

IERM Convention 2017

“People & Green Space – Cradle to Grave”

Sub Theme: Application of Green Infrastructure.

The role of stormwater in Green Infrastructure Applications: City of Johannesburg Stormwater Design Manual

Authors: S Dunsmore, C Brooker, J Eagle, J Barnard.



TAKE AWAY FROM THIS SESSION

- SuDS & Green Infrastructure = a shared opportunity
- Defining Stormwater Green Infrastructure
- The importance of hydrological performance
- Securing the asset



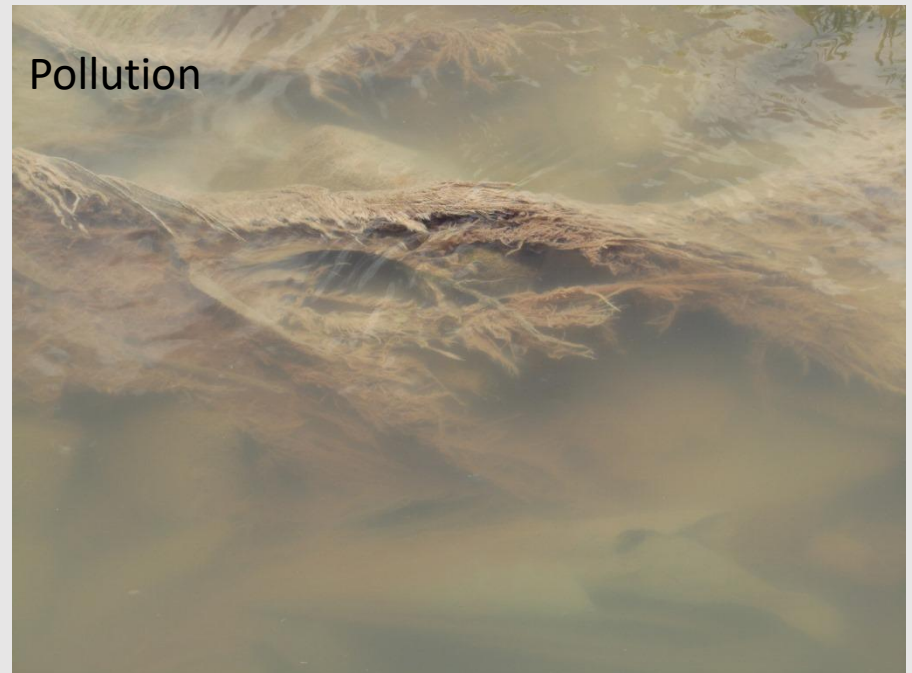
Flood hazard



Erosion & Sediment



