

# Presentation to the Association of Irish Local Government (AILG)

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## *Nature-based Water Management - Sustainable Urban Drainage/NBS SUDS*

**Fran Igoe, Regional Coordinator,  
River Basin Management Service (formerly  
Local Authority Waters Programme)**

**26/06/26**



Seirbhís Bainistíochta Abhantraí  
River Basin Management Service



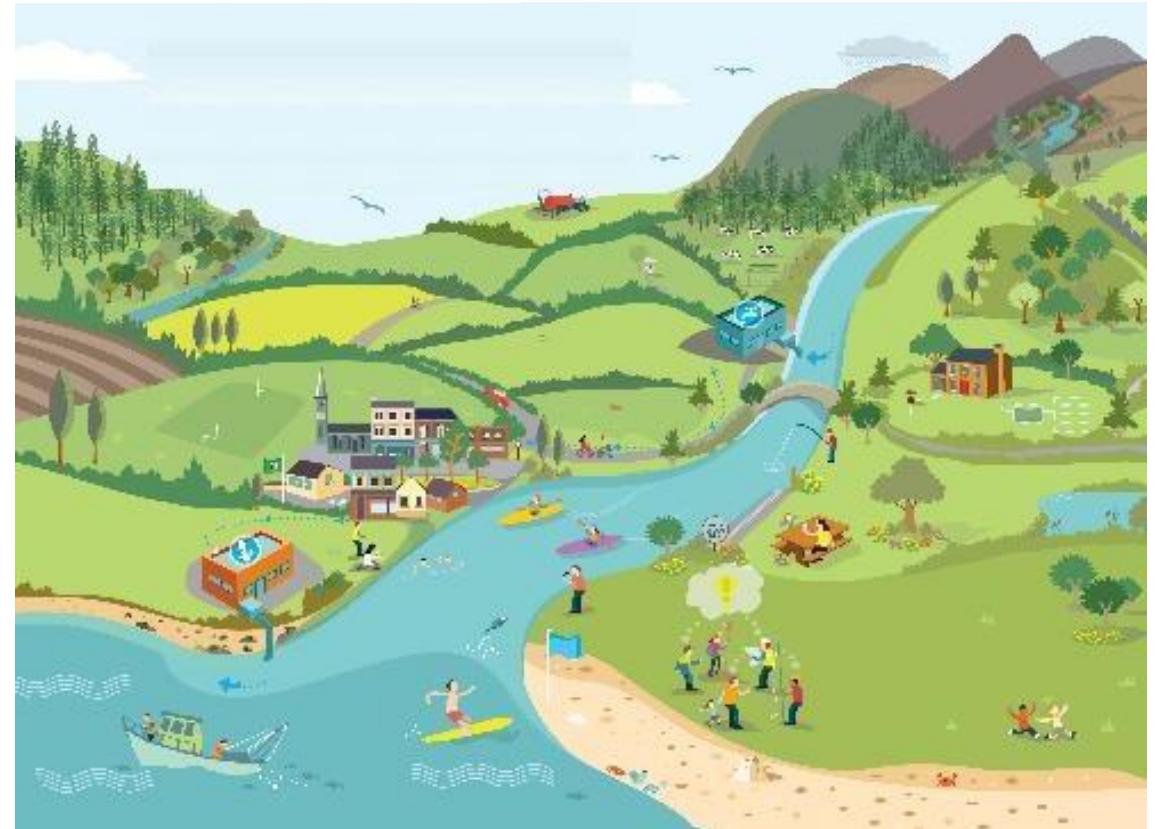
Seirbhís Bainistíochta Abhantraí  
River Basin Management Service



**(formerly LAWPRO)**

*Nature-based Water  
Management - Sustainable  
Urban Drainage/NBS SUDS*

Presentation by:  
**Fran Igoe, Regional Coordinator, River  
Basin Management Service**



# EU Water Framework Directive & Ireland's River Basin Management Plan

**“Water is not a commercial product** like any other but, rather, a heritage which must be protected defended and treated as such.”... the opening line of the EU Water Framework Directive.



Seirbhís Bainistíochta Abhantraí  
River Basin Management Service

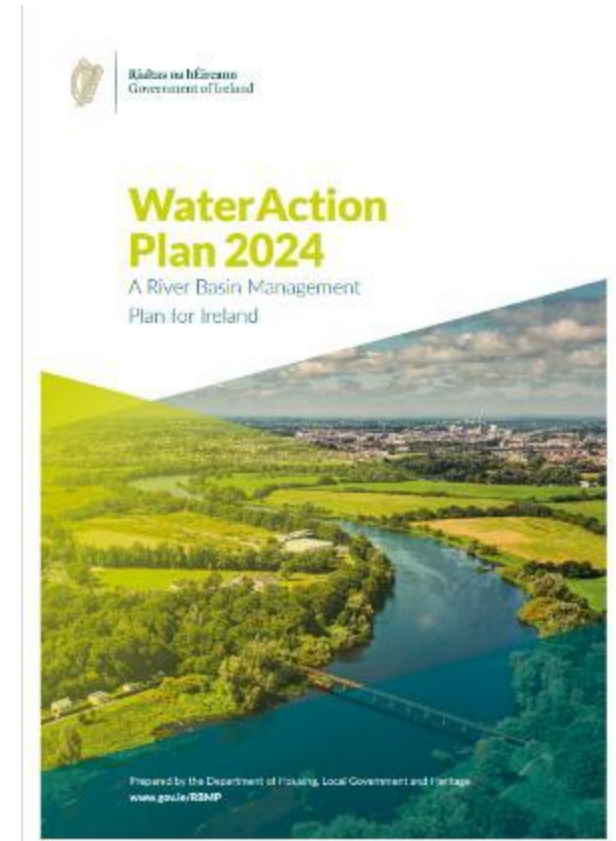
# River Basin Management Service (Local Authority Waters Programme)

- in support the River Basin Management in Ireland

Work	Encourage	Support
<p>Work with Local Authorities in coordinating water quality activities across the regions</p>	<p>Encourage public bodies, sectoral interests, NGO's and local communities, to share knowledge and work together to protect and manage our natural waters</p>	<p>Support community engagement in helping to manage their local waters</p>

## Key focus areas

- *Community engagement*
- *Catchment science*
- *Coordination/Support to WFD governance structures*



# RBMS role as a LA shared service



- Supporting Local Authority in developing
  - Climate Action Plans
  - Biodiversity Action Plans
  - Water Actions Plans (in prep)
  - Better placemaking and housing
- Guidance
- Training
- Funding



Work with government agencies involved in water regulation sectors, sectors potentially impacting on water quality and those substantially reliant on the availability of clean water

- Informed by the Water Action Plan 2040 and the programme of measures within.
- Highlighting the importance of clean water as a public good.
- Public good ranges from the availability of sufficient clean raw drinking water, biodiversity, fisheries, tourism, aquaculture and inshore fisheries, bathing waters and local economic activities.



# Protecting water quality brings many benefits for Irish society



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The United Nations World Water Development Report 2020

# **‘Water and Climate change’**

*Main Messages*

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*Water is the medium through which nature and human societies experience most of the impacts of climate change. Sustainable water management is an essential part of the solution to climate change.*

# Climate is changing our Rainfall Patterns



CORK NEWS CORK SPORT CORK LIVES CORK VIEWS WOW! BUSINESS

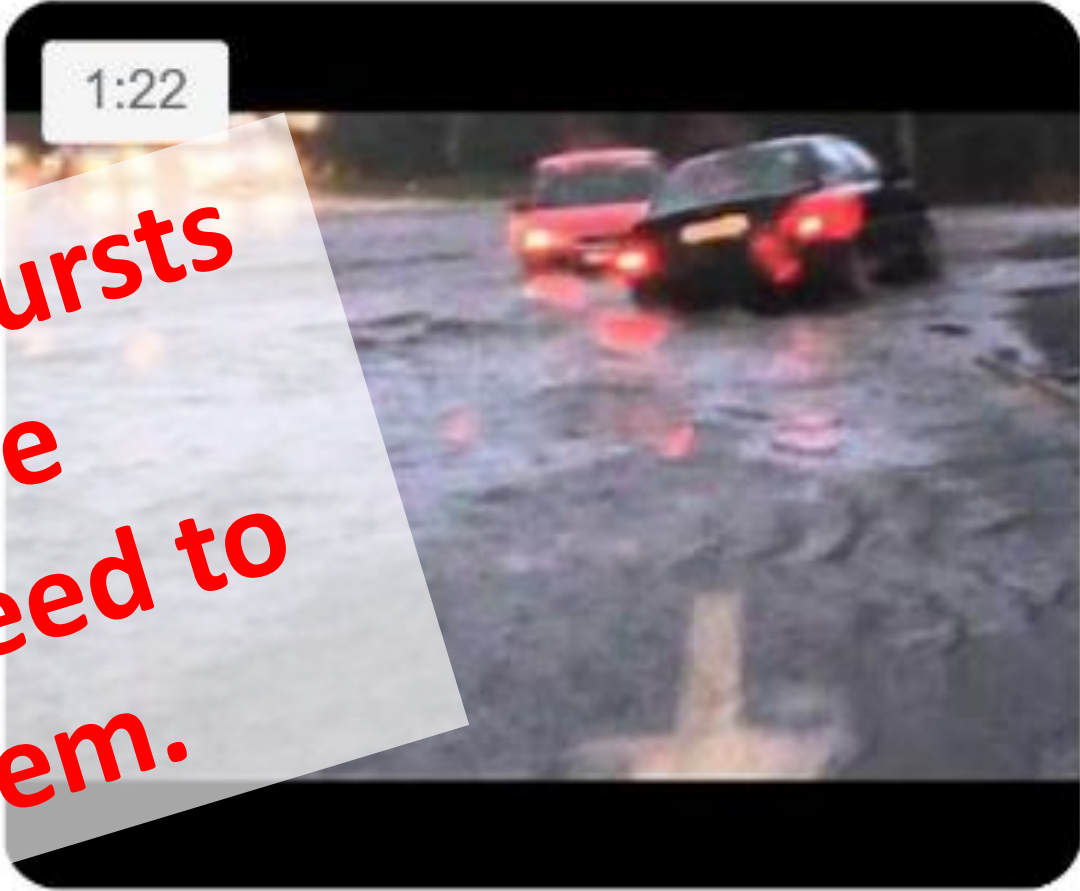
## Watch: Army called in to assist with flood response in county, with Midleton worst affected

A number of parts of the county were seriously impacted by floods on Wednesday.



The main street in Midleton flooded. Picture: Eddie O'Hare

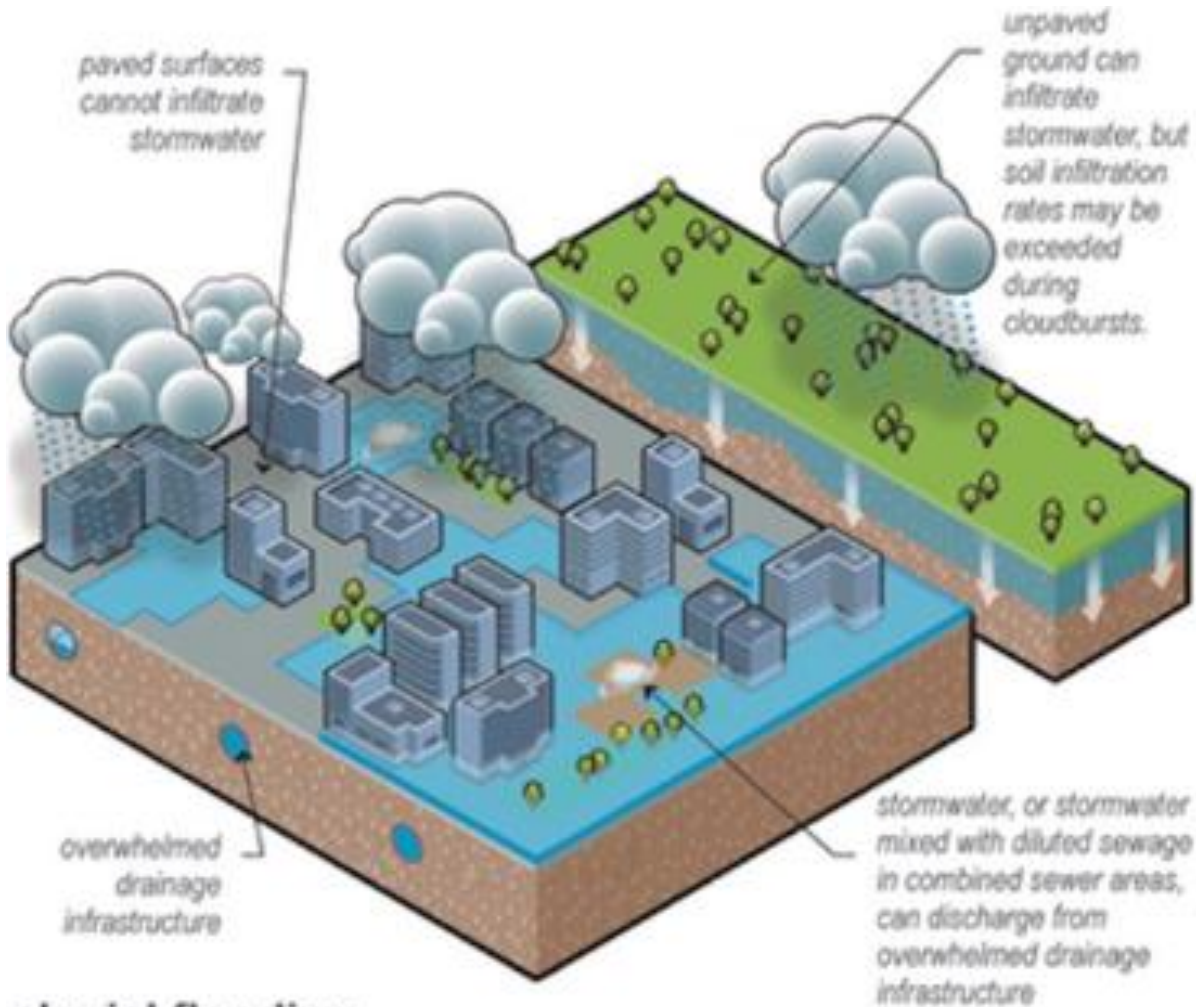
**Localised Cloud bursts will become more common. We need to be ready for them.**



