

Reasonably practicable contributions to stormwater flow reduction

Stormwater NSW franc.2025





# Acknowledgement of Country

The Alluvium Group recognises and acknowledges the unique relationship and deep connection to Country shared by Aboriginal and Torres Strait Islander people, as First Peoples and Traditional Owners of Australia. We pay our respects to their Cultures, Country and Elders past and present.

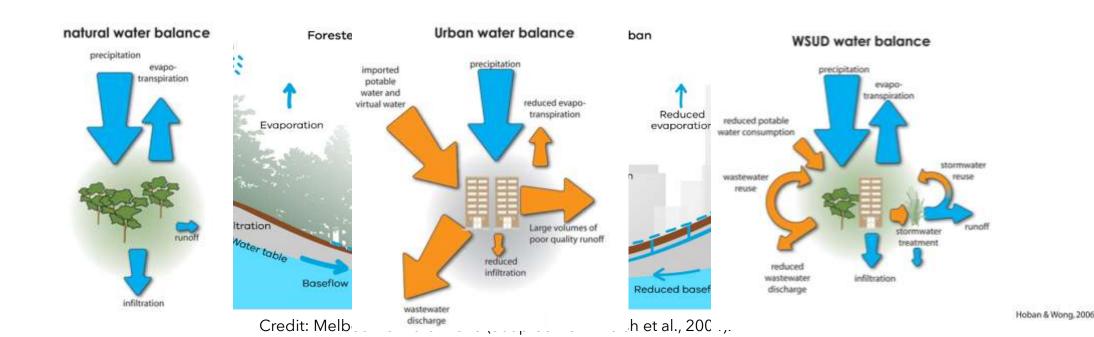
Artwork by Melissa Barton. This piece was commissioned by Alluvium and tells our story of caring for Country, through different forms of waterbodies, from creek lines to coastlines. The artwork depicts people linked by journey lines, sharing stories, understanding and learning to care for country and the waterways within.



## Importance of flow reduction

- "Stormwater runoff.....is the main reason for altered flow regimes and poor water quality" (Melbourne Water, 2018)
- Traditional stormwater pollution reduction targets protect environments (e.g., Port Phillip Bay) and don't reduce volume or improve baseflows for waterways:
  - erosion of the waterway's physical form,
  - diminished habitat values and biodiversity, and
  - increased pollutant levels.

- **alluvium** group
- The NSW Risk-based framework (Dela-Cruz et al, 2017) guided the definition of flow reduction targets in Wianamatta-South Creek.
- In Victoria:
  - EPA guidance defines harvesting and infiltration targets for Victoria at 100 mm rainfall band intervals.
  - EPA Act (2017) defines a General Environmental Duty (GED) that all Victorians must do what is "reasonably practicable" to mitigate environmental impacts, including stormwater impacts on waterways.



**2006** - First NSW Load-Reduction Targets: The

NSW Department of Environment and

precinct planning

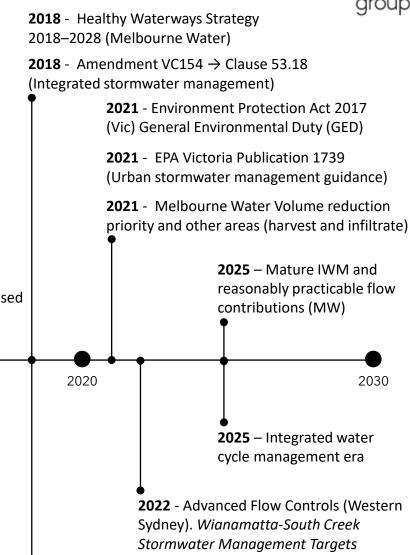
Conservation issues the Western Sydney

Growth Centre's Stormwater Guideline for

## **Evolution of stormwater management**

1996 - Port Phillip Bay study - CSIRO identifies





2018 - Stormwater Targets in Regional Planning. Greater

Sydney Region Plan – "A Metropolis of Three Cities"