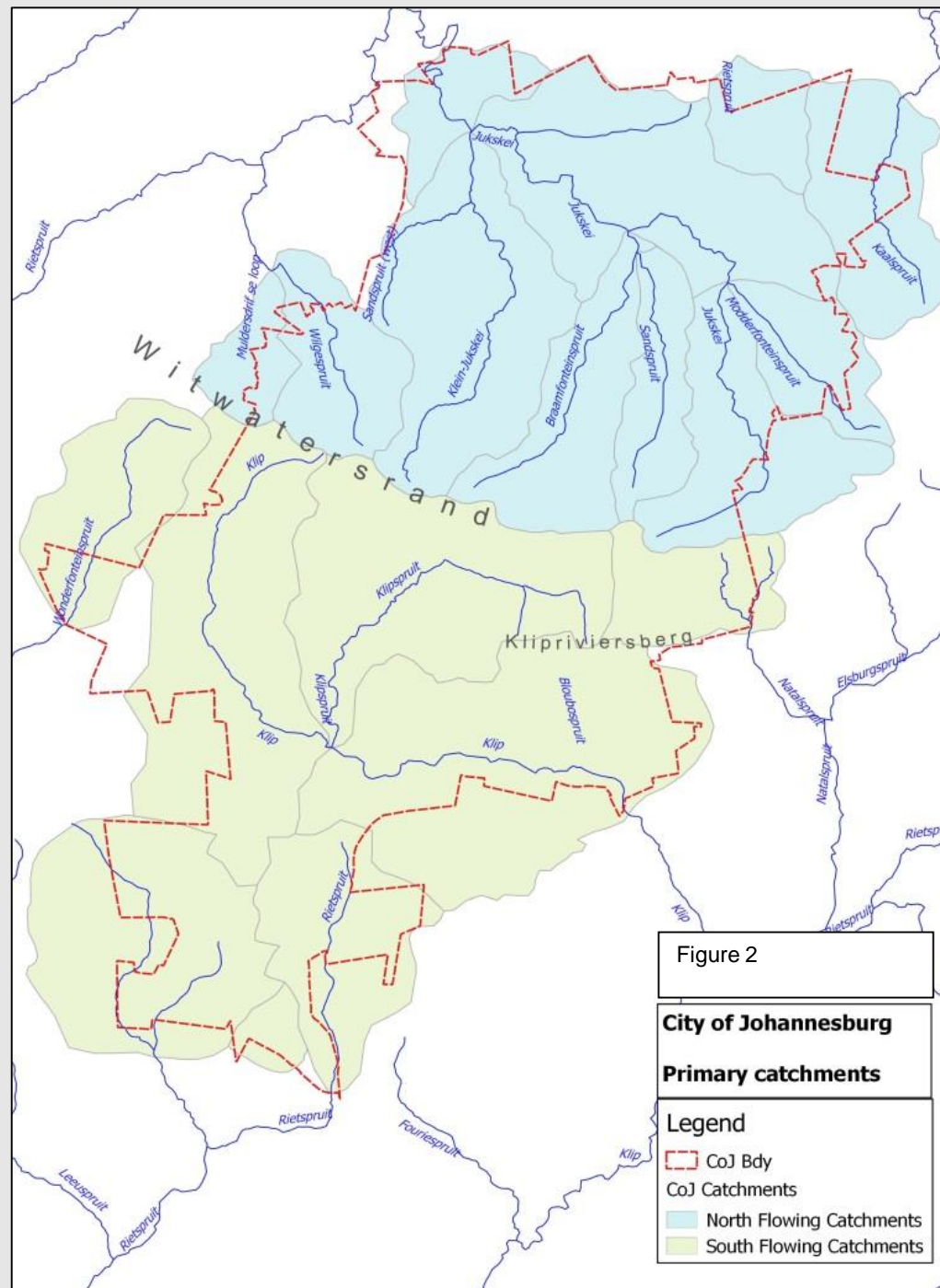
River stability & habitat



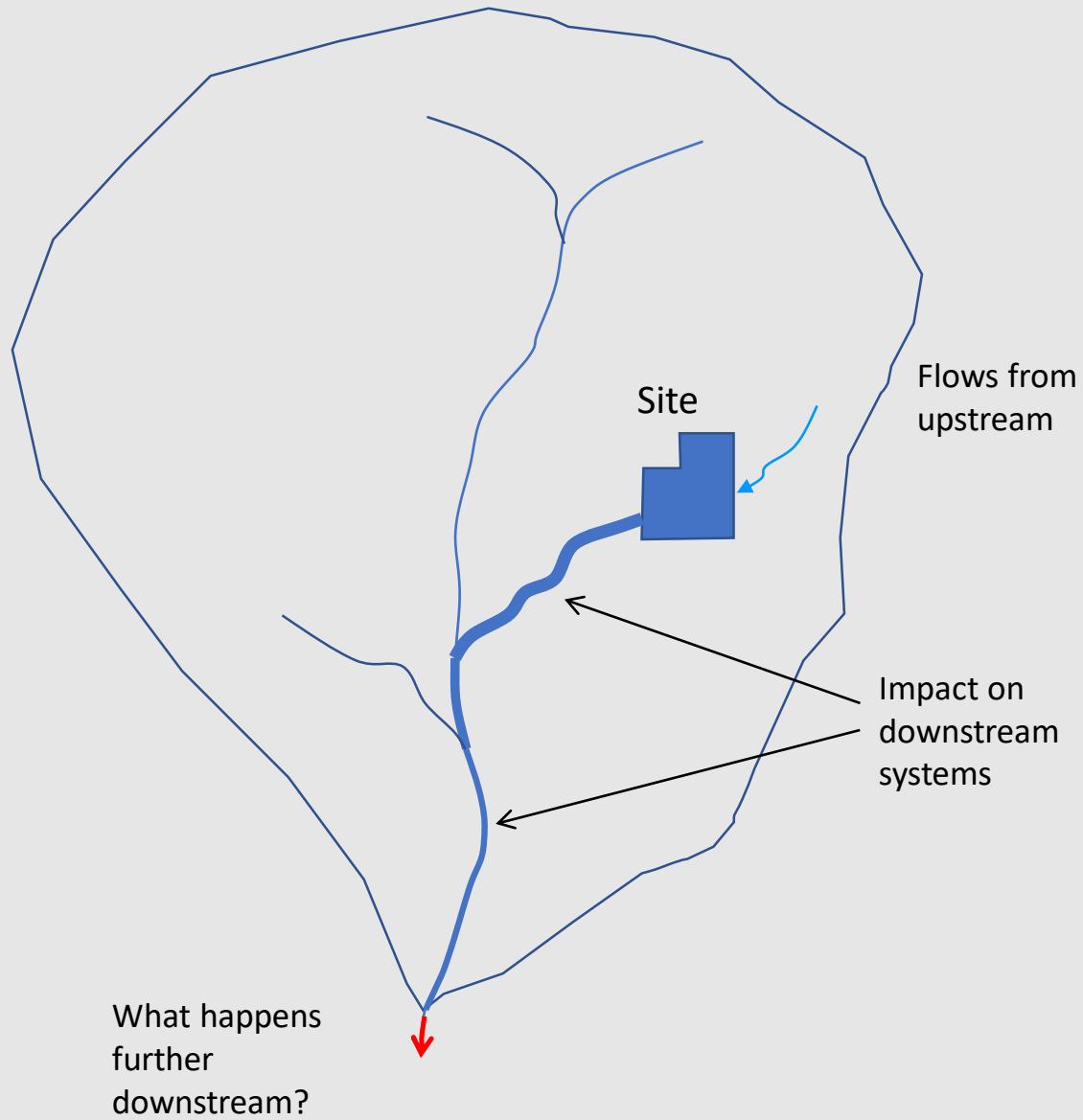
Pollution

Large urban catchments =

- High flood hazard
 - High stormwater energy
 - Urban areas are net generators of runoff!
- Sustainable drainage measures are critical.