Flooding New Ross

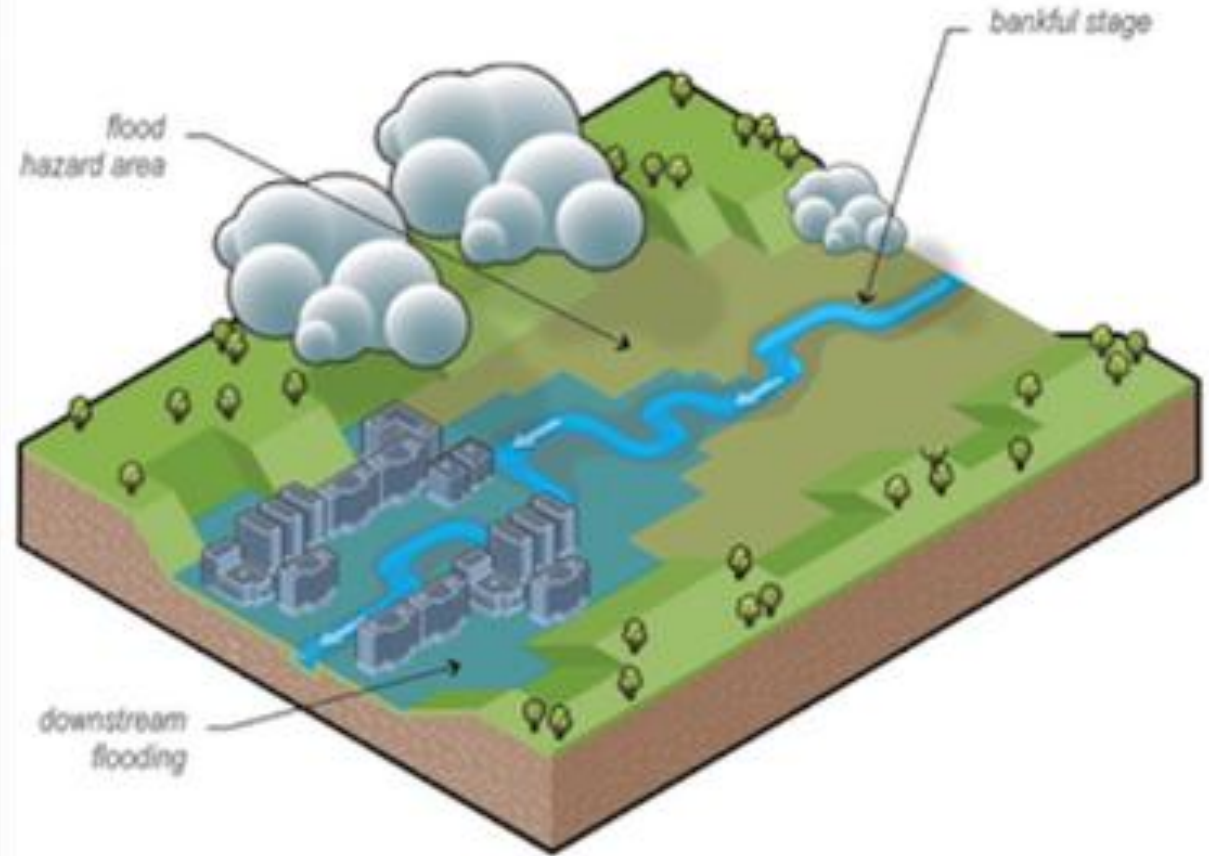
YouTube · Cathy Keane · 4.8K views · 3...

# Four main types of flooding



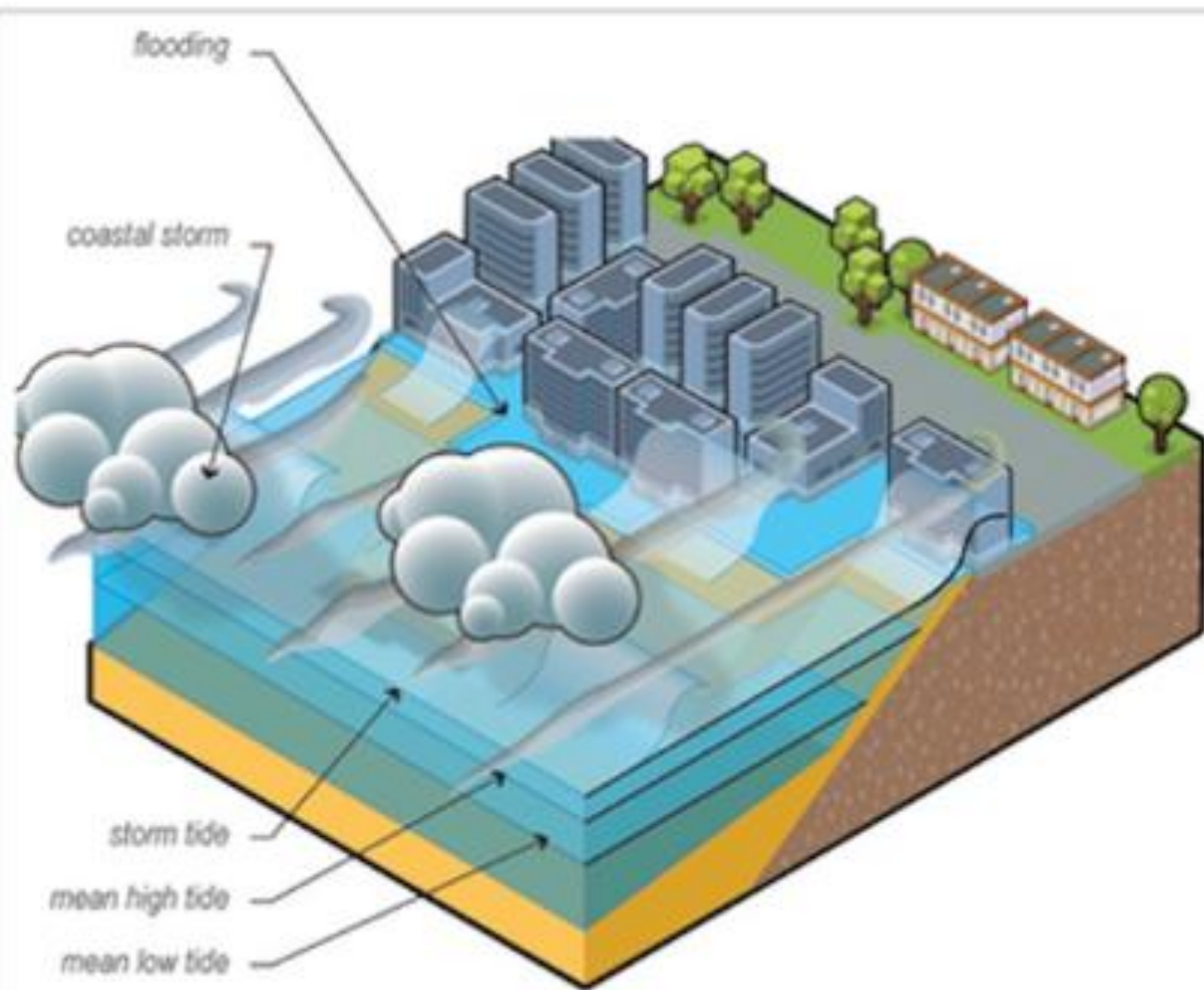
## pluvial flooding

flooding that occurs when the intensity of precipitation exceeds the capacity of the land surface to infiltrate it and / or when the rate of runoff exceeds the conveyance and / or storage capacities of natural and engineered drainage systems. Pluvial flooding is commonly described as 'urban' flooding since it is a particularly important type of flooding in cities.



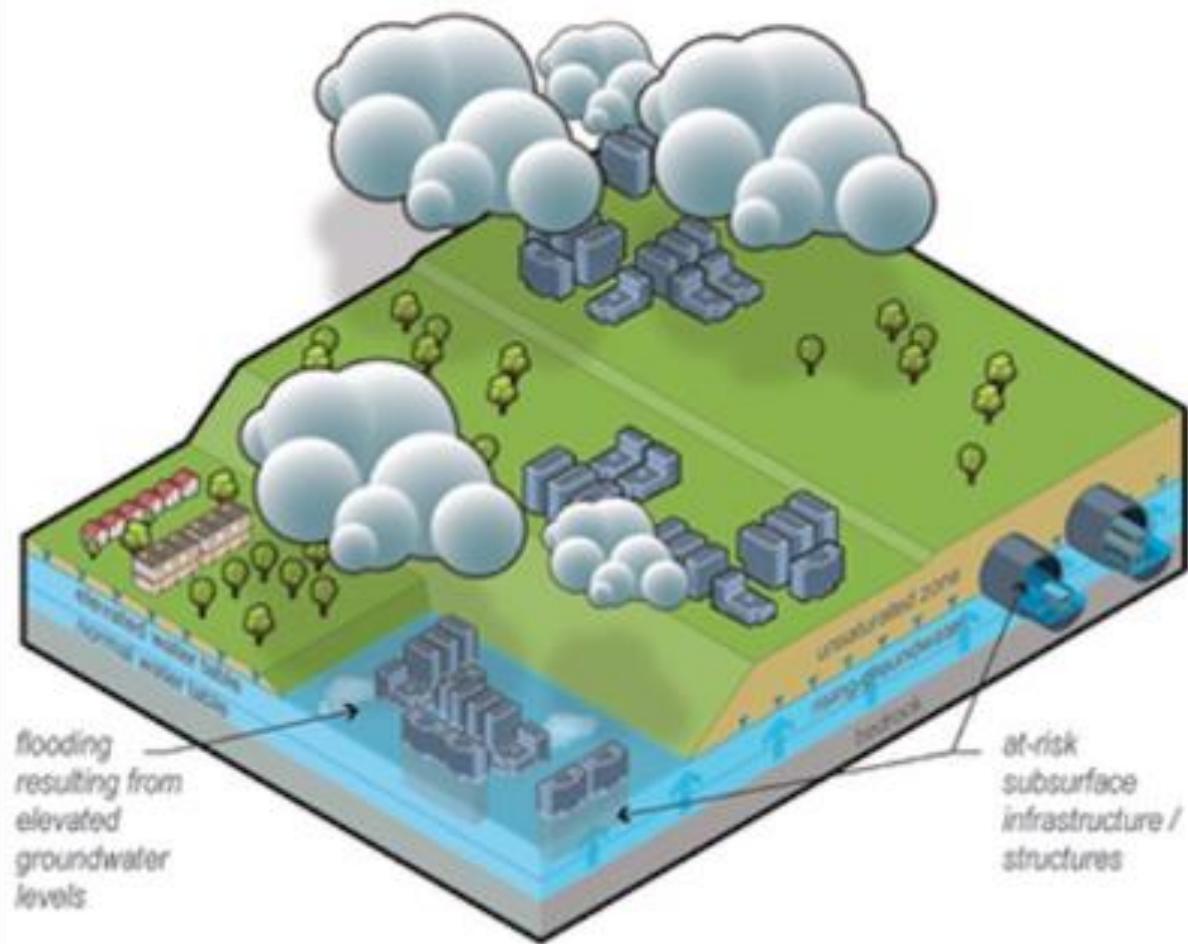
## fluvial flooding

flooding caused when the stage of a river, creek, or stream exceeds the elevation of its banks; also known as river flooding.



