

# Water for All Conserve, Value, Enjoy



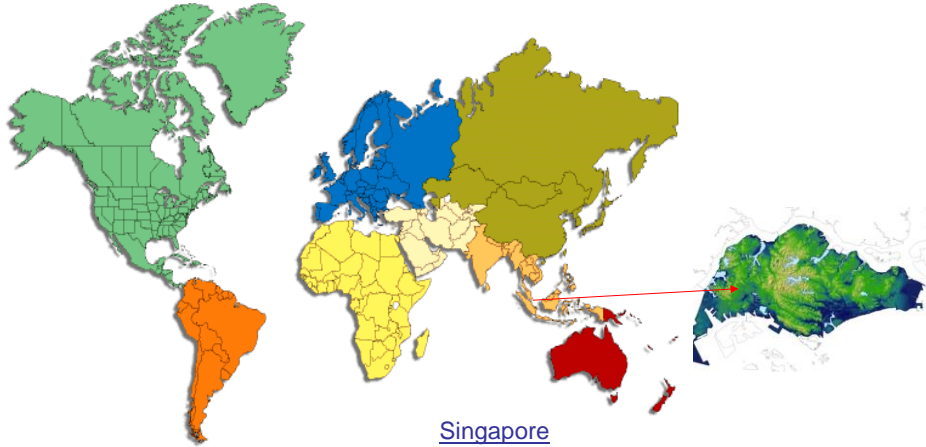
## Singapore's Active, Beautiful, Clean Waters Programme

*Tan Nguan Sen  
Chief Sustainability Officer  
Sustainability Office  
PUB, Singapore's national water agency*



## WATER IN SINGAPORE

## Geographical context of Singapore



### Singapore

Land Area 716 km<sup>2</sup>

Population 5.4 mil

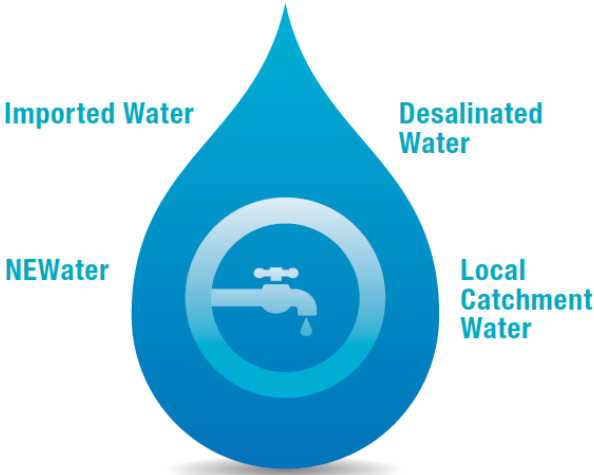
Average Annual Rainfall 2,400 mm

Average Water Demand 1.8 mil m<sup>3</sup>/day (approx 760 Olympic size swimming pools per day)

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## Ensuring Water for All in Singapore

### Four National Taps



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## Water from local catchment

### COLLECTING EVERY DROP OF RAIN

Two-thirds of Singapore's land area is now water catchment

- Separate stormwater and sewerage systems
- Rivers have been dammed up to form reservoirs



## Stormwater management challenges

### Inherent geography

- Very intense rainstorms
- Tidal range of 3m
- Low-lying grounds

### Climate change

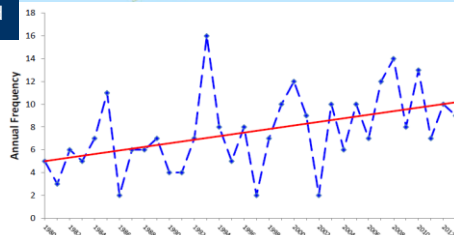
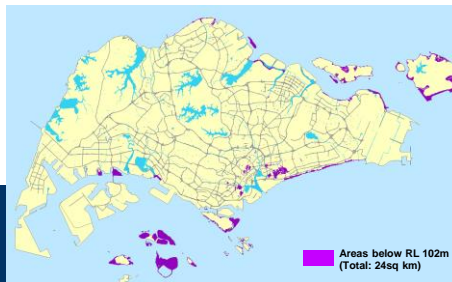
- Historical rainfall data: a trend towards higher rainfall intensities and higher frequencies of intense rainfall

