Chapter 6: Urban Water Harvesting and Reuse

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Australian Runoff Quality
A guide to Water Sensitive Urban Design

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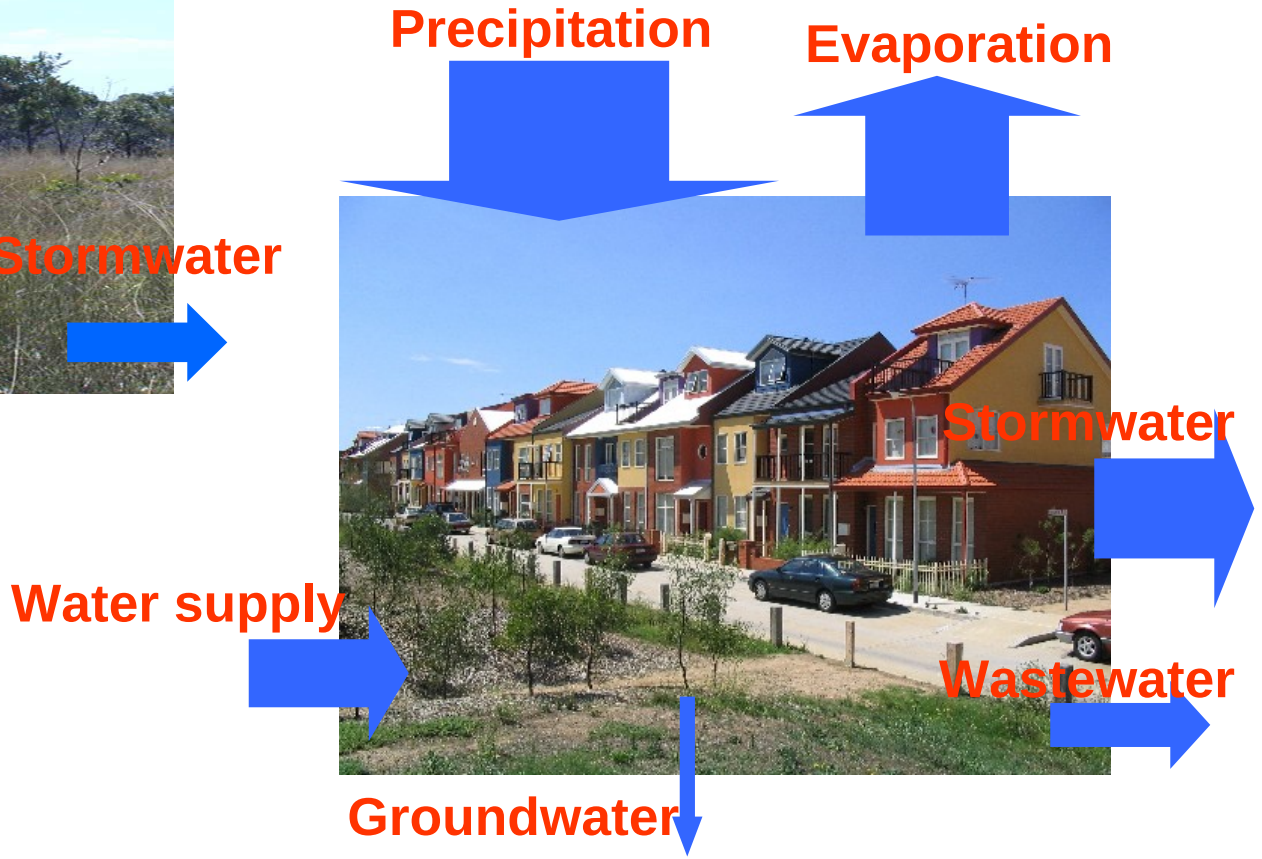
Impacts on the water balance