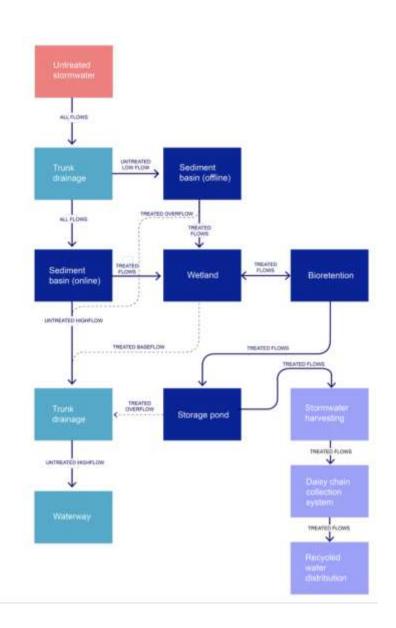
Change, with the Sydney Metropolitan CMA

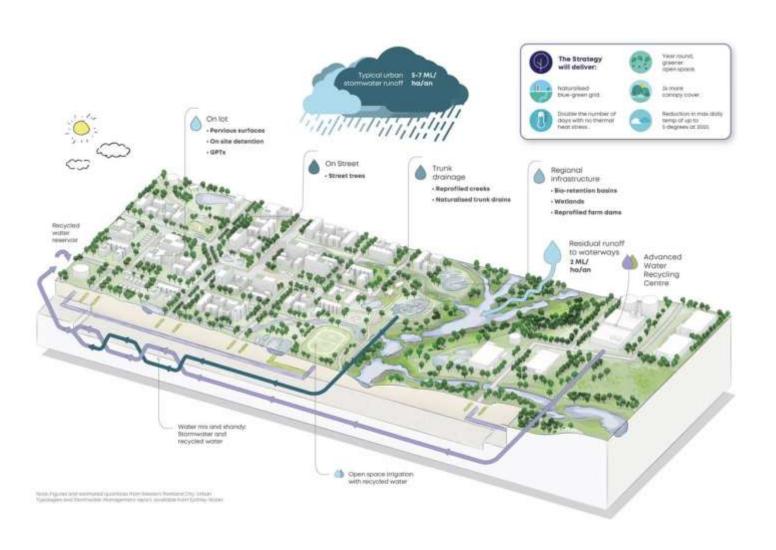
nutrient load threat to Bay; foundational for statewide stormwater reforms. **1999** - BPEM published (Urban Stormwater: Best Practice Environmental Management) 2001 - MUSIC software released **2006** - Planning Provision Mandates WSUD: Clause 56 of the Victoria Planning Provisions 2010 - Shift to IWM era 2013 - BPEM Review: **Volume Targets Proposed** 2010 1990 2000 **2011** - SEPP - Neutral or Beneficial Effect BASIX scheme introduced - 2004 S (NorBE) introduced Stormwater service charge - 2005 2007 - Statewide WSUD Targets (Draft): NSW Department of Environment & Climate

2017 - Risk-Based Framework (NSW Government)

