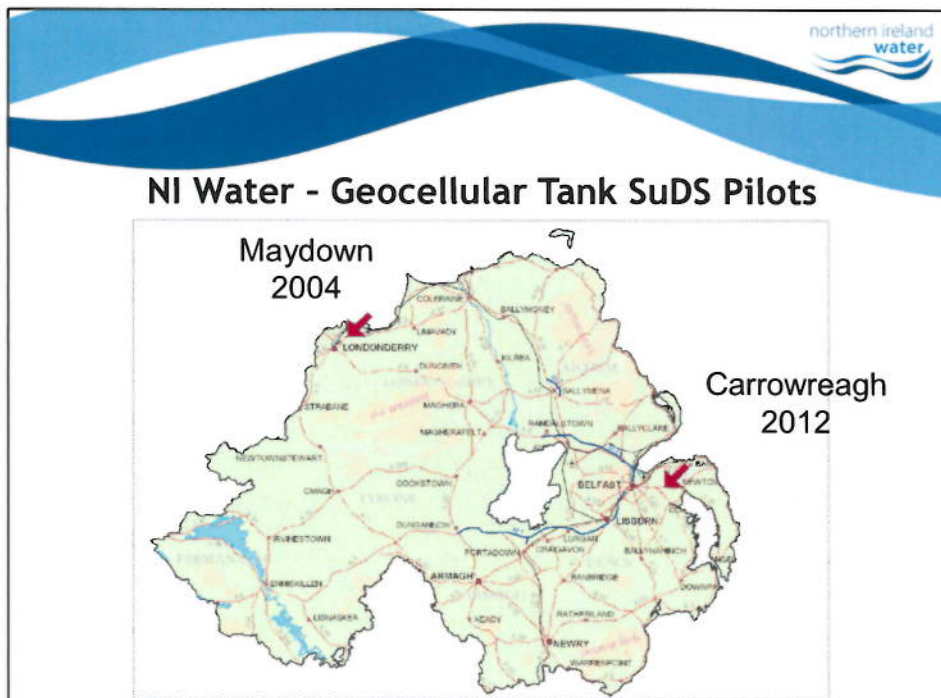
Adoption of SuDS - NI Water Policy (since April 2007)

1. SuDS will be adopted or accepted on the condition they are designed to ensure there is no capital or additional operational cost to NI Water, compared to operating costs of conventional drainage systems.
2. Soft (or vegetative) SuDS options will not be accepted, however if a developer wishes to provide such systems these should be located within private property and not offered for adoption to NI Water.
3. Developers must discuss their proposals with NI Water before submitting drainage layouts for approval. Hard engineered solutions i.e. over engineered pipe systems in accordance with the Code of Practice for SuDS for Northern Ireland and Scotland produced by CIRIA, should only be accepted on the basis that all options for a conventional solution has been explored and eliminated with Rivers Agency.
4. Hard engineered solutions may not be adopted where the upstream SuDS systems are not properly designed or constructed.



Promoting The Optimum SuDS In New Developments - Issues & Proposed Resolution

Issue	Steps to Resolution
<p>1 Water and Sewerage Services (Northern Ireland) Order 2006 is silent on SuDS (all types)</p>	<p>a) Water Bill includes definition of SuDS – clarifying that NI Water can adopt hard SuDS.</p> <p>b) NI Water is developing a revision of Sewers for Adoption (NI) – which will include SuDS. Development of this will consider if geocellular tanks (not below roads) may be adopted. Will be available for issue Jan 2016.</p>
<p>2 Soft SuDS offer wider benefits to NI however for this to happen developers need:</p> <ul style="list-style-type: none"> a) Technical guidance on soft SuDS b) A clear and consistent NI Planning Process c) Clarity on responsibility for maintenance and how to agree this 	<ul style="list-style-type: none"> a) NIEA has co-funded revision of the CIRIA SuDS Manual – the UK definitive technical resource for the design, construction and operation of SuDS. Will be available later in 2015 free to download. b) NI Water has developed proposals which are to be presented to the DRD and NIEA co-chaired Stormwater Management Group (SMG) on 02/07/15 c) The proposals set out recommendations for maintenance.



2012 Carrowreagh Project SuDS Pilot

New Housing
Development
(20 hectares)

1,300 m³
Geocellular
Retention tank

£230k saving
over conventional
solution



River

Conclusions

- 1) Stormwater separation is being progressed due to flooding, environmental needs (EU compliance), to facilitate economic development, adapt to climate change and reduce operational costs. SuDS will often be an enabler for storm separation.
- 2) Promotion of SuDS in new developments will be assisted by the proposed Water Bill and revision to Sewers for Adoption (NI)
- 3) Often the optimum solutions will include types of soft SuDS. The DRD and NIEA led Stormwater Management Group is to consider if an how NI Planning Policy can be developed to promote soft SuDS.