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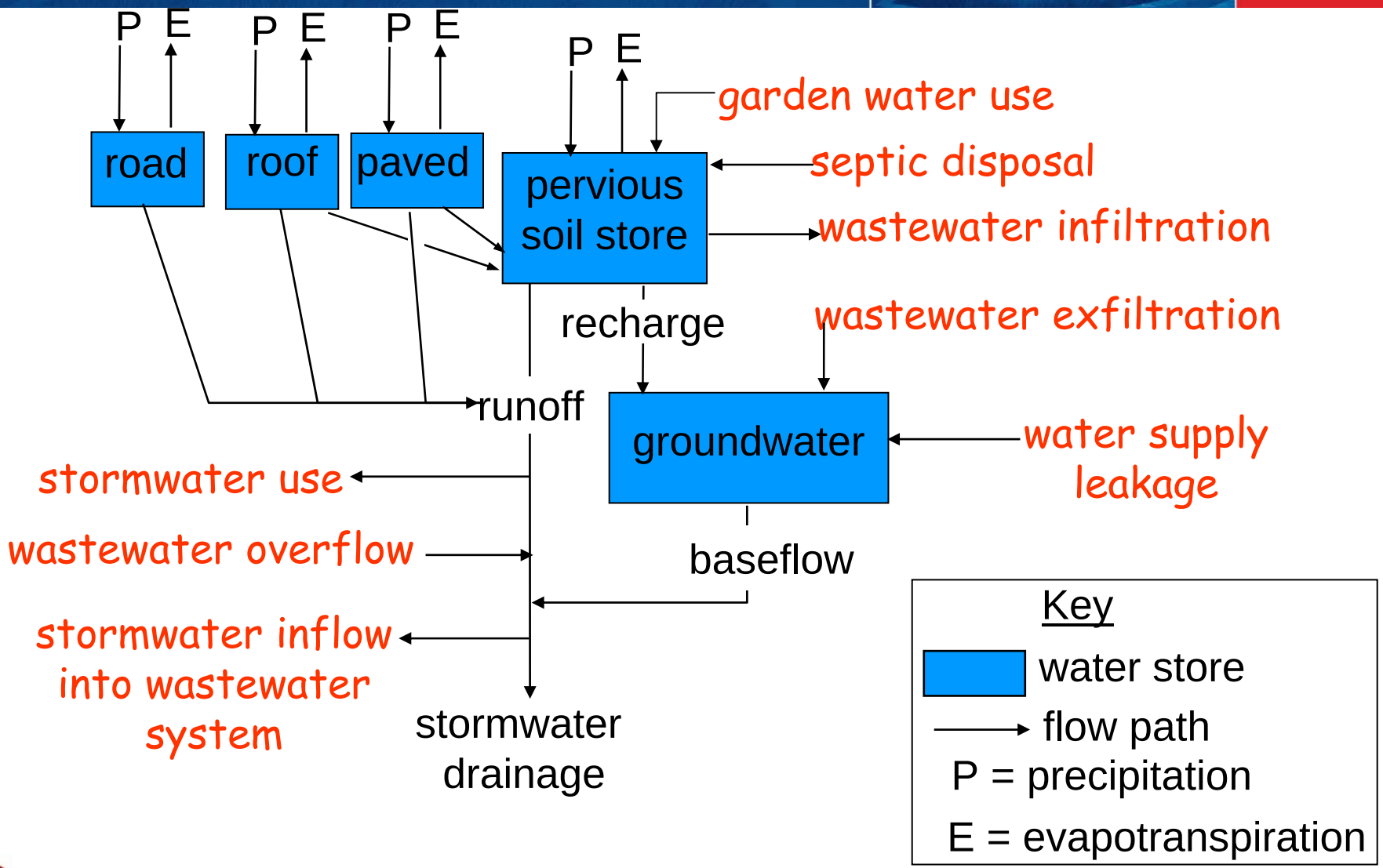
Rainfall-runoff within total cycle