# Regional stormwater management schemes



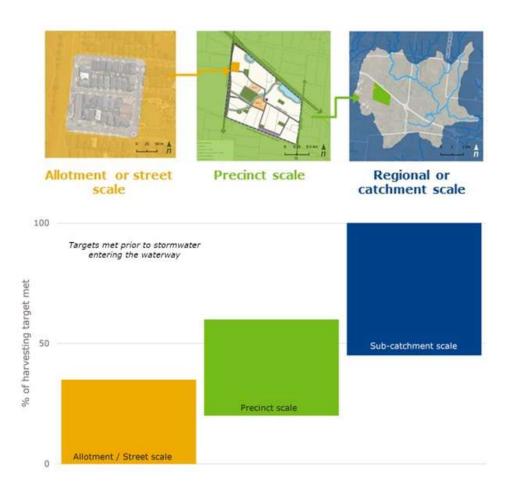


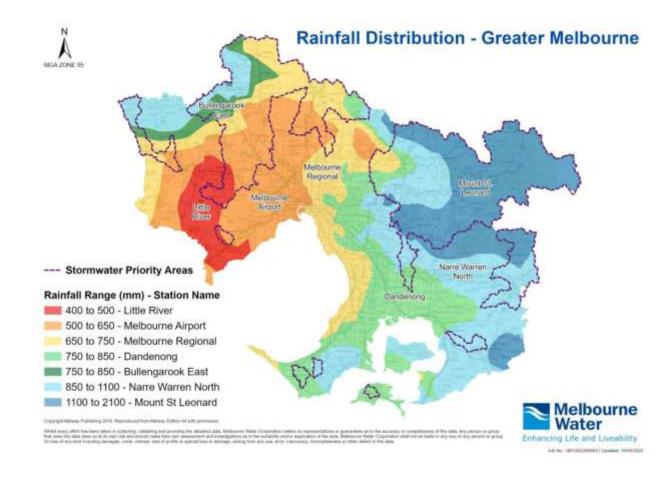


## 'Reasonably Practicable': project context and drivers



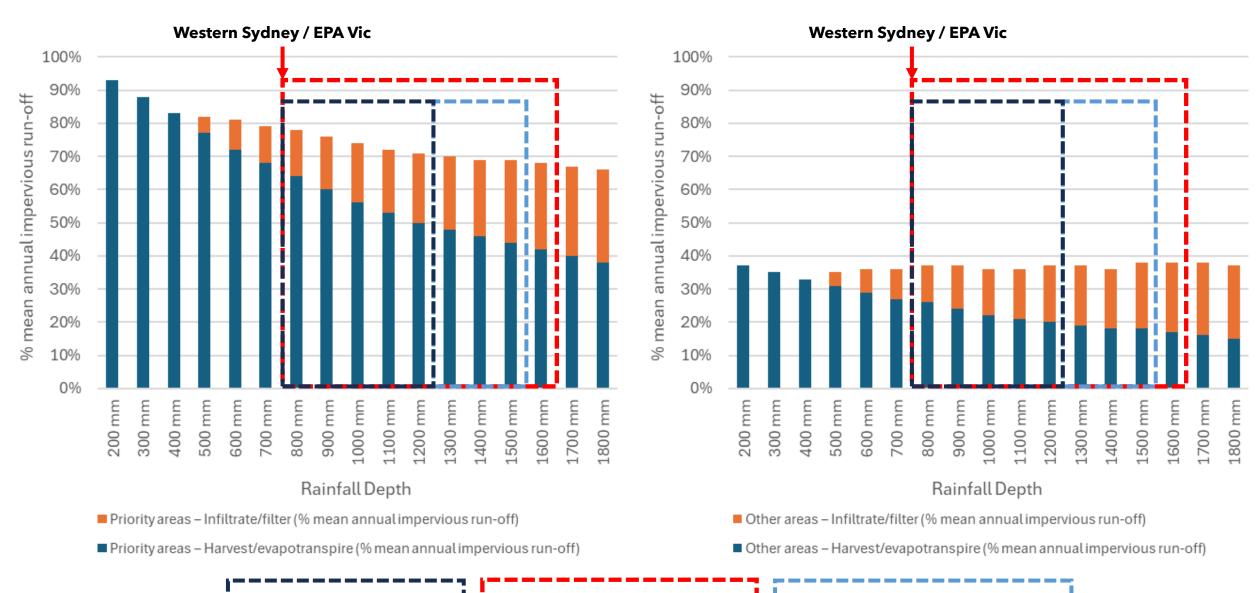
- Meeting flow reduction targets is challenging and requires equitable, multi-scale contributions.
- Targets respond to rainfall
- What is a reasonably practicable contribution at each scale of urban development lot, street, precinct?