## coastal flooding

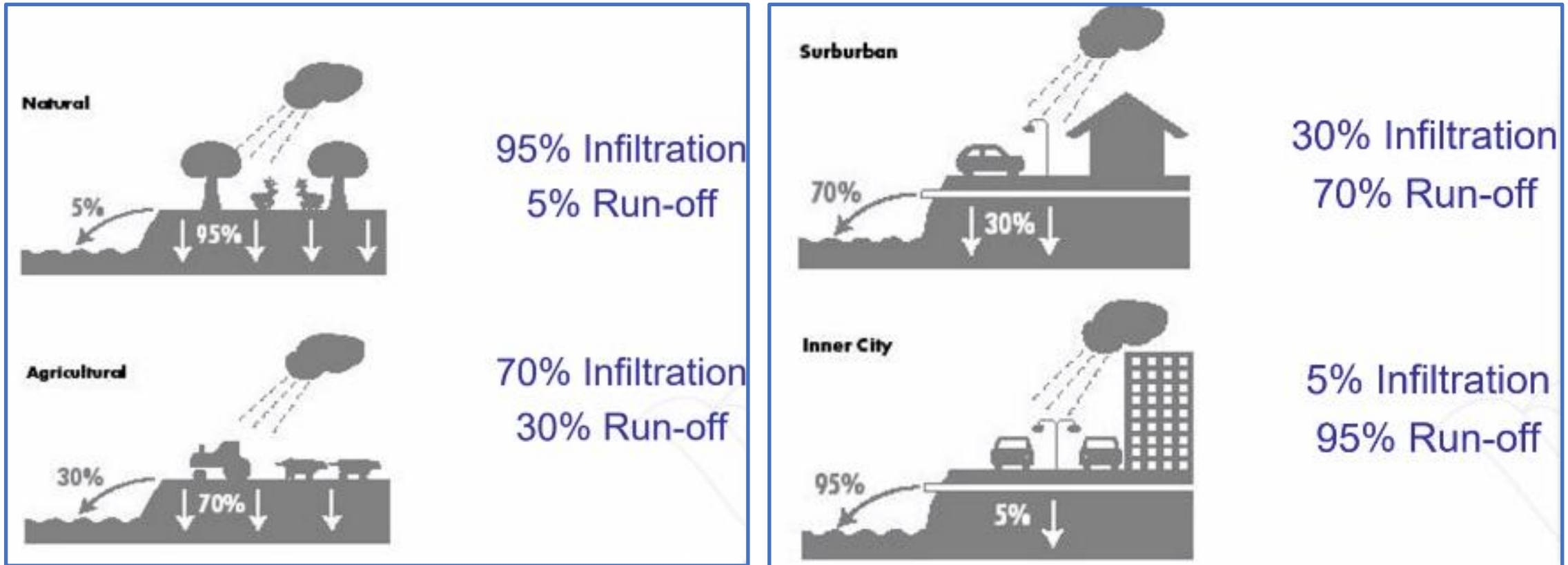
*flooding caused by high tides and storm surge. This type of flooding will be exacerbated by sea level rise.*



## groundwater flooding

*flooding caused when the water table rises to levels that cause inundation of the land surface or subterranean property.*

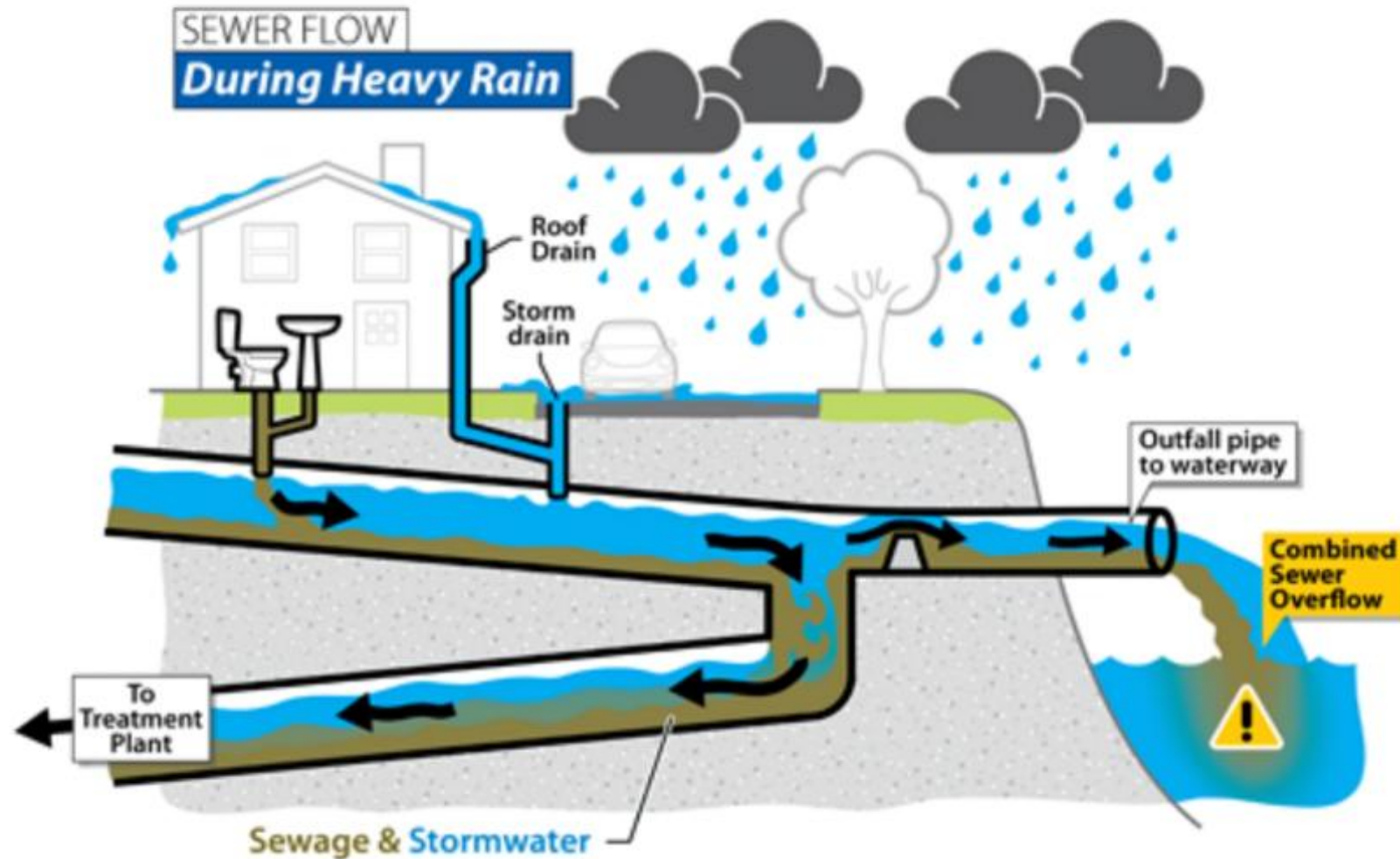
# Pluvial flooding: rainwater infiltration rates decrease with increasing hard surfaces (urbanisation)



Content courtesy J. Stack, DCC & US EPA

The precipitation climate” will become more variable, with substantial projected increases in occurrence of both dry periods and heavy rain events. ICHEC, Irish Times, Sept 18 2020)

# Older systems stormwater and sewage use the same pipes



# More intense rainfall increases risk to Storm Water and combined Sewer Network in settlement areas

Increasing volumes of water may exceed design capacity of storm water network (gullies, underground pipes etc).

Combined sewer networks if flooded out will lead to pollution discharges



# Pollution from motor traffic



Barntown, Wexford



Dungarvan, Waterford

Table 2. Sources of pollutants released by vehicular traffic in urban areas.

Specific source	Pollutants released	References
<b>Vehicle operation</b>		
Exhaust gases and particles	Hydrocarbons, PAHs, NOx, Ni, BTEX	Markiewicz et al. (2017); Brinkmann (1985); Huber et al. (2016); Kayhanian (2012); Duong and Lee (2011); Liu et al. (2018b)
Catalytic converters	Rh, Pd, Pt	Rauch et al. (2005)
<b>Vehicle wear</b>		
Tires	TSS, Cd, Cu, Zn, PAHs, microplastics	Muschack (1990); Councell et al. (2004); McKenzie et al. (2009); Legret and Pagotto (1999); Kose et al. (2008); Horton et al. (2017a)
Tire studs	W	Huber et al. (2016)
Brakes	TSS, Cd, Cu, Ni, Pb, Sb, Zn, PAHs	McKenzie et al. (2009); Hjortenkrans et al. (2007); Markiewicz et al. (2017)
Engine and vehicle body wear	Cr, Ni	Gupta et al. (1981); Ward (1990)
Body paint	Pb	Kayhanian (2012)
Wheel balance weights	Pb, Fe (steel), Zn	Root (2000); Bleiwas (2006)
<b>Vehicle washing</b>		
Commercial car washing facilities	Pb, Cd, Cr, Zn Phthalates, NPs, NPEOs	Sörme et al. (2001) Björklund (2010)
<b>Road abrasion</b>		
Abrasion by tires (non-studded and studded)	TSS  PAHs Microplastics	Hvitved-Jacobson and Yousef (1991); Van Duin et al. (2008) Lindgren (1996) Markiewicz et al. (2017) Magnusson et al. (2016); Horton et al. (2017b); Vijayan et al. (2019a)

Müller et al 2020. The pollution conveyed by urban runoff: A review of sources. Science of the total environment. Vol 709.



# Road runoff is extremely toxic

*After a storm, water often runs off of impervious urban surfaces directly into aquatic ecosystems. **This stormwater runoff is a cocktail of toxicants that have serious effects on the ecological integrity of aquatic habitats.** Young et al 2018. Nature Scientific Reports*

## Toxic road runoff kills adult coho salmon in hours, study finds

Open Access published on February 12, 2018, at [nature.com](#) | [DOI: 10.1038/s41598-018-28000-0](#)



A 1-year-old coho salmon swims through an aquarium. Scientists know that the fish are stressed in poor water conditions for the better part of a year. [Mike Vogel / The Seattle Times/Alamy](#)

**A new study shows that stormwater runoff from urban roadways is so poisonous to coho salmon that it can kill adult fish in as little as 2 1/2 hours.**

[nature](#) > [scientific reports](#) > [articles](#) > [article](#)

## SCIENTIFIC REPORTS

Article | [Open Access](#) | Published: 12 February 2018

## Urban stormwater runoff negatively impacts lateral line development in larval zebrafish and salmon embryos

Alexander Young, Valentin Kochenkov, Jenifer K. McIntyre, John D. Stark & Allison B. Coffin [✉](#)



Example of Stormflow impact on Clashawley River, Fethard, Co. Tipperary during low flow river water levels, after a localised shower of rain in 2019. *Source J. Gilleran, EFO, IFI Clonmel*



# Nature-based solutions



If delivered appropriately, Nature-based Solutions can significantly contribute to addressing multiple societal challenges

One third of climate mitigation needed to meet the goals of the Paris Agreement can be provided by Nature-based Solutions