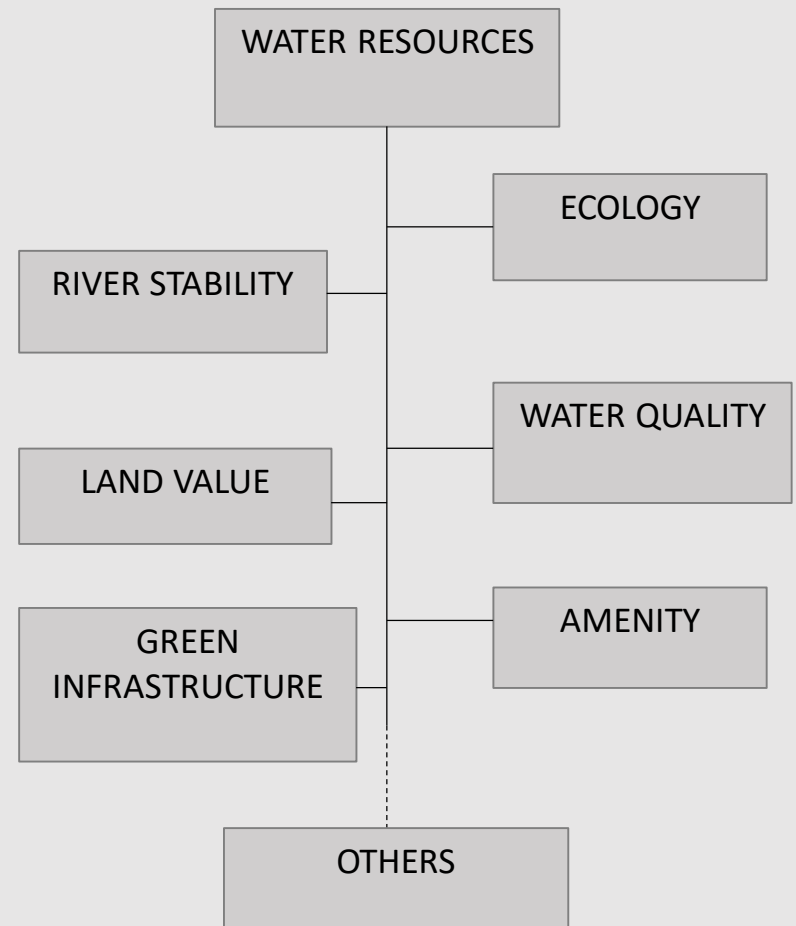
SITE HYDROLOGY



FOUNDATION OF THE STORWATER DESIGN MANUAL

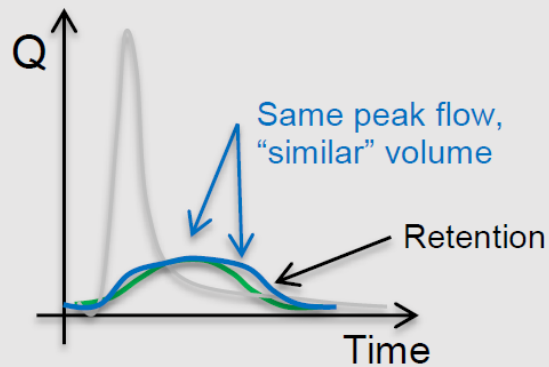
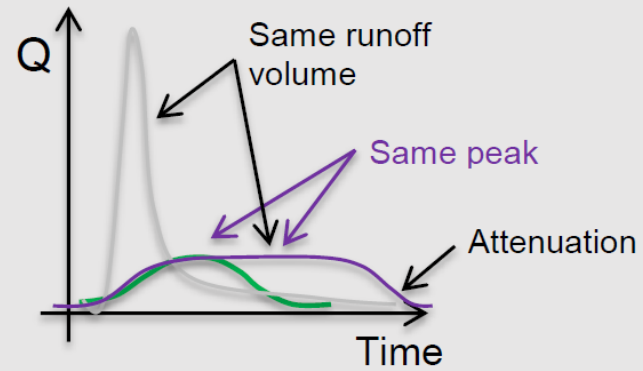
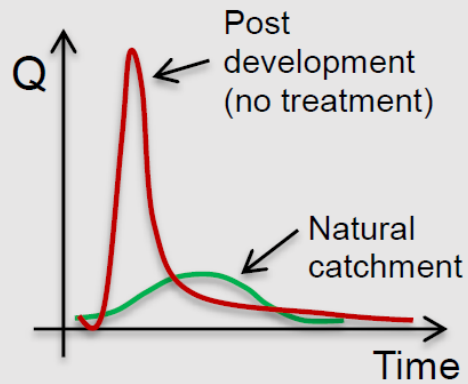
PRINCIPLES

1. Stormwater is a resource
2. Catchment Master Planning (CMP)
3. Catchment recovery ("Catchment Repair")
4. Runoff harvesting (more than rainwater harvesting)
5. Water quality
6. Flood aspects (hazard, floodplain management)
7. Ecological services
8. Amenity services
9. Informal settlements
10. Densification
11. Climate change & adaptation
12. Asset register



PROTECTING THE RESOURCE

Is it harvestable?



ATTENUATION vs RETENTION

Retention provides more opportunity to harvest stormwater

SUSTAINABLE DRAINAGE & GREEN INFRASTRUCTURE

DIFFERENT GOALS BUT THE SOLUTION IS THE SAME..

SuDS:

- Hydrological performance – runoff volume & quality
- Mimic pre-development hydrological response = greener methods

GI

- Ecological corridors
- Supporting multiple services

BUT

Not all SuDS = GI

Not all GI provides hydrological performance

Table 1: Typical SuDS facilities (Armitage et al., 2013).

Source Control	Local Control	Regional control
Green roofs [†]	Filter strips [†]	Detention (attenuation) ponds
Rainwater harvesting	Swales [†]	Retention Ponds [†]
Soakaways	Infiltration trenches	Constructed wetlands [†]
Permeable pavements	Bio-retention areas [†]	
	Sand filters	
[†] SuDS facilities that typically support vegetated and ecological systems		