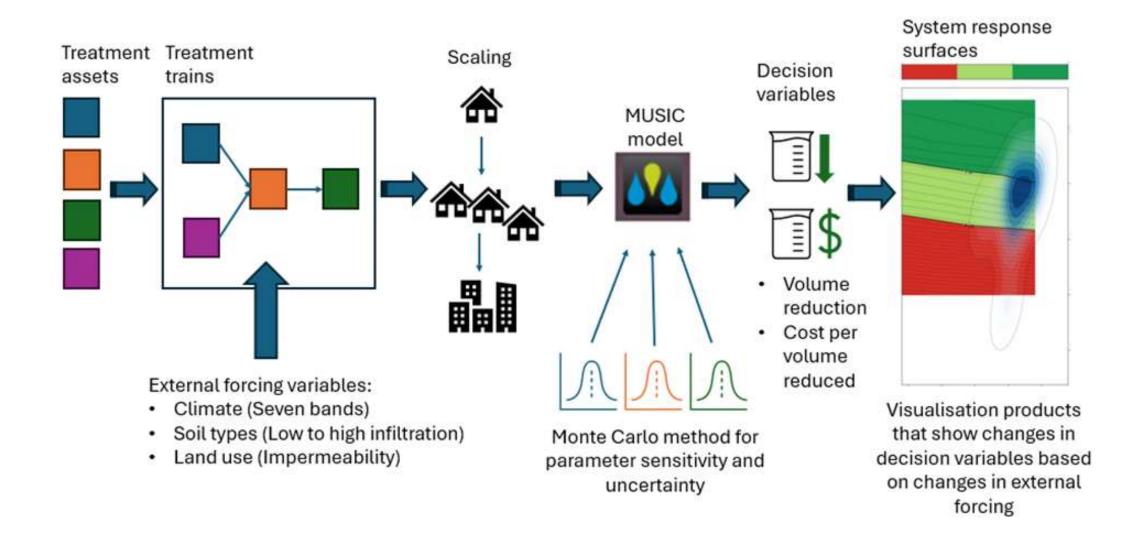
## Priority and other area flow reduction