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Source: CSIRO

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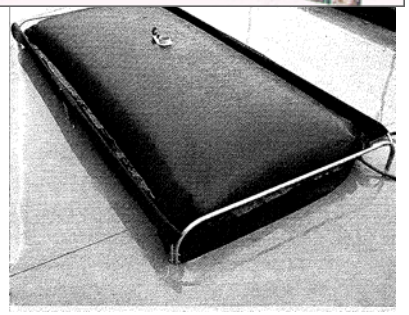
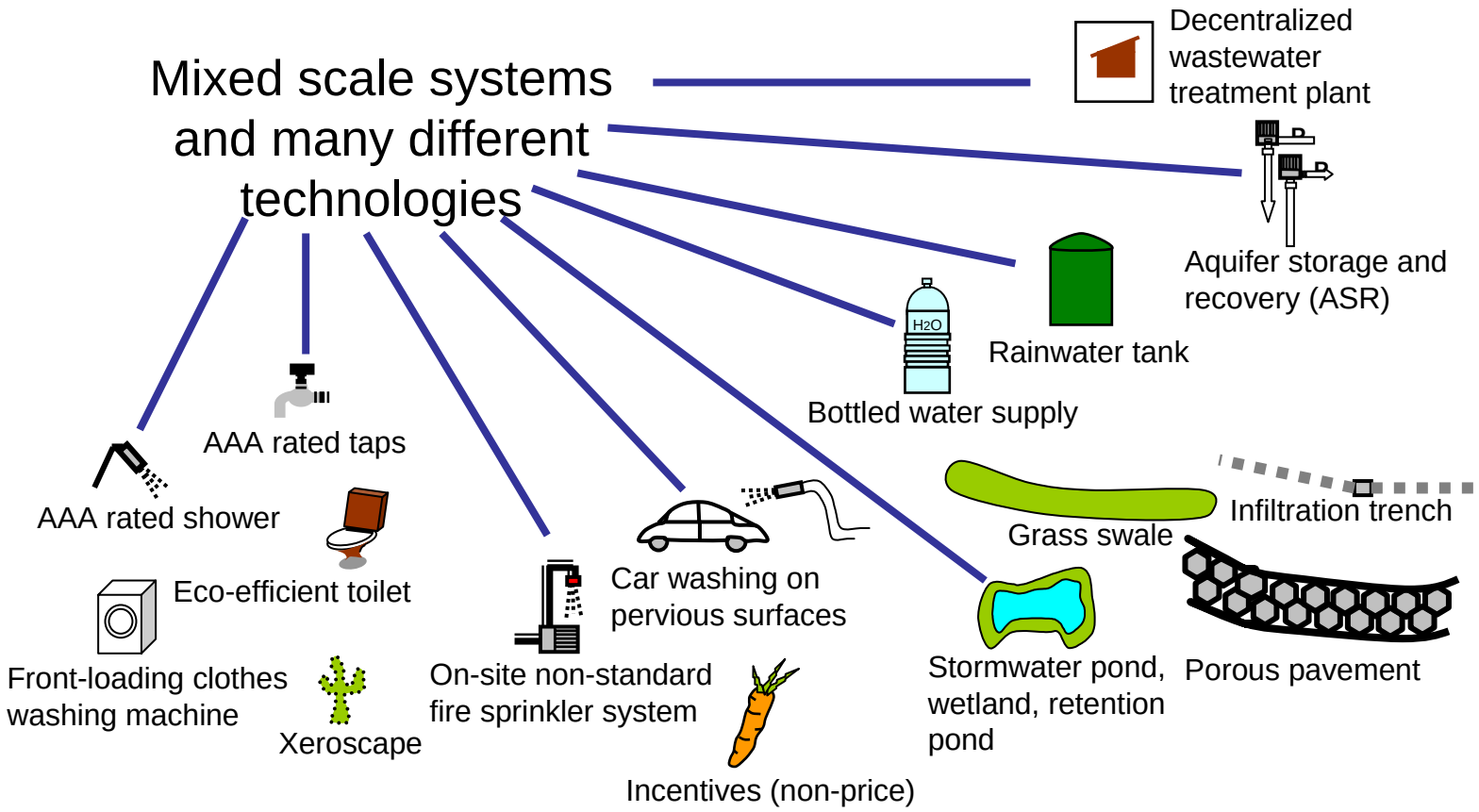
Changing Scales

- No longer “whole-of-city” scale
  - Allotment scale
  - Local neighbourhood to suburban scale
  - Regional scale
  - Beyond the urban area….
- Combinations of scales within an integrated urban water management system

Many sources

- Water efficiency
- Source control
- Roof water
- Stormwater
- Graywater
- Wastewater
- Groundwater