Constructed wetlands



Green urban spaces



Bioswales

# Types of Nature-based Solutions

Courtesy of The International Water Association <https://iwa-network.org>



Natural wetlands



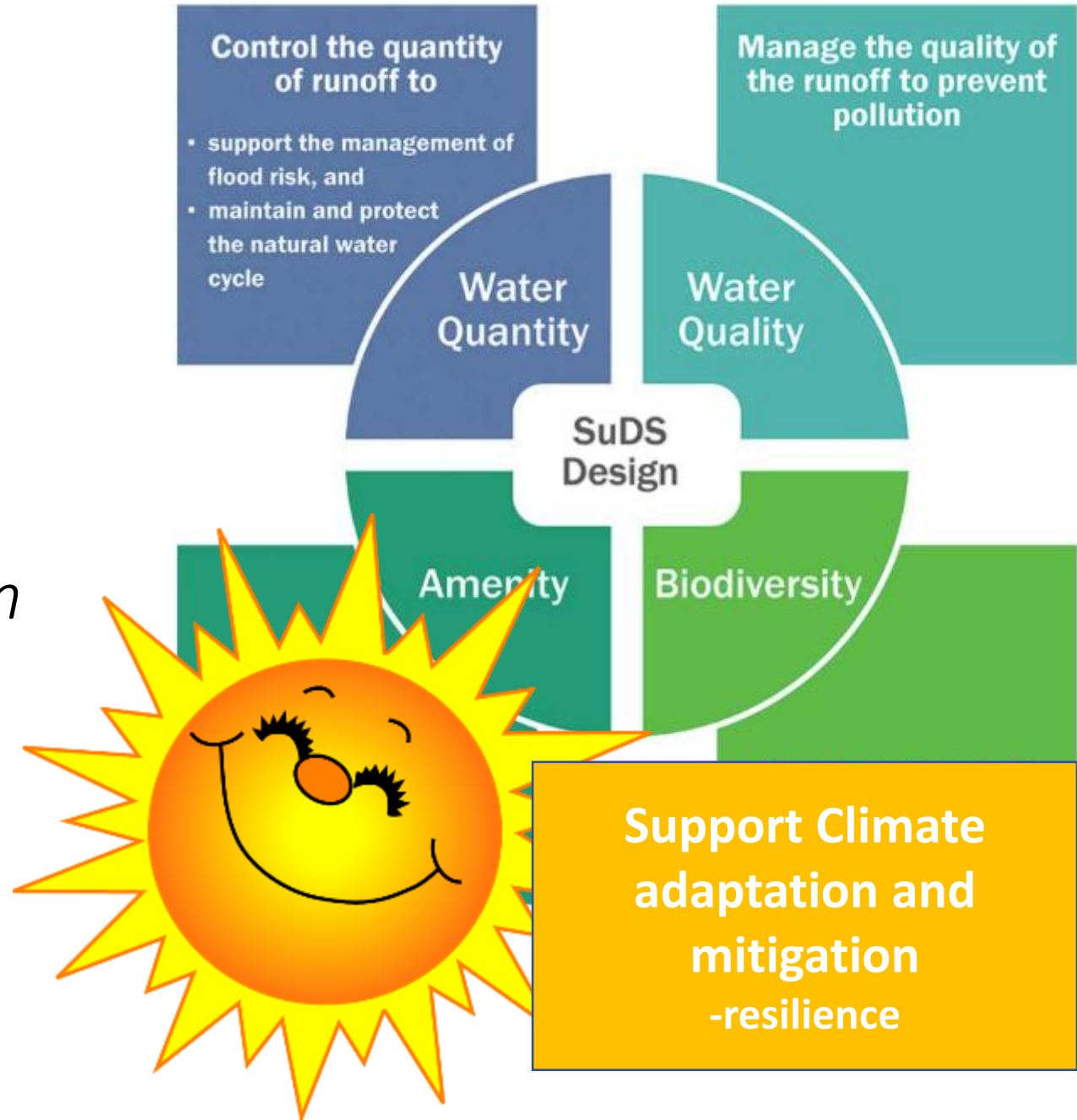
Mangroves



Reforestation

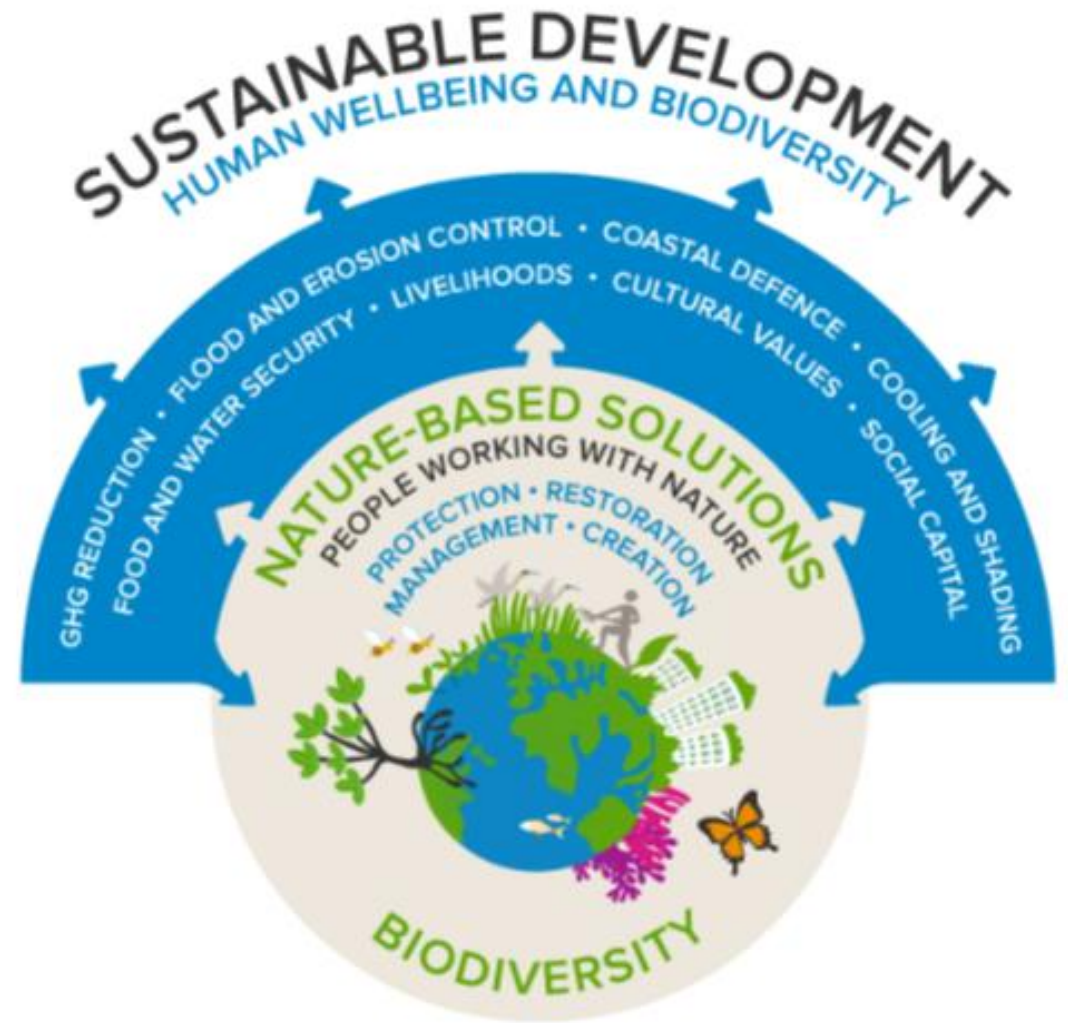
# Sustainable Urban Drainage Systems:

*Nature-based SuDS relevant to climate action and water quality must be factored into climate adaptation & resilience planning*



# How can Nature-based solutions contribute to a better quality of living?

- Mental health
- Recreation
- Clean air
- Clean water
- Flood risk resilience
- Cooling effect
- Closer to nature



# Rainwater Management Planning:

Follow the water!



Management of stormwater as it moves across urban areas



Maps out the process and identifies data sources



In support of settlement plans irrespective of scale



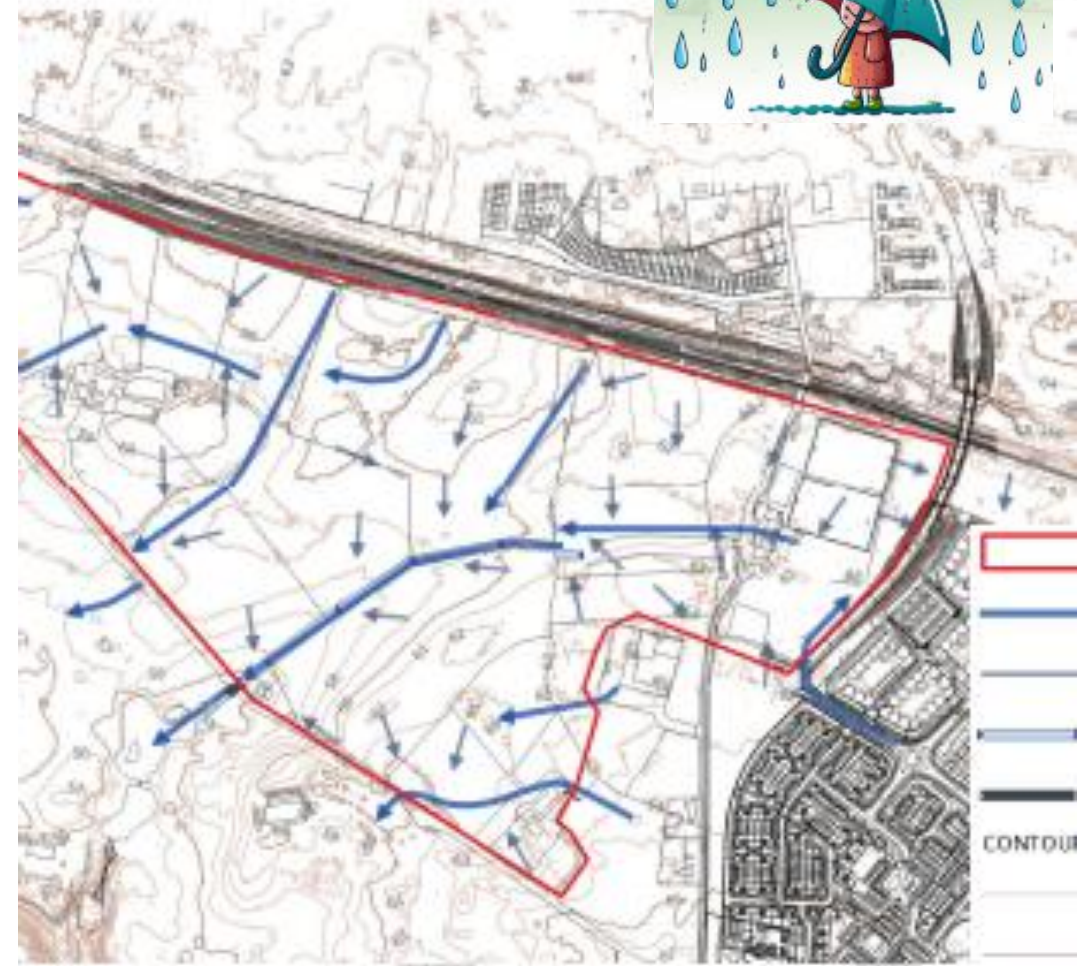
Important in understanding of cloudburst scenarios



Should direct planning, brownfield site retrofits



Key to protecting Combined Sewer networks and minimising overflows





An Roinn Tithíochta,  
Rialtais Áitiúil agus Oidhreachta  
Department of Housing,  
Local Government and Heritage

## Rainwater Management Plans Guidance for Local Authorities

2024



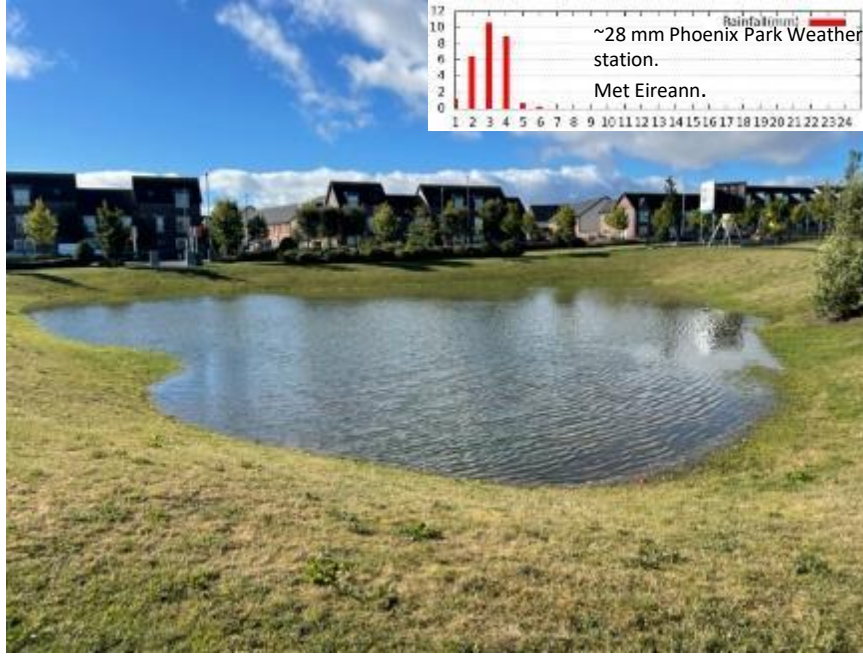
Source of image on left: [Landscape | Central Coast Low Impact Development Initiative \(centralcoastlidi.org\)](https://www.centralcoastlidi.org/)