## **Technical nitty-gritty**





#### **Treatment assets**



Rainwater tanks

Internal and external demands

'Passive irrigation' tanks Green <u>infr</u>astructure

Green roofs

Raingarden / biofiltration

pavement

Permeable

Passive irrigation of street trees

Swales / Infiltration trenches Wetlands & waterways

Constructed treatment wetland

Stormwater treatment & harvesting wetland

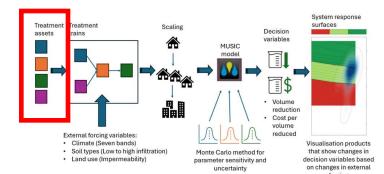
Ephemeral wetland

Riparian sponge

Regional schemes

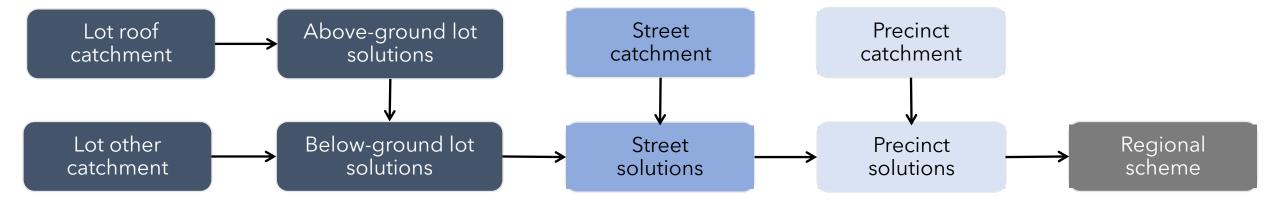
Regional stormwater harvesting schemes

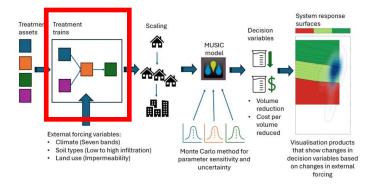
Evaporation basins



#### **Treatment trains**

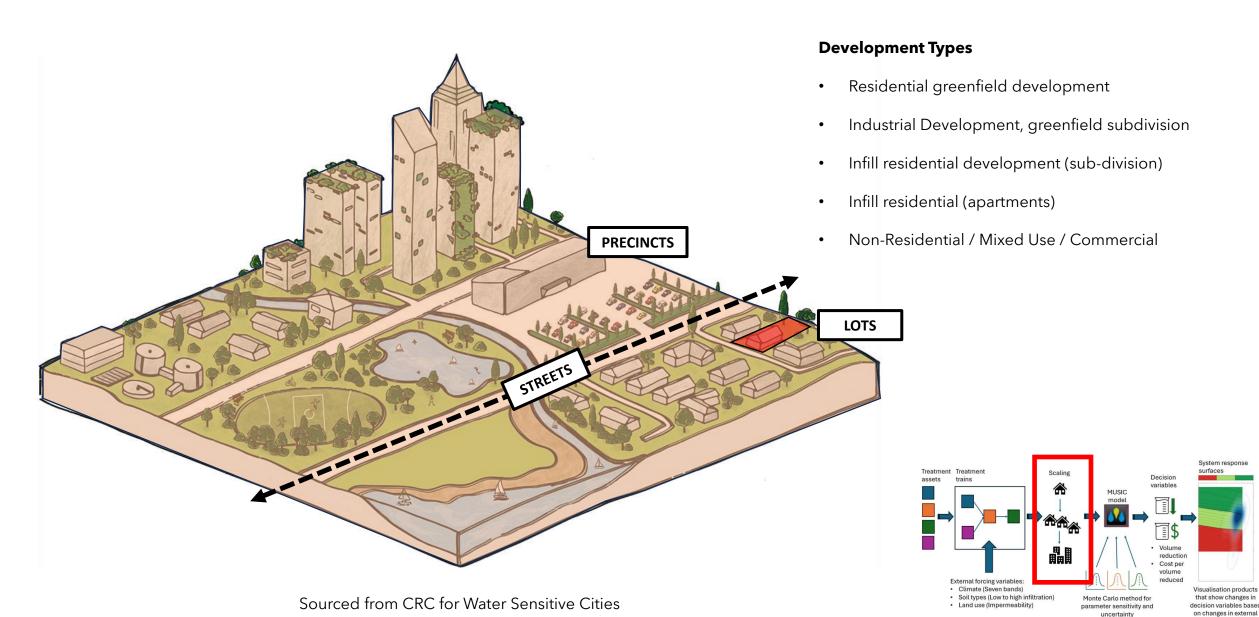






## Scaling





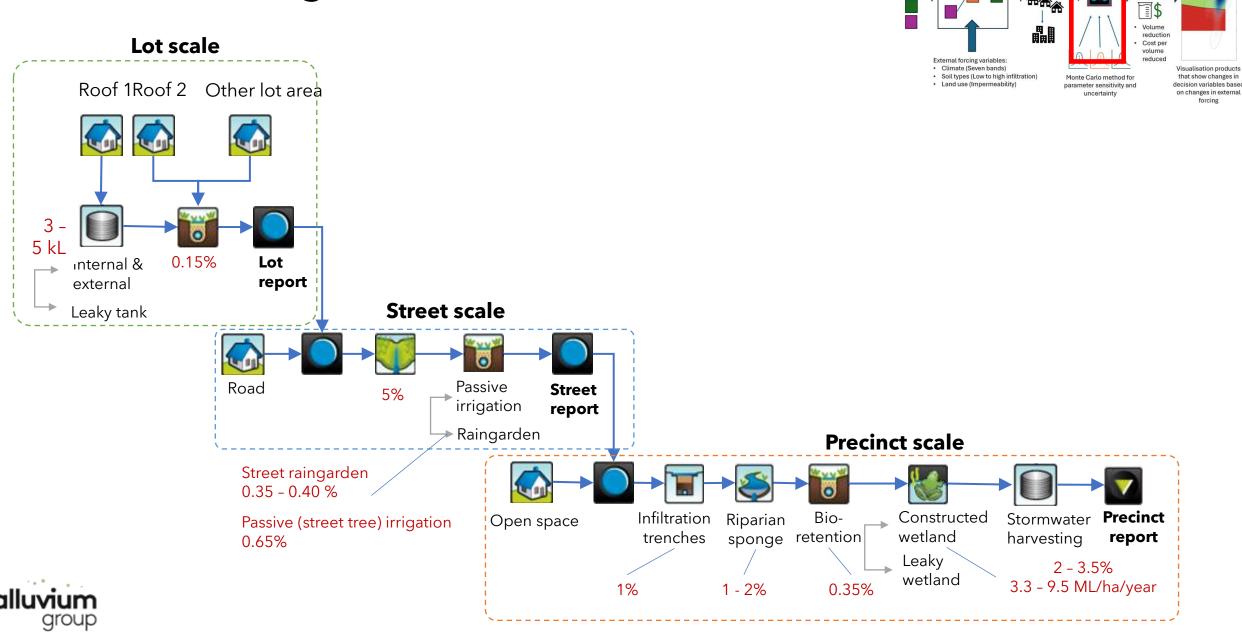
Treatment Treatment

Scaling

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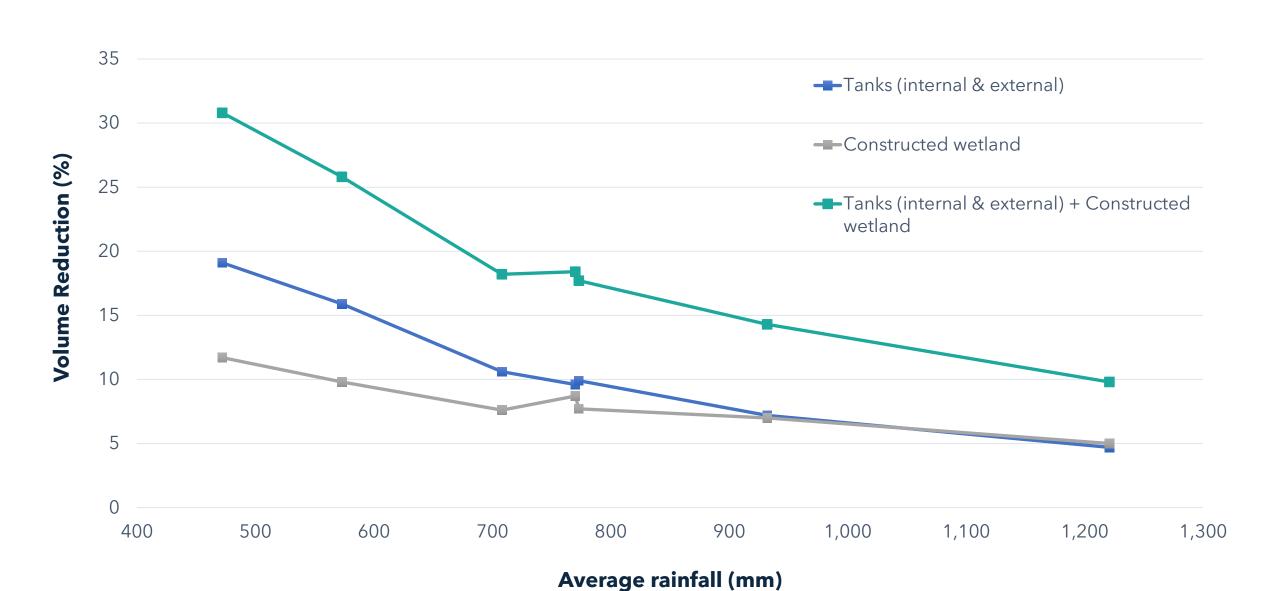
Decision variables