### Urbanisation

- Highly-urbanised catchments
- Densely populated

### Implications

- Drainage capacity must be large enough to cater for high peak flows
- Limited space available to widen drains due to competing land use

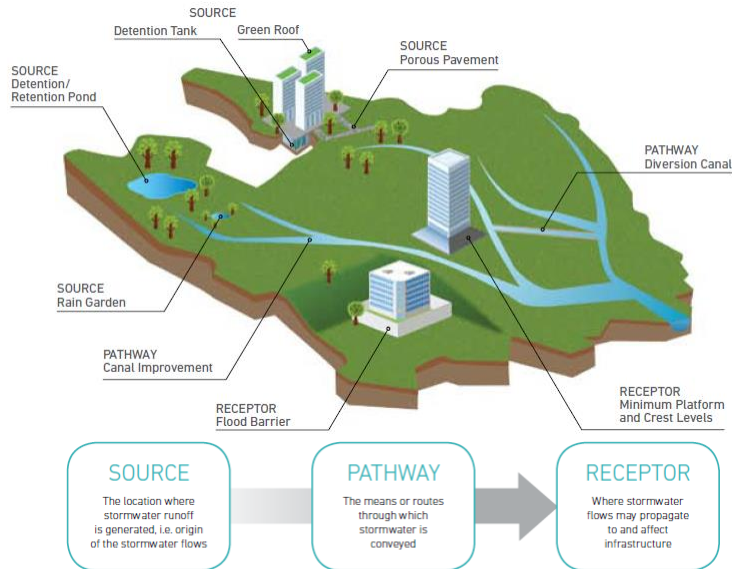


Annual frequency of occurrence of maximum hourly rainfall exceeding 70mm (upward trend of 1.6 days per decade)

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## Holistic Stormwater Management



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## ABC Waters and climate change



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## ACTIVE, BEAUTIFUL, CLEAN WATERS PROGRAMME

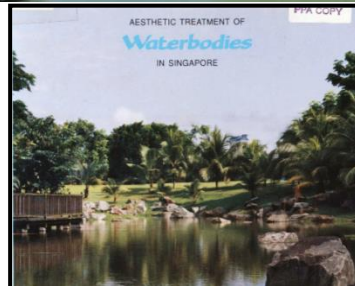
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### Before the ABC Waters programme

#### Waterbodies Design Panel

- End-1989 - 2000
- Focus: Aesthetic treatment of waterbodies and their environs and their possible recreational uses
- Demonstration projects, e.g. Sungei Api Api
- Development control submission guidelines
- Compilation of techniques for the aesthetic treatment of waterways



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## A paradigm shift in Singapore's water governance

- Water bodies opened up for community and recreational use
- More engaging and experiential ways for the public learn about the importance of water
- Public as guardians of Singapore's water resources



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## Active, Beautiful, Clean Waters programme



"In the past, we protected our water resources by keeping people away from them; now, we will bring people closer to water so that they will enjoy and cherish it more... By linking up our water bodies and waterways, we will create new community spaces that are clean, pleasant, and bustling with life and activities. We will integrate our water bodies with our parks and green spaces and turn Singapore into a city of gardens and waters."