Larger scale: Making room for the river by using existing public spaces – takes flood pressure from towns

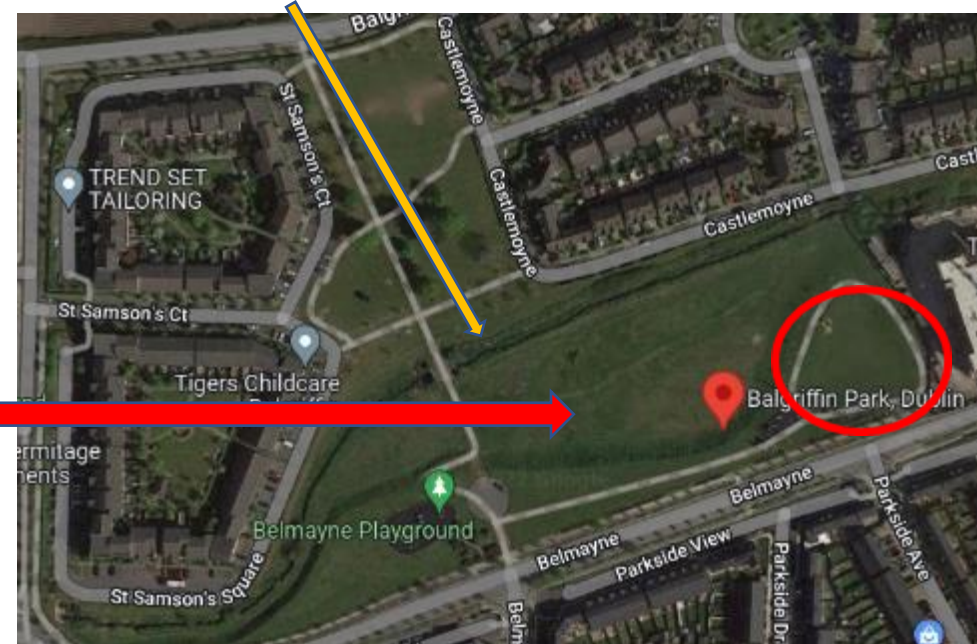


Making space for water. Dennis Burke park in Clonmel floods in February 2021. By working with Nature the park serves multiple functions including supporting amenity, biodiversity, alleviating flood risk and providing essential services in Clonmel with greater Climate resilience.

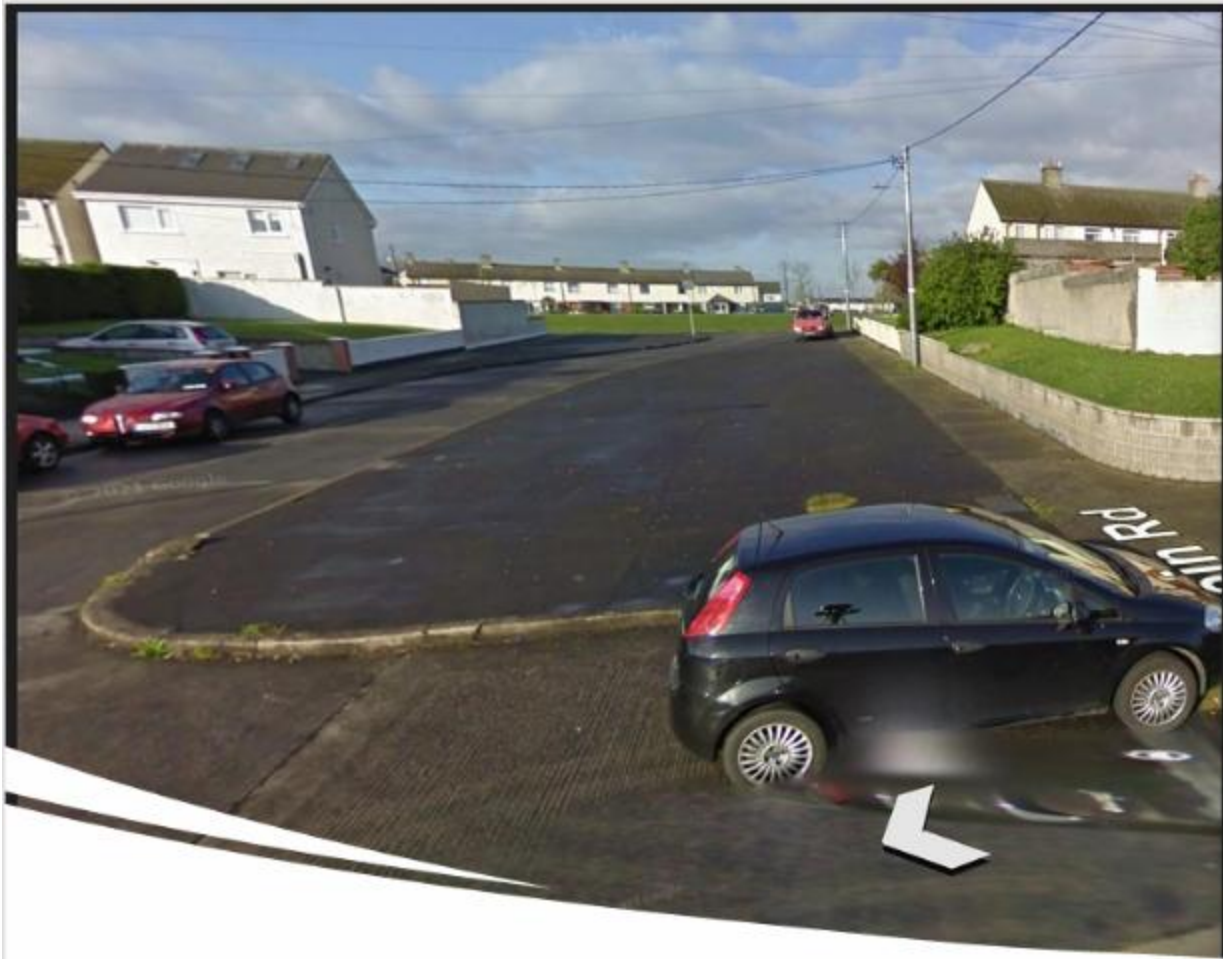
# Large scale urban example in action – North Dublin



- This area is normally dry. It is fed from the housing estate you can see in the background and discharges to a small stream. 04/09/22. C Galvin



- Drained one day later. 05/09/22. C Galvin



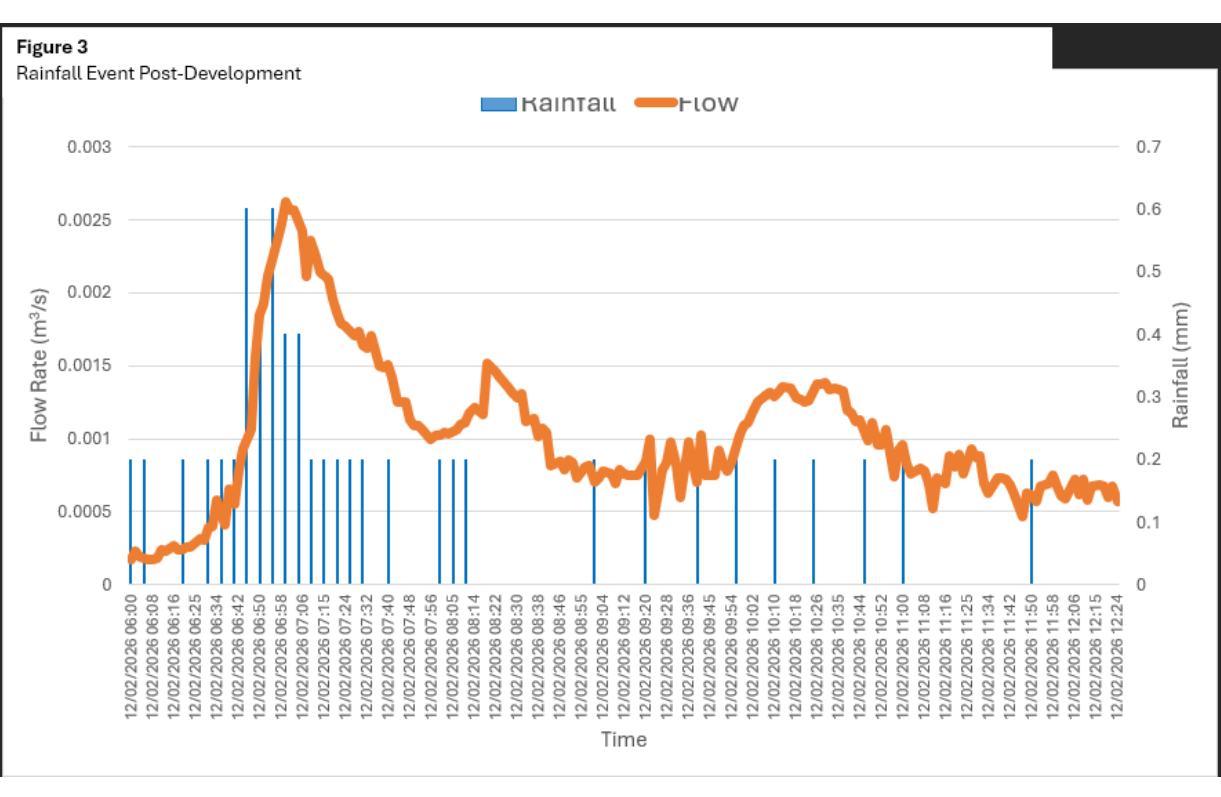
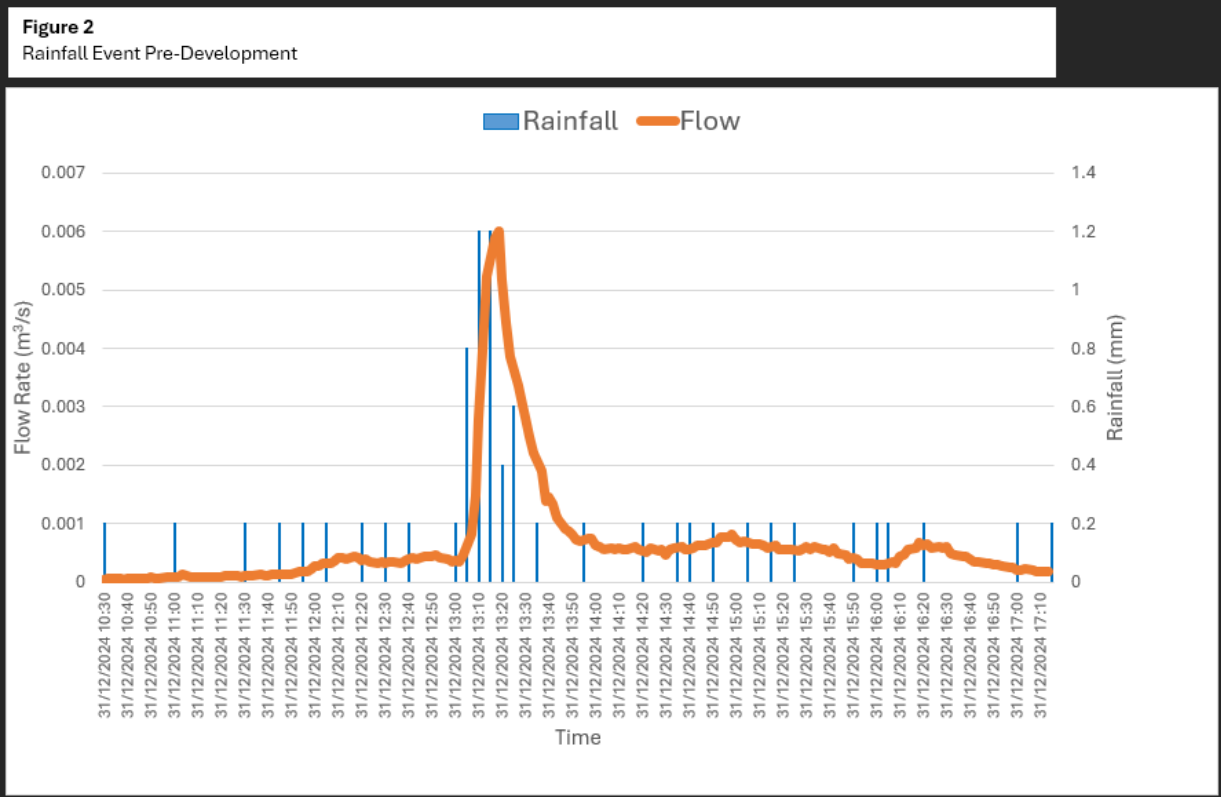
# Rainscapes

