

By Tan Nguan Sen

REVITALISING SINGAPORE'S URBAN WATERSCAPES:

ACTIVE, BEAUTIFUL, CLEAN WATERS PROGRAMME

The Challenge

Singapore is a densely populated, island city-state with over five million people living in an area of only 710 square kilometres. Although it receives ample rain, its small catchment area means there is insufficient ground space to collect and store enough water for its needs. In addition, the island does not have extensive aquifers or groundwater. Ensuring water sustainability is, hence, a strategic national challenge.

During the 1960s and 1970s, Singapore faced multiple problems associated with rapid urbanisation. These included polluted rivers, water shortages and widespread flooding. Yet today, it is capable of producing enough water to satisfy the requirements of its population

and industries. In just four decades, Singapore has overcome its water challenges and turned its vulnerability into a strategic asset.

Singapore has 32 major rivers, 17 reservoirs, and more than 7,000 kilometres of drains and canals. The Blue Map of Singapore on page 15 shows this pervasive network of waterways and water bodies. Moving beyond a source of water supply, the PUB, Singapore's national water agency - saw the potential of using these 'blue spaces' to encourage people to create more interaction between people and water.

The Solution

In 2006, PUB launched the Active, Beautiful, Clean Waters (ABC Waters) Programme with the

aim of transforming Singapore's network of functional but utilitarian drains, canals and reservoirs into vibrant and aesthetically pleasing streams, lakes and rivers with lush landscaped banks. They are also integrated into surrounding residential developments, where residents can enjoy activities close to the water.

The ABC Waters Programme is not only an asset in improving water quality, but also an urban revitalisation tool that improves accessibility, aesthetics and recreational potential. It has created new community spaces and opportunities for people to enjoy and appreciate water bodies and, in so doing, bond with water. The integration of the ABC Waters sites with park connectors also





1 pg 12-13: People enjoying activities by the rejuvenated river at the Bishan-Ang Mo Kio Park.

Photo courtesy of Atelier Dreiseitl.

2 pg 14, top: Kallang River at the Bishan-Ang Mo Kio Park before its transformation under the ABC Waters Programme.

Photo courtesy of Atelier Dreiseitl.

3 pg 14, middle: The river after the transformation.

Photo courtesy of Atelier Dreiseitl.

4 pg 14, bottom: Canoeing activities along the revitalised Kallang Ayer waterfront.

Photo courtesy of PUB.

5 pg 15: The Blue Map of Singapore shows Singapore's network of waterways and water bodies.

Image courtesy of PUB.



helps create a sustainable urban environment.

PUB adopted a three-pronged approach for the project's implementation. This entailed the development of a master plan, sustained engagement of the community, and efforts in encouraging the public and private sector to adopt the ABC Waters concept.

Strategy One: Developing the ABC Waters Master Plan

PUB initiated three demonstration projects at Bedok Reservoir, MacRitchie Reservoir and a stretch of the Kallang River at Kolam Ayer. With the experience gained, a master plan was developed to identify over 100 potential projects across the island to be implemented over the next 10 to 15 years.

The map of Singapore was divided into three watersheds - Central, Eastern, and Western - each with its own themes and projects. A team of multi-disciplinary consultants was then engaged for each watershed, working together with other government agencies, including the Urban Redevelopment Authority (URA), the Housing and Development Board (HDB), JTC Corporation and the National Parks Board (NParks). With this integrated approach, ideas and resources could be pooled in order to synergise the infrastructure planning.

Strategy Two: Engaging the Community

From the outset, PUB recognised the importance of actively engaging the community. Thus, a publicity campaign was launched in 2007. It started with an exhibition officiated by Singapore's Prime Minister, where the public were invited to learn more about the programme and what it set out to achieve. The campaign got residents excited about the projects near their homes and was well received.

PUB also carried out extensive briefings, consultations and road shows involving grassroots leaders, educational institutions, and non-governmental organisations. Such sessions helped refine the projects based on users' feedback. Site visits held during the project's construction stage kept the stakeholders regularly updated and helped get their buy-in.

Through PUB's Our Waters Programme, members from the public, people and private sectors can 'adopt' waterways or reservoirs and organise community events or develop sustainable projects at these sites. As of March 2012, there are 158 corporations, schools and organisations that have adopted various waterways and reservoirs.

Strategy Three: Encouraging Adoption Of ABC Waters Concept by the Public And Private Sectors

The public and private sectors are encouraged to embrace the ABC Waters concept and incorporate its design features - such as bioretention swales, rain gardens and wetlands - in their developments. Such environmentally sustainable features minimise the hydrological and pollution impact of urbanised catchments and safeguard water quality. PUB has compiled information on these features into the ABC Waters Design Guidelines handbook (launched in 2009) as reference material for industry professionals to incorporate into their development projects.

The ABC Waters Certification scheme, launched in 2010, recognises organisations that embrace the ABC Waters concept and holistically incorporate its design features in their developments. Additionally, the BCA (Singapore's Building and Construction Authority) Green Mark Scheme - a benchmarking scheme that incorporates



internationally recognised best practices in environmental design and performance - acknowledges the inclusion of such design features.

PUB also taps into the experience of top local architects, engineers and developers, which comprise the ABC Waters Review Panel. They review the master plan, and the design of strategic projects.

The Outcome

The ABC Waters programme has provided a framework for an integrated planning process, where multi-disciplinary teams from various government agencies and stakeholder groups collaborate creatively. The results are seen in key projects such as the Sengkang Floating Wetland and the Kallang River at Bishan-Ang Mo Kio Park.

The latter is a flagship ABC Waters project, and a collaboration with NParks. Designed based on a flood plain concept, it entailed the transformation of a 2.7 kilometre stretch of Kallang River that ran in a canal along the edge of the park into a lush river meandering through the park. Bishan-Ang Mo Kio Park was initially identified as a 'people's park', and the design facilitates that. When the water level in the river is low, users can

with more than 25,000 people gathering at 15 ABC Waters sites.

Realising the programme's full potential may take decades, but the success thus far has allowed PUB to embark on a second phase. This will see the creation of yet more recreational hotspots in order to educate people on the importance of keeping Singapore's waters clean; the notion behind which stems from the belief that long-term sustainability can only be achieved when people become stewards of the environment.

get closer to the water and enjoy recreational activities along the banks. Yet, upon heavy rain, the parkland next to the river doubles-up as a conveyance channel, carrying excess water downstream. The concrete canal walls were naturalised using bio-engineering techniques. Plants and bedding materials were also used to stabilise the banks, and to create a natural habitat for native plants and animals.

Opened in March 2012, this project has demonstrated that careful planning and innovative design can transform concrete waterways into socially rejuvenating urban waterscapes, characterised by a thriving ecosystem that is enriched with biodiversity.

The success of the first phase of the ABC Waters Programme was made possible with strong support from PUB's 3P (People, Public, Private) partners. Since its launch in 2006, 18 projects have been completed by PUB with four more currently being implemented; 14 projects have been completed by other public agencies and private developers with another 17 are in the pipeline. For two consecutive years, World Water Day celebrations have been held concurrently across the island,



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Mr Tan graduated with an engineering degree from Munich Fachhochschule, Germany. He went on to pursue a post-graduate diploma in Hydrological Engineering from the International Institute for Hydraulic and Environmental Engineering in Delft, the Netherlands. Subsequently, he obtained a Master of Science in Management of Technology from the National University of Singapore.