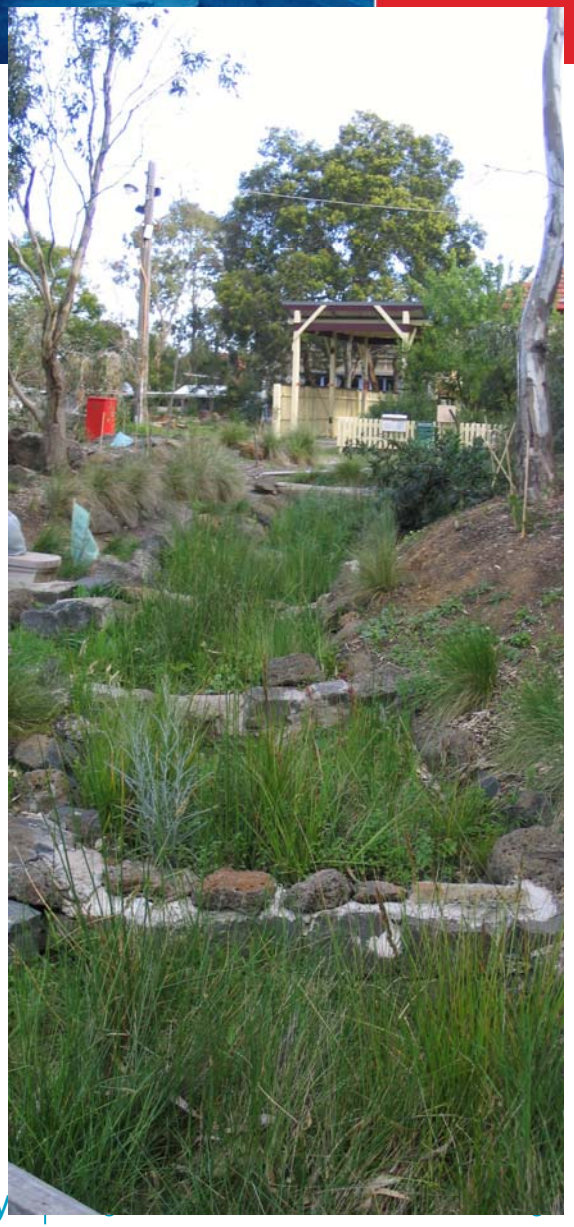




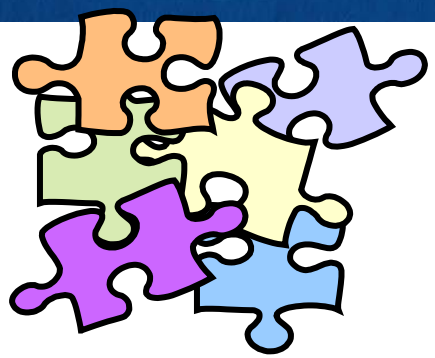
Source: CSIRO Urban Water

Opportunities

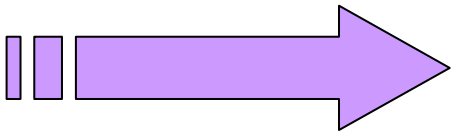
- Enormous opportunities for innovation
  - Demand & supply side
  - Structural and non-structural
  - Tailored to local objectives and conditions
- Only limited by ability to harness them:
  - Prepared to do things differently
  - Balance innovation with risk/precautionary principle

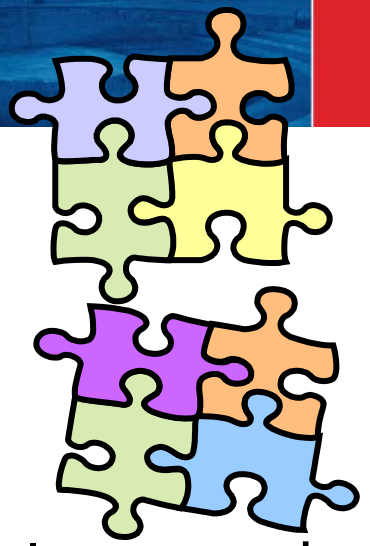


Selecting your approach



Individual tools





Integrated solutions

Site specific objectives

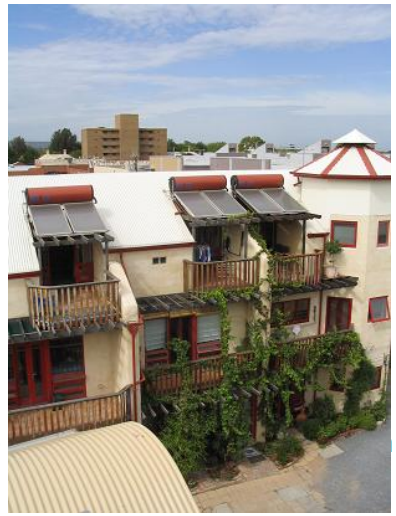
Matching water demands with available resources

Fitting into the urban landscape

Social and governance considerations

Economics (direct & indirect costs)

Operation and maintenance



Principles for matching demands and resources

- Fit-for-purpose at point of use
- Quantity and seasonal patterns of demand and supply
- Minimise “moving” water around; reduce conveyance and pumping