- A scheme to retrofit NBS/SUDS into existing residential housing estates
- Phase 1 – McAuley Park, Ribh Road, Lein Road in Artane
- Funded by DHLGH and DCC

# Flow curve data profile: McAuley Park

## Before development

## After development



(Courtesy Dublin City Council/John Stack)

# What are we doing?

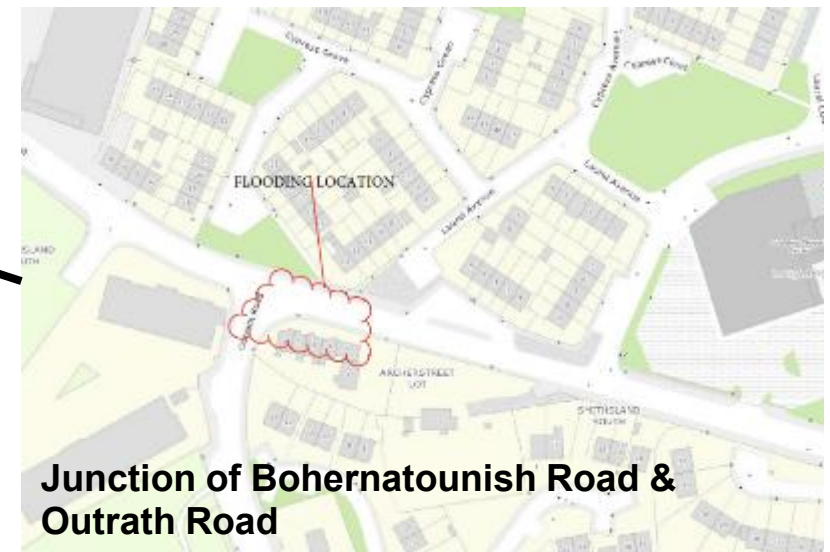
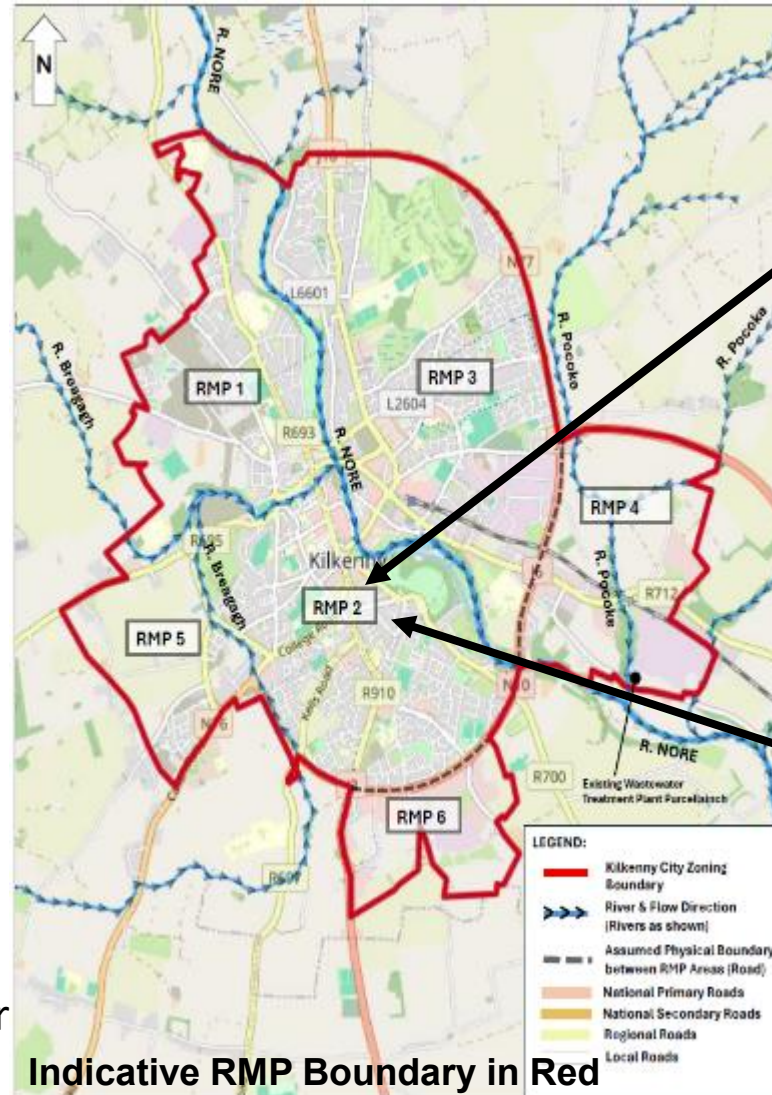
- Supports to Local Authorities
- Project demonstrators
- Exploring how NbS can be extended to support improved water management in Rural areas

# URBAN Context: Nature-based solutions

- Rainwater Management Planning for settlements
- Training for Local Authority Staff and Private Sector
- Projects

# Rainwater Management Plan Pilot – Kilkenny City (Work In Progress)

## Nature-based Solution (NbS) potential to alleviate Pluvial Flooding

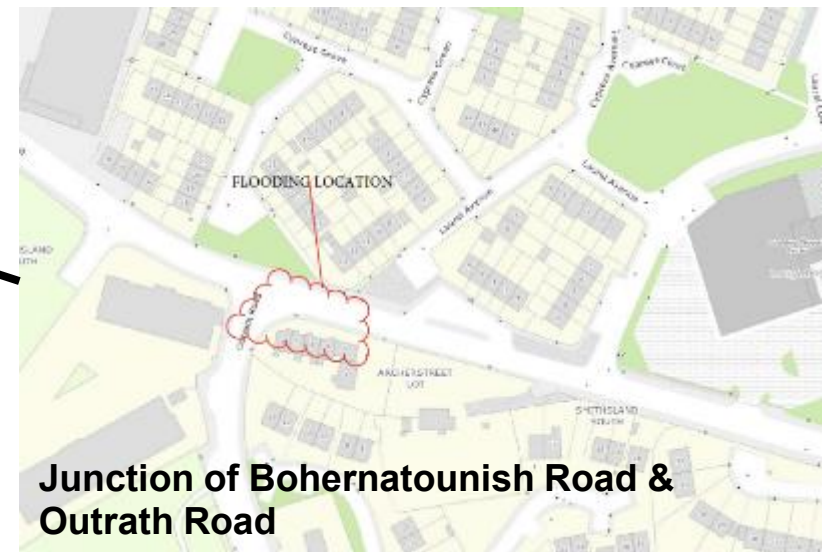
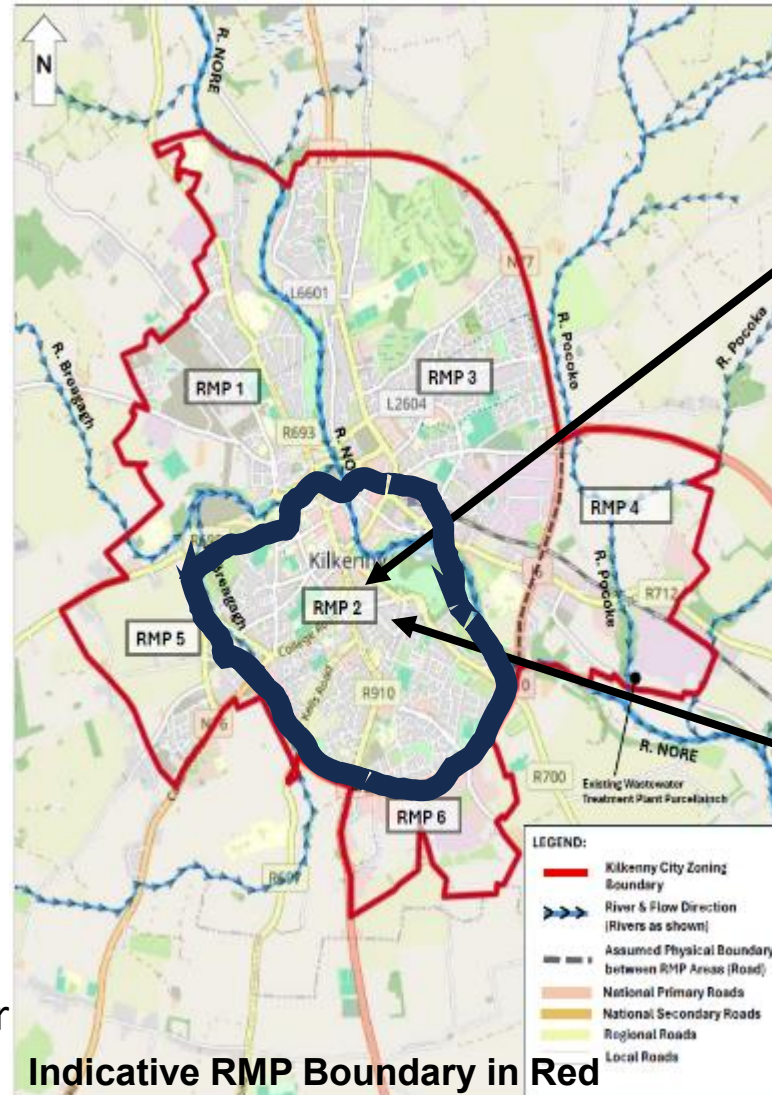


Rainwater Management Plan (RMP) for Kilkenny City, incorporating Nature-based Solutions, including the development of a strategy for implementation of the plan.



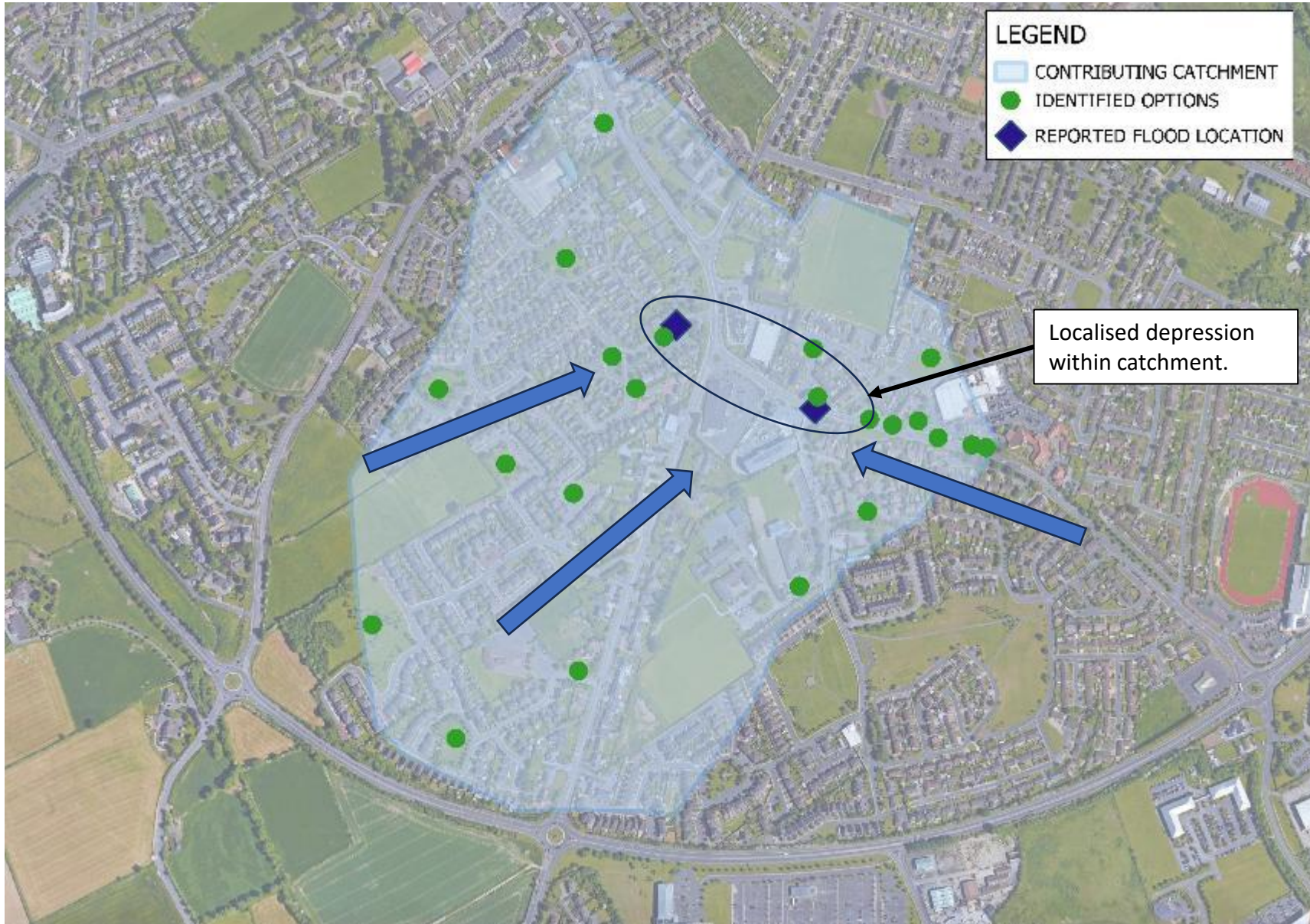
# Rainwater Management Plan Pilot – Kilkenny City (Work In Progress)

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Rainwater Management Plan (RMP) for Kilkenny City, incorporating Nature-based Solutions, including the development of a strategy for implementation of the plan.