SuDS EXAMPLES

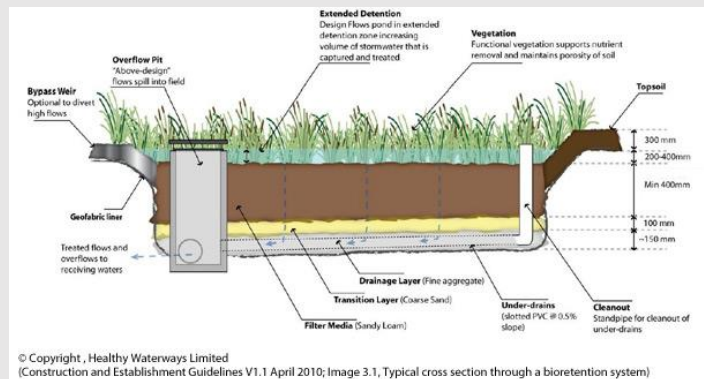
Filter strip



Swale



Bio-retention system



REGIONAL CONTROL - EXAMPLES

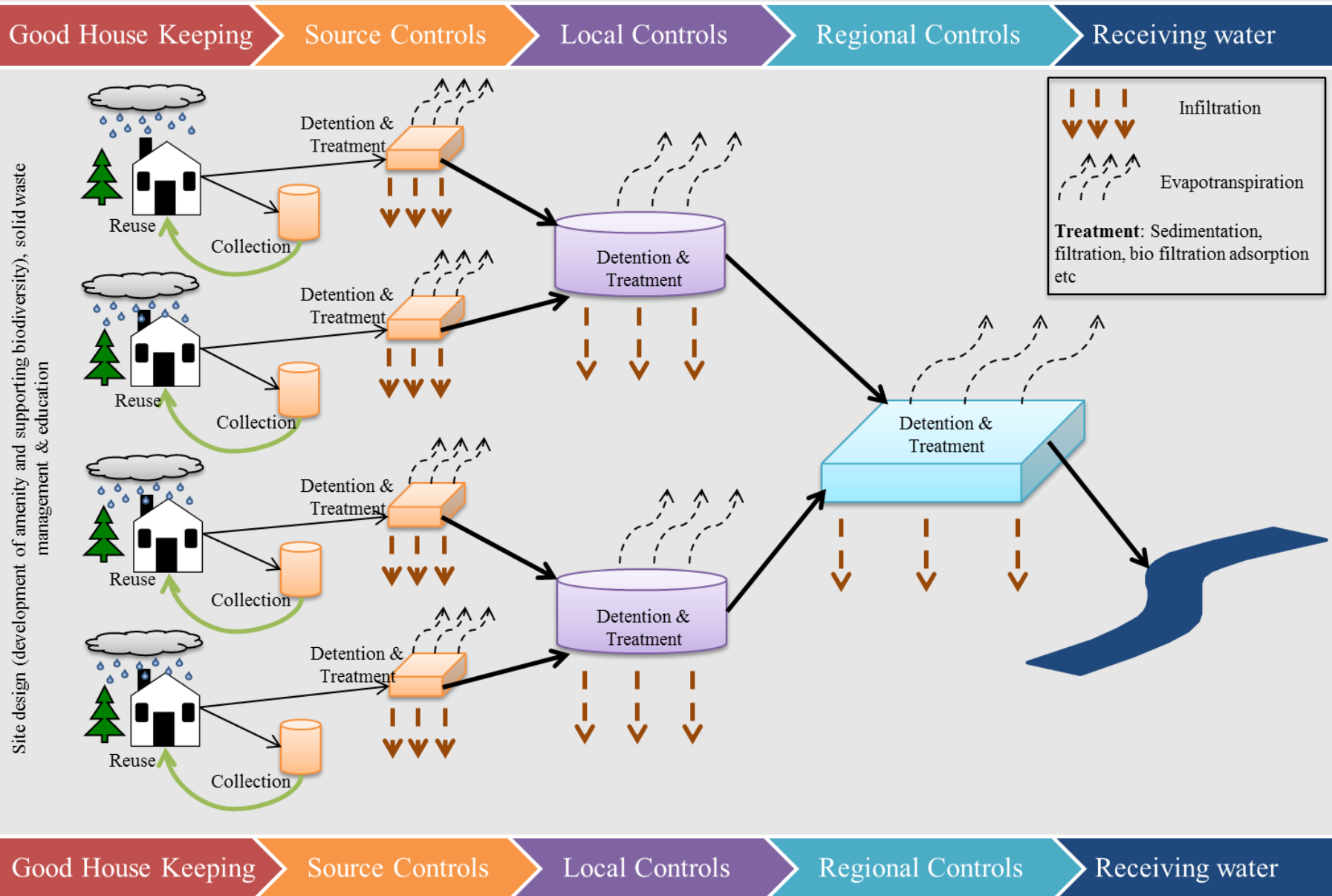
Retention pond



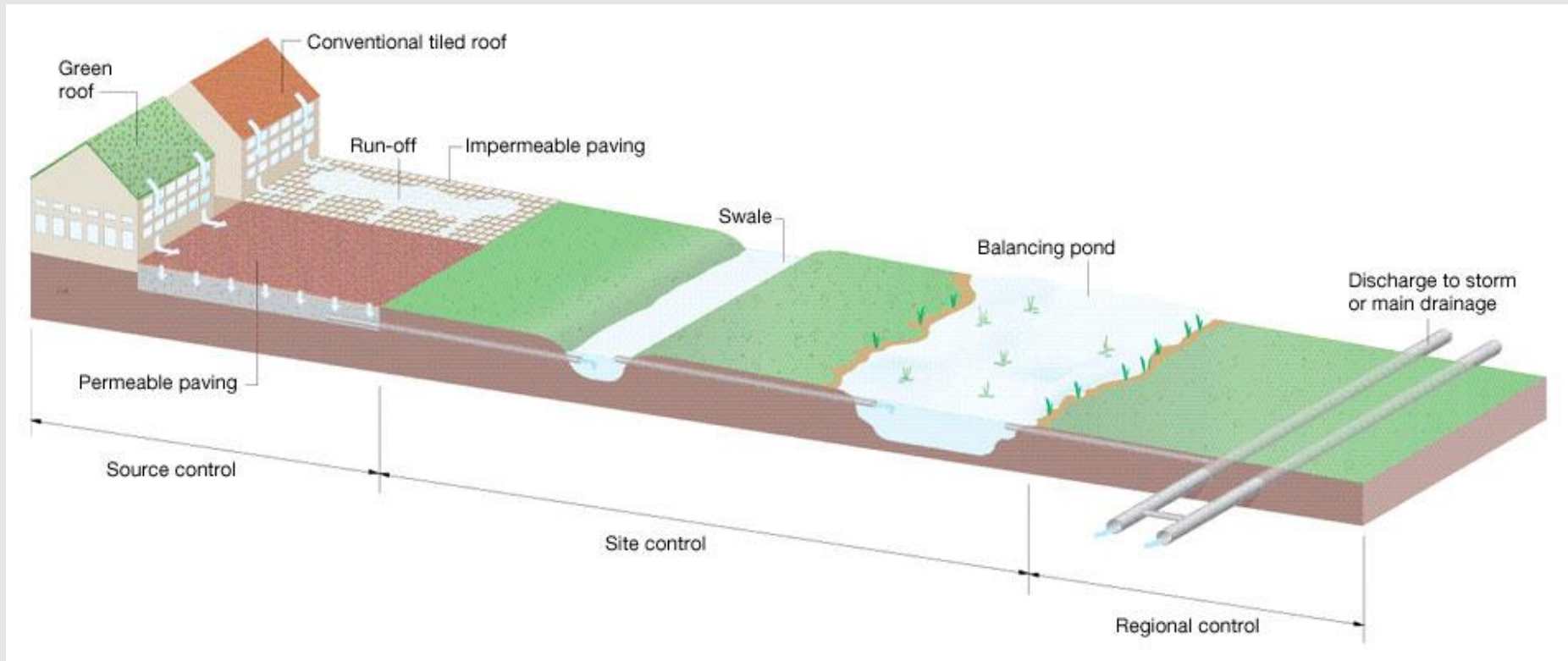
Constructed wetland



WHAT IS A TREATMENT TRAIN?



DOES A TREATMENT TRAIN FORM PART OF SDP APPROVAL?



1. DEFINE THE PERFORMANCE CRITERIA OF THE STORMWATER (OR GI) ASSET
2. IT IS CRITICAL TO REGISTER THE ASSET TO PROTECT THIS PERFORMANCE

MULTIDISCIPLINARY TEAM

PLANNER

*Develop functions,
concepts.*

ENGINEER

LANDSCAPE ARCHITECT

*Define capacity,
performance, etc.*

ECOLOGIST

COMMUNITY

Identify KPI's

MUNICIPAL DEPTS:

Roads & Stormwater

*Set objectives, functions,
etc.*

Parks

Provide strategic goals.

Environmental Management

(Solid Waste)

*Ensure maintenance &
longevity.*

(Sanitation)

INTER-DISCIPLINARY PROJECT DEVELOPMENT

Evaluation of MUSIC by
eWater (Australia)



- Multidisciplinary use
- Improves understanding and uptake of GI/SuDS
- Improves communication between disciplines
- Improve project authorisation process ???

Stormwater Management Measures

- Swales & Buffer Strips
- Sedimentation Basins
- Wetlands and Ponds
- Bioretention Systems – Rain Gardens
- Infiltration Systems
- Gross Pollutant Traps (GPT)
- Porous Pavement



ATLASPRUIT FLOOD RELIEF



INTEGRATED NETWORK

Project







QUESTIONS..