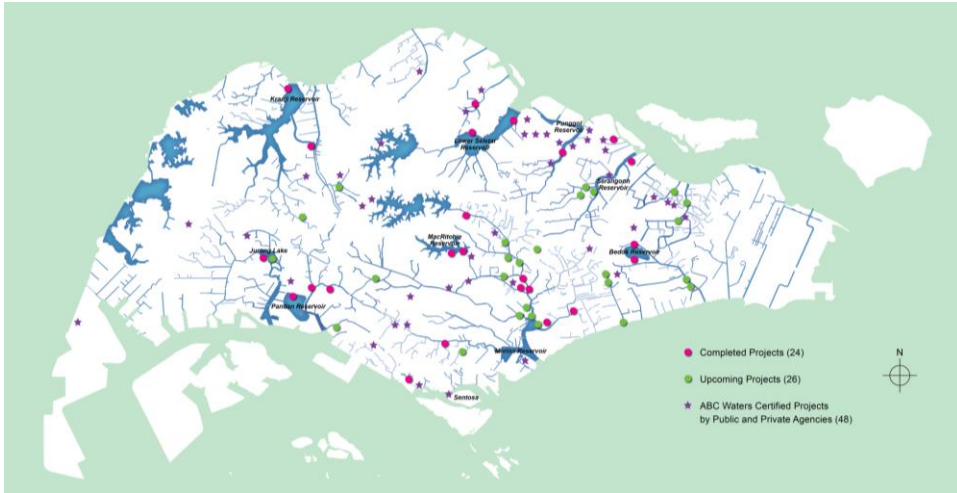
*Singapore Prime Minister Lee Hsien Loong at the launch of ABC Waters Master Plan in 2007*

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## Water as an environmental asset

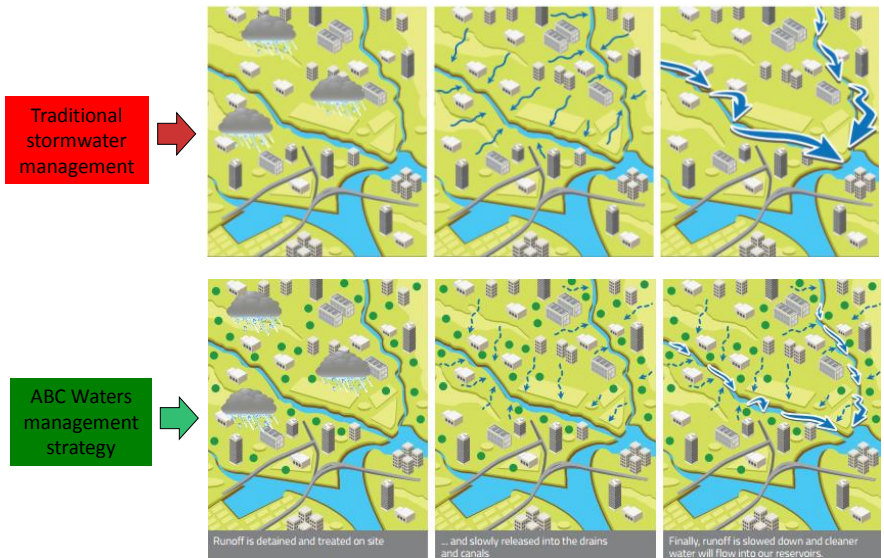
### Blue map of Singapore

17 reservoirs, 32 major rivers and more than 8000km of canals and drains...



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## ABC Waters Management Strategy



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## ABC Waters programme

Active, Beautiful, Clean Waters: Kallang River @ Bishan-Ang Mo Kio Park



Before



After



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## ABC Waters programme

Spaces to encourage community ownership of Singapore's water resources



Alexandra Canal



Sengkang Floating Wetland



Sungei Ulu Pandan



Lower Seletar Reservoir



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## ABC Waters design features



Cleansing biotope at Jurong Eco-Garden



Wetland at Grove Drive



Rain Garden at Balam Estate



Vegetated swale at Sungei Ulu Pandan

## Promoting the adoption of ABC Waters

### Building up capacity

- ABC Waters Design Guidelines
- ABC Waters Professionals programme
- Training of third parties on maintenance of ABC Waters design features
- Incorporation into tertiary education curriculum