Reported Flood Locations, Catchment contributing rainfall runoff & Identified NBS Opportunities

# Example options



**Retrofit SuDS – Swale in existing public open space, storing surface runoff and slowing the peak flow.**

(McCloy, Dublin SuDS Pilot)



**Roadside bioretention raingarden  
Storing and treating rainfall runoff from road**

(DCC, SDEG 2021)

**Integration of trees within raingardens, basins, or SuDS tree pits**

(BlueGreen Urban)



# Training for Local Authority staff and professional sector



- Town Centre First
- CAROs/LASTNG (2026)
- One-one one LA session
- Engineers Ireland/Professional Bodies





# Learnings from previous Town Centre First Opportunities to embed Nature-based Solutions learnings from 2025 training

- Significant opportunities to integrate NBS
- Push back from consultant designers and “maintenance concerns”
- Need for mapping and an integrated approach with the Drainage Area Plans and Biodiversity / Climate Action Plans
- Need for integrated LA team approach
- Complimentary funding to URDF, RRDF etc would enhance NBS opportunities
- **Biodiversity** and better placemaking opportunity co-benefits identified
- Request for follow up “hands on training” to assist with town plan designs.

# URBAN Context: Funding Nature-based solutions

- Being smart – leveraging exist opportunities
- Plan led approach to development
- Maintenance and taking in charge
- Targeted NDP funding

# Leveraging funding

- Direct funding streams
- Ireland
  - Biodiversity
  - Climate Action
  - Water (Community Water Development Fund)
- International
  - EU INTERREG
  - EU LIFE
  - EU Horizon
  - EU LEADER
  - Biodiversa

## **Build into capital projects!**

- Capital regeneration or active route Projects
- Urban Regeneration and Development Fund
- Rural Regeneration and Development Fund
- Active Travel & Safer Routes to School
- Outdoor Recreational Infrastructure Scheme
- Local Authority own projects
- Town Plans delivered by Town Centre First teams

# Rural Context: Nature-based solutions

- Focus to date – water quality
- Farming for Water EIP
- Training (Workshops) - on water retention measures through national NbS Conference
- Pilot project with the Office of Public Works

# Similar benefits to Urban areas

- Water quality protection
- Biodiversity
- Flood resilience
- Amenity
- Climate benefits: e.g. mitigation, temperature cooling etc



# Example of Slow the flow methods (UK)



(a) Leaky woody dams



(b) Storage ponds



(c) Afforestation

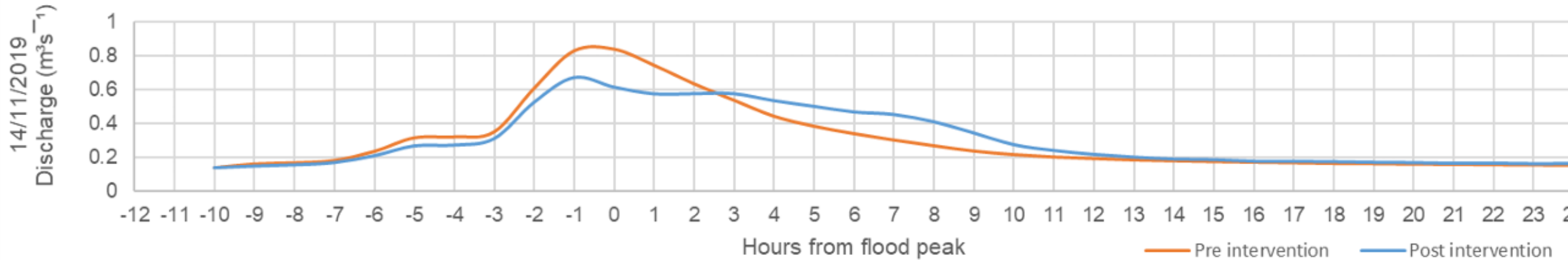


(d) Soil/land management

**Fig. 1.** Common Natural Flood Management (NFM) measures.

Two UK projects namely the Littlestock Brook Natural Flood Management (NFM) pilot and LANDWISE (Land Management in Lowland Catchments for Integrated Flood Risk Reduction). The Littlestock Brook NFM study showed that the Nbs interventions successfully attenuated all storm event discharge peaks during the monitoring period (up to 55% reductions) and that over 40% of the total storage volume remained available throughout all events. The LANDWISE project demonstrated that whilst increased organic matter improves soil structure and porosity, innovative arable management practices (e.g., controlled traffic and min till) can also improve soil structure and porosity, increasing soil hydraulic conductivity and therefore NFM potential

# Example of Slow the flow methods (UK)



**Fig. 4.** Event hydrograph for discharge pre- (orange) and post-FSA interventions (blue).

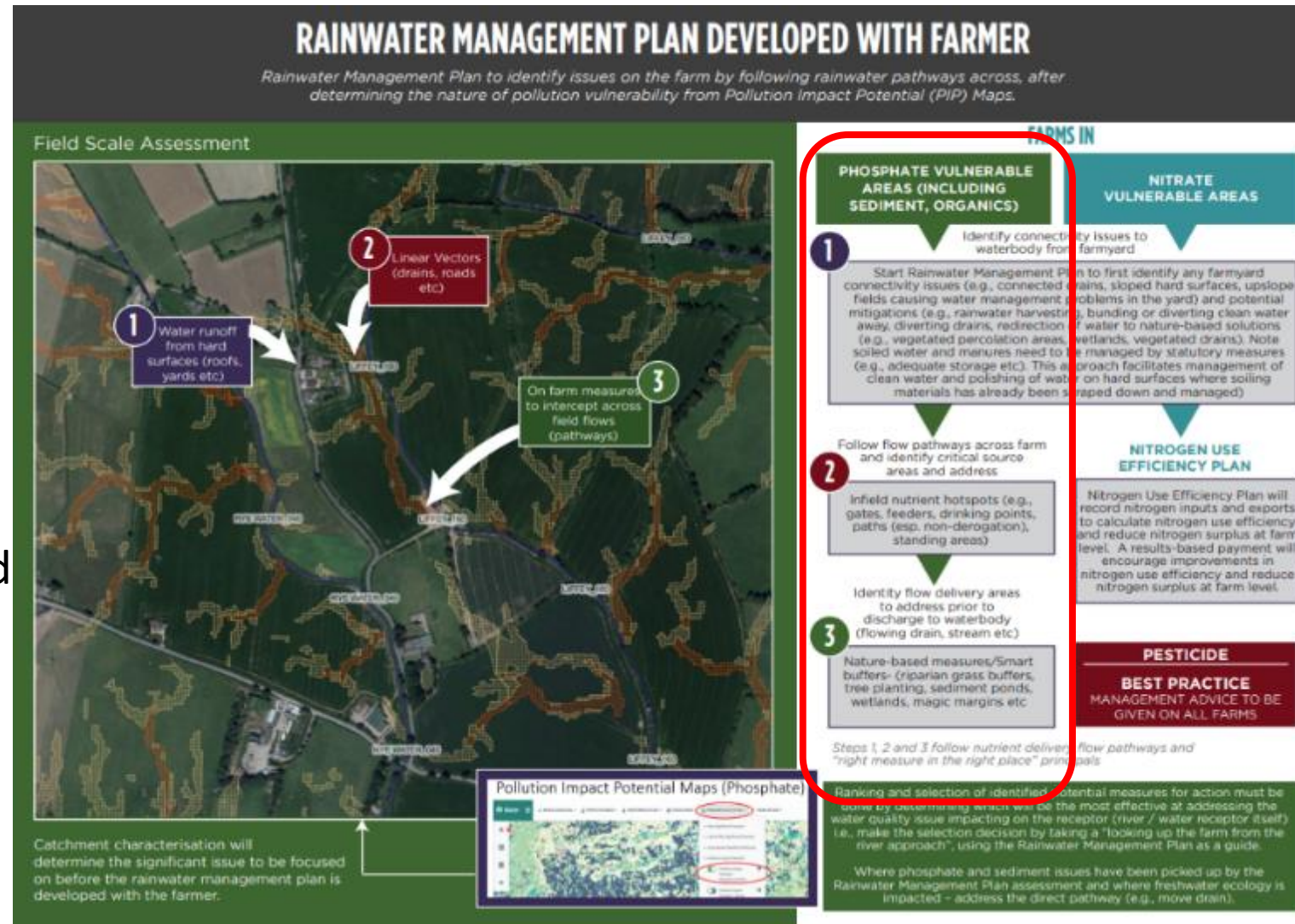
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- €60 million Agri-environmental scheme for farmers, spanning a five-year period (2023 – 2027).
- Launched on 7<sup>th</sup> March 2024
- Managed by LAWPRO in partnership with Teagasc and Dairy Industry Ireland (*and supporting partners*).
- Aims to engage 15,000 farmers
- **Focus on water quality, with co-benefits for biodiversity and climate actions (Nature-Based Solutions)**
- €50 million in payments to farmers for supplementary measures (i.e. non-regulatory) by DAFM, co-funded by the EU
- €10 million for operational costs by DHLGH



# €60 Million European Innovation Fund – farming scheme including Nature-based solutions

- Applications start with a **Rainwater Management Plan** building on the catchment science
- Measures selected based on PIP maps, and actual scenarios on the farm
- Local knowledge is key – farmer and Advisor input.
- Adhering to *‘the right measure in the right place’* principle
- Measures selected, agreed and included in the EIP application
- Validation and verification of measures built-in
- Source-Pathway-Receptor focus



# Rainwater Management Plan:Farmed Land Area Maps



## Key:

- Farm boundary:
- River:
- OPW river maintenance:
- Drains:
- Slope/Water:

## Measures:

- 5 Multi Species Swards:
- 13B Hedgerow without mound:
- 14A & B Spatially targeted riparian buffer zone:
- 17 Tree Planting within Buffer Zone:
- 18 Small Scale Wetland pond:
- 19 Earthen Bund:
- 21 Management of CSA:
- 24 Sediment Traps:
- 30 Bovine exclusion from water bodies:
- 38 Vegetated Bunded Drains:



= Nature-based measures with Natural Water Retention co-benefit

# Nature-based solutions for pollution management (phosphorous & sediment)



Riparian margin rich in biodiversity.



Sediment and nutrient interception ponds.



Tree planting



Vegetated bund at end of field to trap sediment from tillage



Solar powered alternative drinking points.