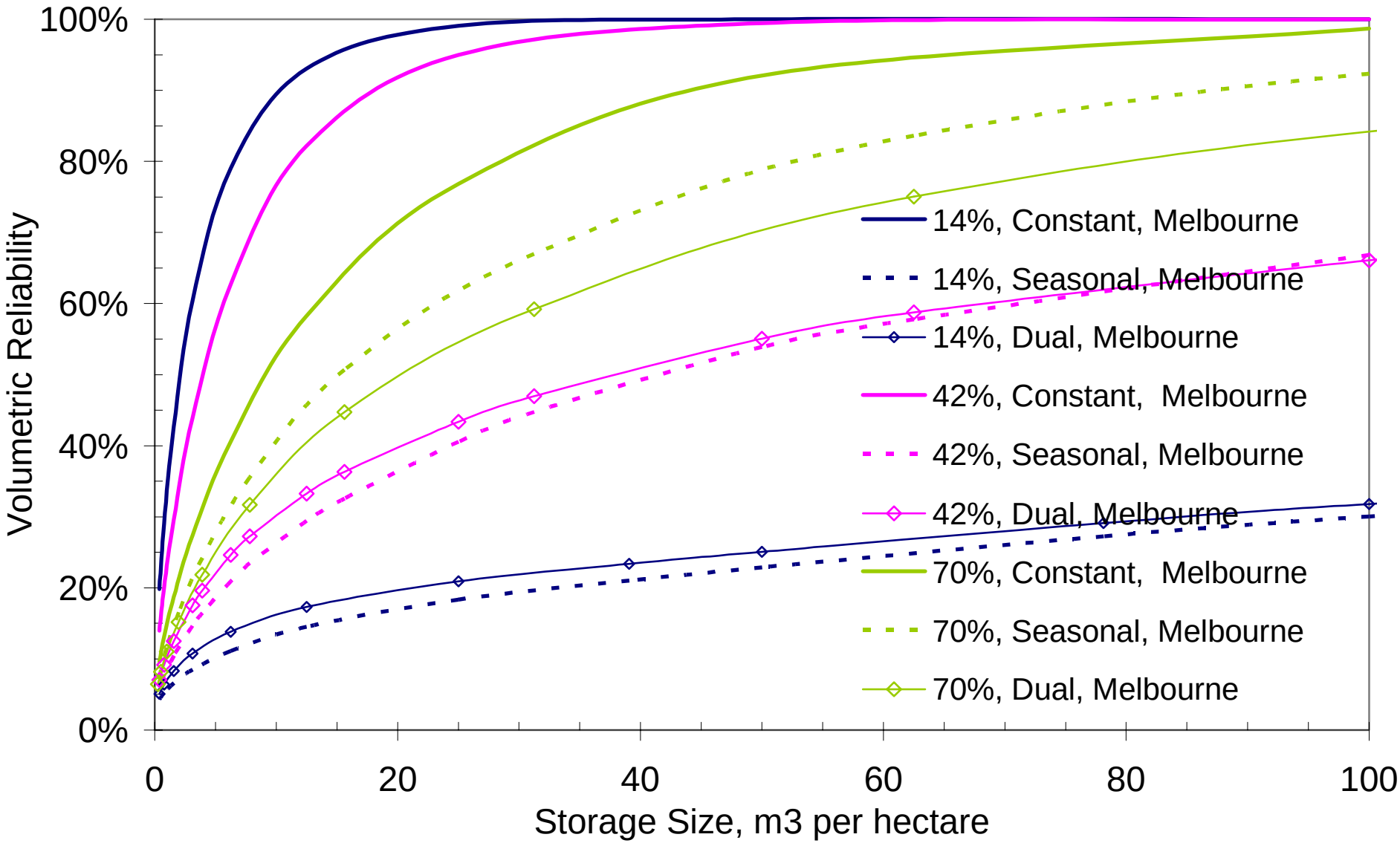
How much storage is required?