### Incentivising

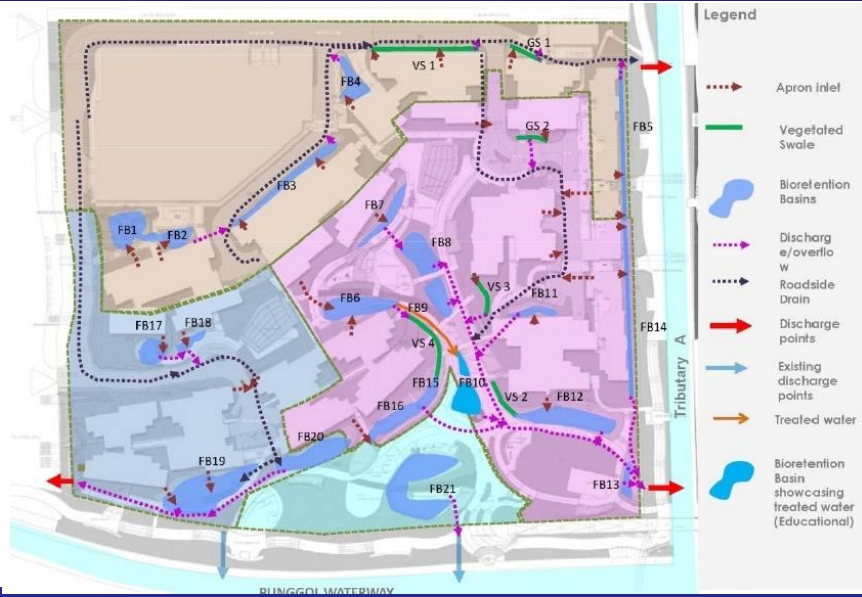
- ABC Waters Certification



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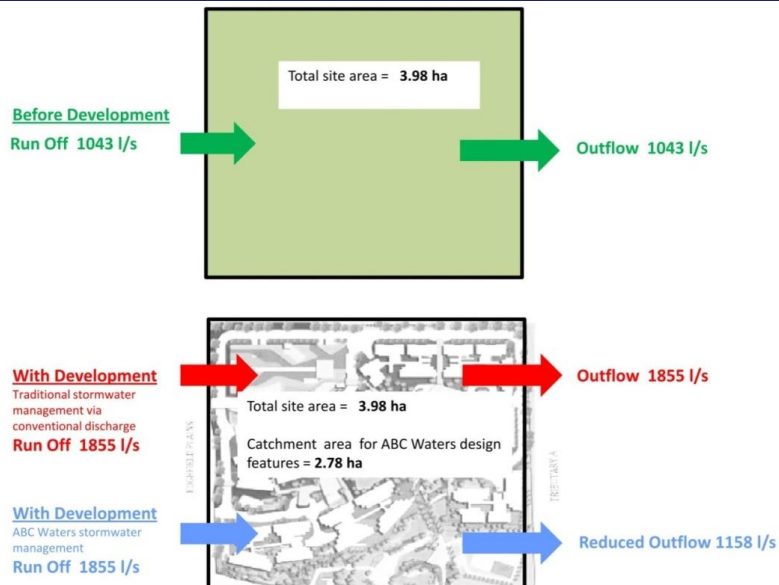
## Mainstreaming ABC Waters: Punggol C39 housing precinct & common green



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## Mainstreaming ABC Waters: Punggol C39 housing precinct & common green



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## Scaling up the ABC Waters Management Strategy

Punggol C39  
(3.98 ha)

Kallang  
Riverside  
(23.5 ha)

Bidadari  
Estate  
(93 ha)



Kallang Riverside sub-catchment plan



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## Conclusion

- Continuous work on ABC Waters design features has offered Singapore a set of solutions that can:
  - Help build up resilience to climate change
  - Offer co-benefits such as social amenities and urban biodiversity
- Looking to the future:
  - How can we further scale up ABC Waters Management Strategy and have ABC Waters design features implemented in more spaces?



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**Thank you**

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