## **MUSIC** modelling - Residential Greenfield



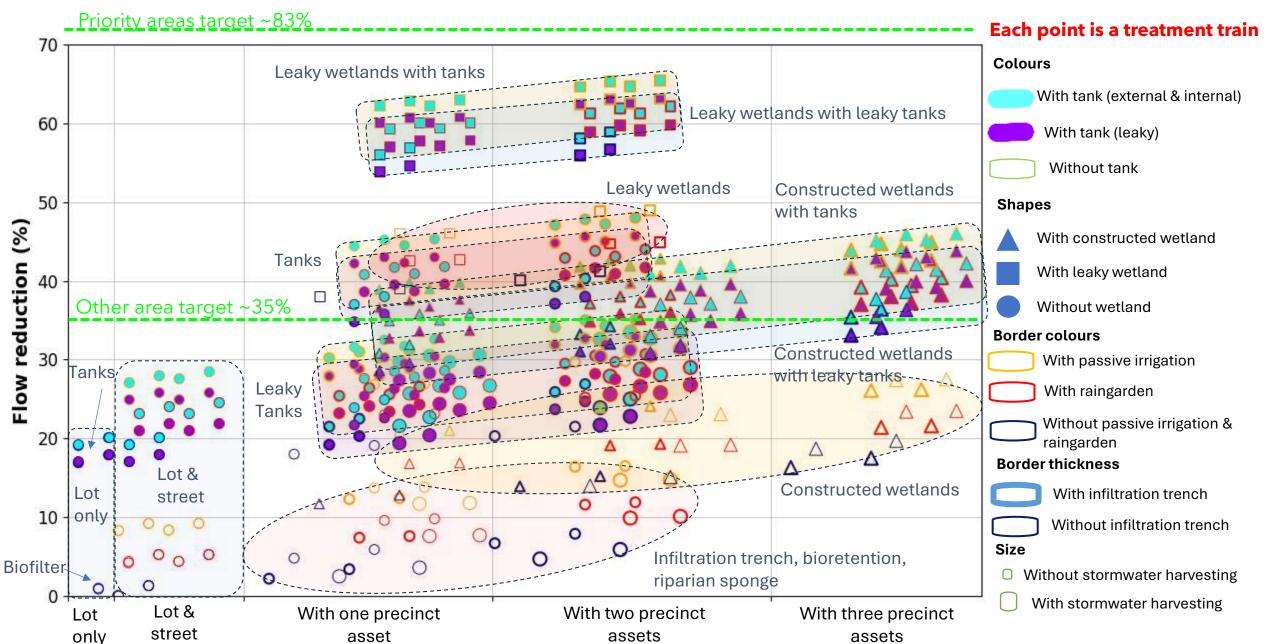
## Residential Greenfield - Base case





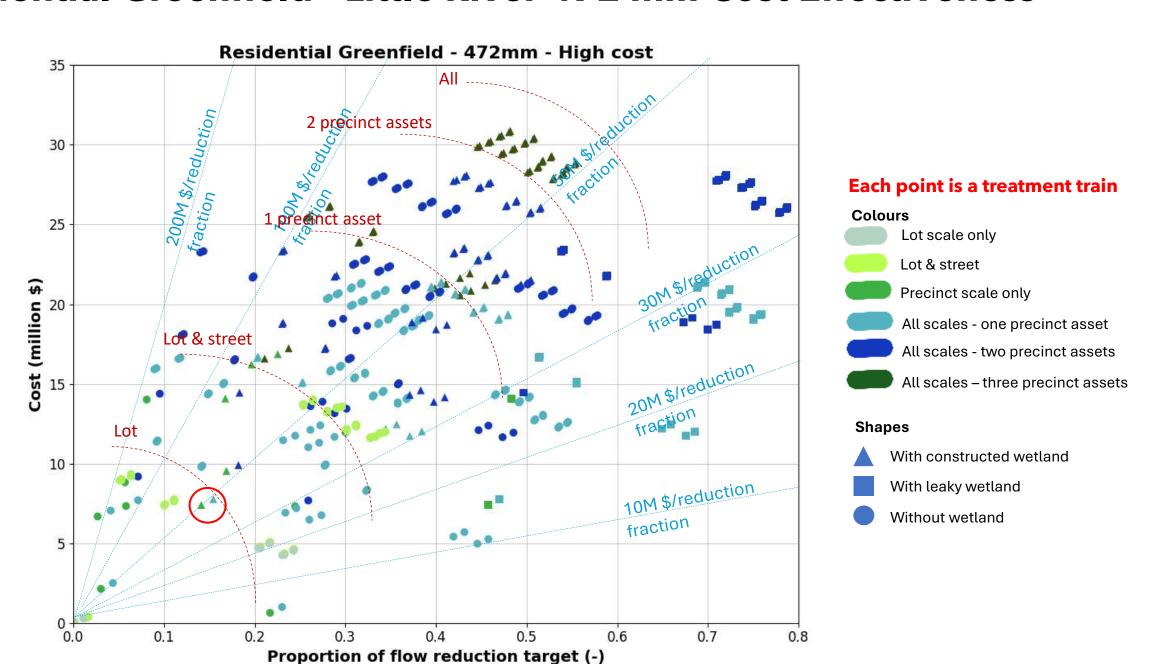
## Residential Greenfield - Little River 472 mm





## Residential Greenfield - Little River 472 mm Cost Effectiveness

group



## **Conclusions**



- Stormwater volume reduction is critical to preserving waterway ecological health
- Volume reduction targets are often significant and challenging.
- Contributions at each scale of development are critical to
  - Reduce the scale and cost of larger regional schemes
  - Distribute economic contributions equitably across water authorities, local government and the development industry
  - Distribute benefits to local communities (e.g. rainwater harvesting, stormwater harvesting, streetscape greening and cooling).
- This project will provide an evidence base for interim guidance on what is a "reasonably practicable" contribution to stormwater volume reduction and improved waterway health.