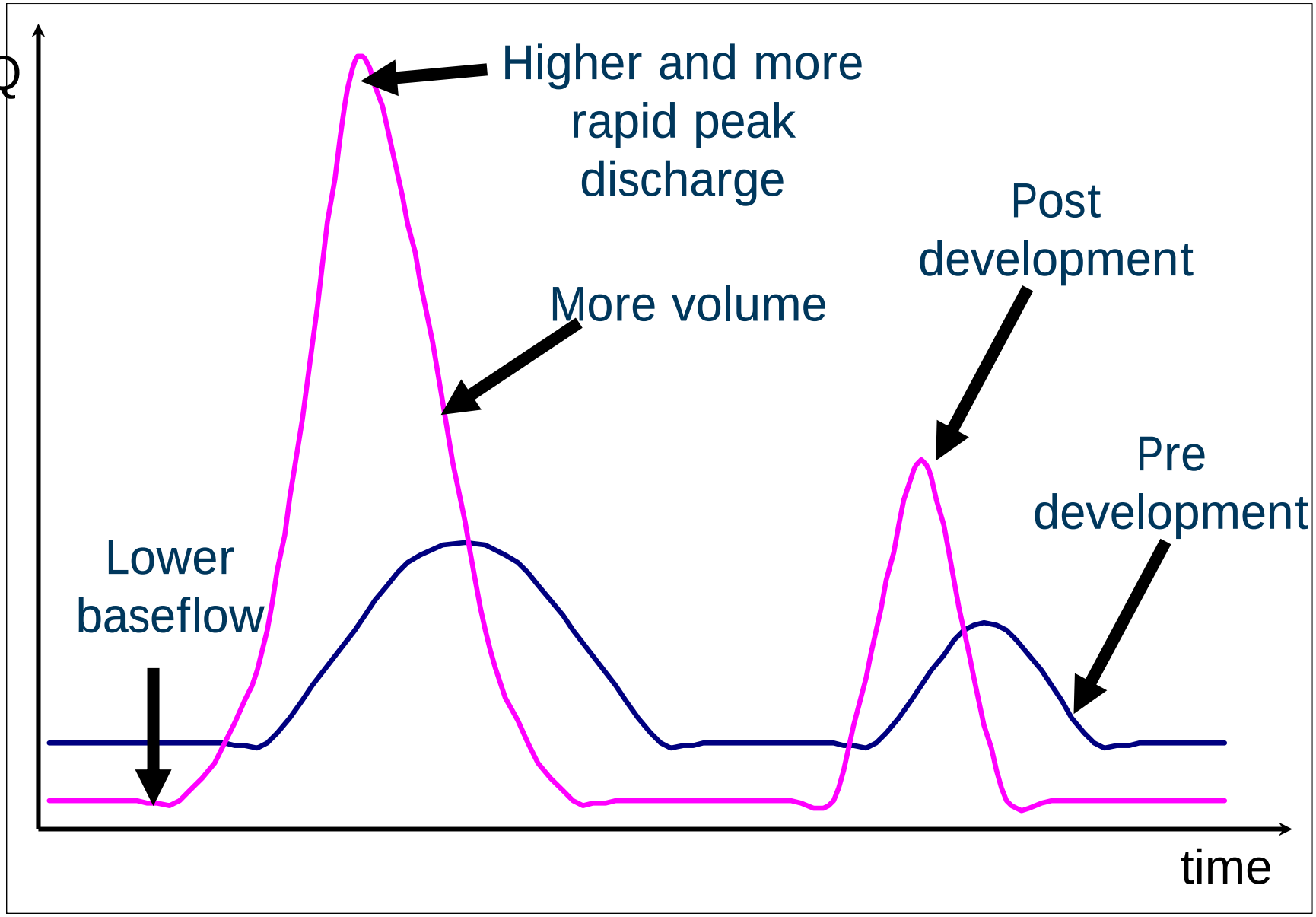
Dependent on:

- Temporal pattern & size of harvestable runoff
- Temporal pattern & size of demand
- Degree of supply reliability required

"Reliability" – proportion of the water demand which is actually supplied to the end use

Sizing for lower reliability

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Higher and more rapid peak discharge
More volume
Post development
Pre development
Lower baseflow
time

Environmental Flows

- Design harvesting system to enhance environmental flows
- “Starving urban streams”:
  - only in very high rainwater & stormwater harvesting scenarios
  - more likely to improve stream health
- Wastewater discharges a poor source of environmental flows

Examples of stormwater harvesting…

Bowies Flat, Brisbane: water is harvested from the constructed wetland

CH2: City of Melbourne

- Water-mining plant
- Rainwater utilisation
- Fire hydrant water recycling
- Green roof
- Est. **72%** less water supply

- phase-change cooling materials
- automatic night-purge windows
- wavy concrete ceilings
- façade of vegetation & louvers

Summary

- Living within cities water resource & ecological constraints requires innovation
- Systems approach to providing urban water cycle services
- Decentralised methods supplementing centralised infrastructure services