Add he

# Targeted measures to help with flood risk – e.g., from North Wexford farm in the Farming for Water EIP

Farm in North Wexford – combination of solutions (settlement tanks = grey solution, swale / filter strip and pond = nature-based solutions)



# Potential to form partnerships with private landowners / farmers to assist with flood mitigation?



- Potential to attenuate / filter road run off on private land?
- Multiple benefits.
- Farming for Water EIP example – North Wexford (Boro River: high status)
- This example is a NbS treatment train picking up road runoff and farmyard and roof water



Really is a mix of Nature-based solutions and conventional settlement tank (concrete) = **settlement tanks, swale and biodiversity pond**

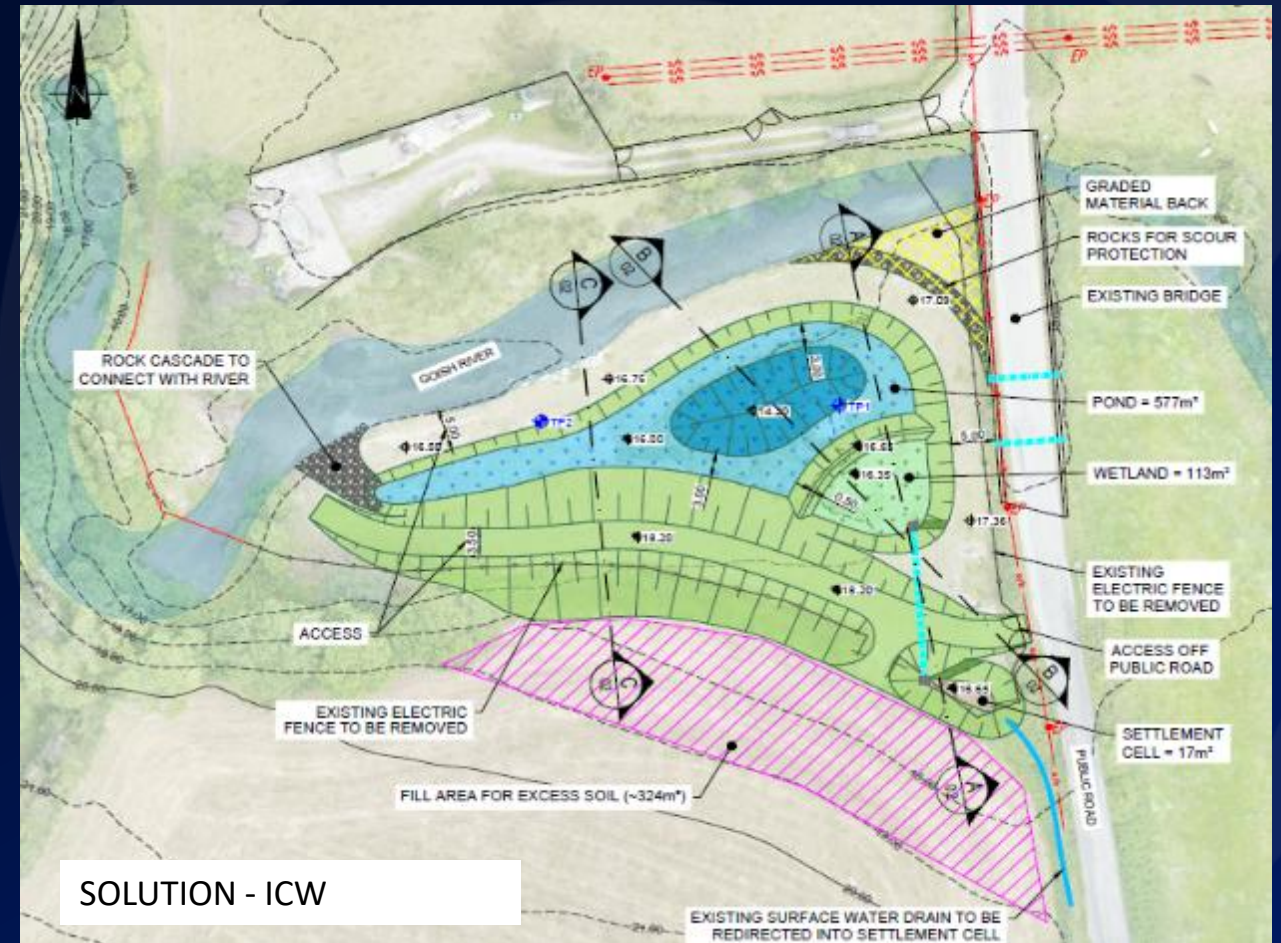
# Case study 1: Nature-based Solutions (NbS) Demonstrator Project to filter and slow the flow

(delivered by Waterford CCC, local community: funded by DHLGH/LAWPRO)

## Wetland – Coolroe, Aglish Village Waterford (2025)



- Flooding on Local Road affecting access to village and services including primary school.
- Integrated Constructed Wetland (ICW) for flood storage.



Drawing Courtesy of VESI Environmental Ltd & Waterford City & County Council

# Nature-based Solutions (NbS) Demonstrator Project to filter and slow the flow

## Integrated Constructed Wetland (ICW) – Coolroe, Aglish Village Waterford (2025)



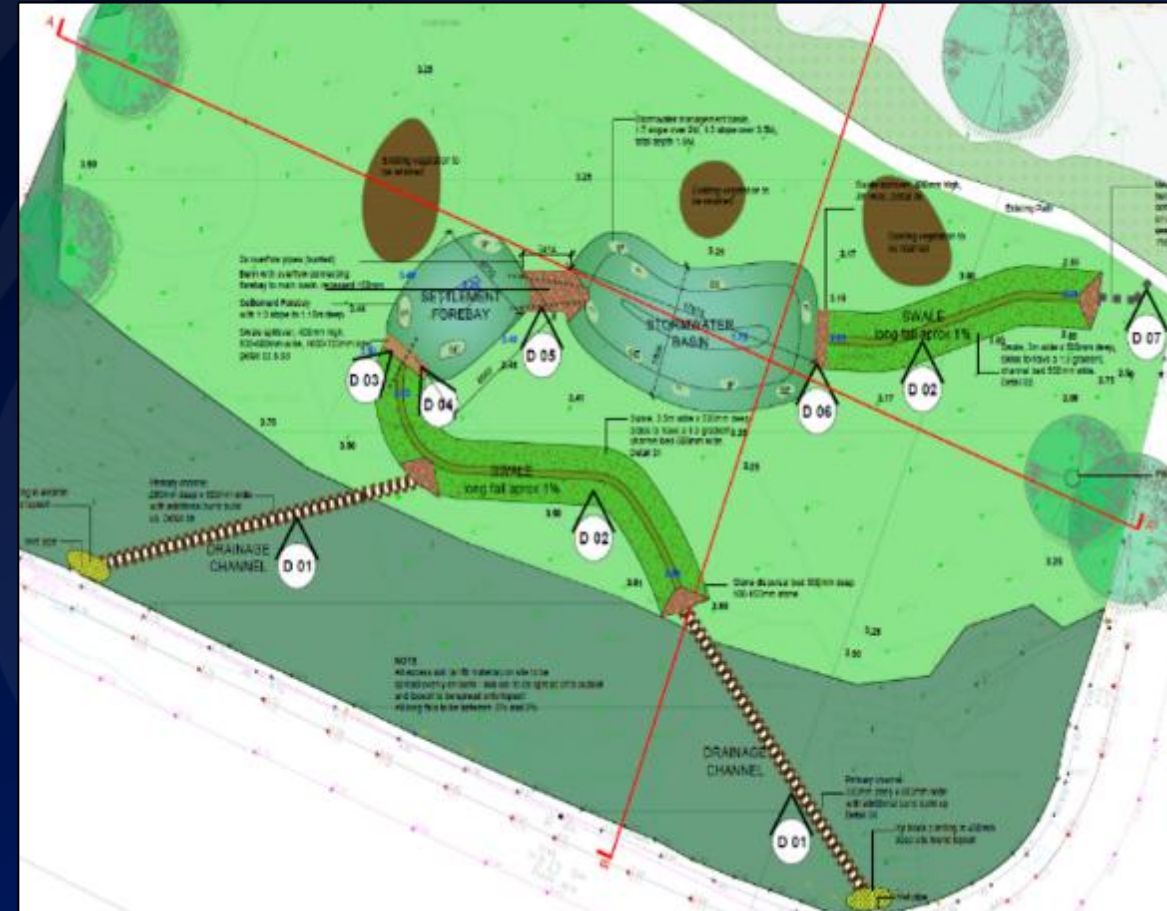
General Site Clearance Completed



for the ICW

# Case study 2: Nature-based Solutions (NbS) Demonstrator Project to filter and provide amenity and biodiversity benefits (delivered by Tipperary CC, Lions Club, Tirlan: funding

DHLGH/LAWPRO): Swales and Settlement Ponds Bog Field Carrick-on-Suir, Co. Tipperary



Background & Context plus Design Plan View

Google Pin <https://maps.app.goo.gl/md9Bv6parAV19dVs7>

# Nature-based Solutions (NbS) Demonstrator Project to filter and provide amenity and biodiversity benefits (delivered by Tipperary CC, Lions Club, Tirlan: funding DHLGH/LAWPRO)

## Swales Settlement Ponds Bog Field Carrick on Suir Co. Tipperary



Completed Project (photo taken August 2025)

Shortlisted at the National Property Awards 2025  
(Corporate Social Responsibility Initiative)

# Mainstreaming Urban Nature-based Solutions (NbS) - Demonstrators

## Rain Gardens Carlow Town



Pre-development

Photo: Ciaran Brennan, Carlow Co. Co.

Google Pin <https://maps.app.goo.gl/Tt6jVpu51RW7kiGw7>

# Mainstreaming Urban Nature-based Solutions (NbS) - Demonstrators

## Rain Gardens Carlow Town



Project Complete



Photo: Ciaran Brennan, Carlow Co. Co.

Google Pin <https://maps.app.goo.gl/Tt6jVpu51RW7kiGw7>





Community participation is key: Public meeting Portlaoise 2<sup>nd</sup> March 2026

# Tidy Towns

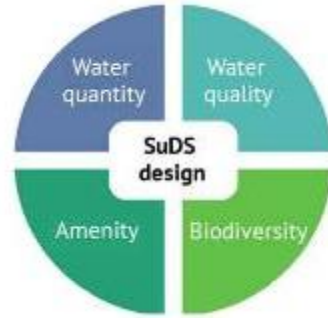


Geashill, Tidy Towns, Co Offaly. Funded via LAWPRO. World Water Day planting of wetland



# Nature-based Solution (NbS) Demonstrator Project

## “The Fosse” – City Wall Linear Park NbS – Phase 1 – Limerick



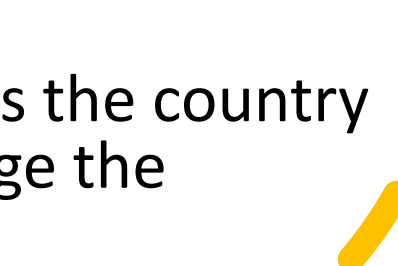
NbS treating and managing a quantity of surface run-off (slow the flow) from paved surfaces / road, whilst providing increased biodiversity and an amenity park and play area for the public and nearby St. Mary’s National School



**Helping Local Authorities (LA) achieve actions under LA CAP & BAP**



Our Rural  
Approach:  
Developing a  
pilot approach  
to “Slowing  
the Flow NbS”  
with the OPW

- LAWPRO working with OPW to develop a model for Natural-based Solutions focused at flood risk using Water Retention Measures
  - Possibly leveraging the Minor Works scheme (90% OPW and 10% LAWPRO/Resiriver INTERREG funding)
  - OPW working on tender for consultant and options report
  - Focus area will be Hollyford (Multeen catchment), Co. Tipperary.
  - If options are viable then next step is working out payment system for farmers, maintenance and who will lead.
  - Potential model to replicate across the country and could compliment and leverage the Farming for WaterEIP measures
- 

# Our Urban Approach: NbS funding opportunities planning for public bodies 2026-2030

- €4.3 million available in 2026
- Local Authorities have send in projects to EOI circulated in Q4 2025
- Minister formally announced the funding at the NbS Conference on June 10<sup>th</sup>
- Currently working through the projects after scoring and ranking
- First round of offers have gone out and further offers imminent
- Each Local Authority to get an urban NbS Coordinator post (engineer grade 7 equivalent) – notice issued to all Chief Executives last Friday
- EOI for 2027 will take place later this year: funding will increase with also a focus on larger scale projects and rainwater management planning.



# NATURE-BASED SOLUTIONS



TO PROTECT AND RESTORE URBAN, RURAL, COASTAL AND RIVERINE ENVIRONMENTS



Two Day National Conference  
Dundalk Institute of Technology  
10<sup>th</sup>-11<sup>th</sup> June 2026



# Multidisciplinary working: national Nature-based solutions conference and workshops



# Enabling mechanisms

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- Planning for the future
- Building on the National Planning Framework 2040
- We need to be more coherent in our new County Development Plans to mainstream and upscale Nature-based solutions for water quality, flood risk and all co-benefits.
- Next cycle Local Authority Climate Action Plans also offer an opportunity to mainstream to address climate risks



# THANK YOU

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