Table S1. Stormwater Management Objective Comparison between Sustainable Development Goals (SDGs), International Water Association (IWA) Principles for Water Wise Cities (WWC), Australia Water Sensitive Cities (WSC), Singapore Active, Beautiful, Clean (ABC) Water and China Sponge City Construction (SCC)

Objective classification	Specific objective	SDGs (2030)	IWA Principles for WWC	Australia WSC	Singapore ABC Water program	China SCC
	Surface water control	V	V	V		
C4	System performance	V	V	V		
Stormwater system	Economic sustainability		V			
	Technical Innovation	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	
	Environmental governance	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$
Integrated management	Disaster resistance	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$
integrated management	Resource efficiency	$\sqrt{}$	\checkmark	\checkmark	\checkmark	\checkmark
G	Public participation	V	V	V	V	
Social engagement	Scientific governance	V	V	V		
	Urban space quality improvement	$\sqrt{}$	\checkmark	$\sqrt{}$	\checkmark	\checkmark
Urban development	Public infrastructure renewal	V	V	V		
-	City resilience enhancement	√	V	√	V	√

Supplementary Table S2. Decision Support Tools Comparison under Comprehensive Evaluation Framework for Sustainable Stormwater Management

Objective classification	Specific objectives	Indicators	SWMM	SUSTAIN	MIKE URBAN	Infoworks	MUSIC	DAnCE4 Water	Urban BEATS	CALVIN
	Surface runoff control	Runoff quantity control	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	\checkmark	\checkmark	\checkmark
		Non-point source pollution control	$\sqrt{}$	$\sqrt{}$		$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	\checkmark	
		Meet design objectives	$\sqrt{}$	\checkmark	$\sqrt{}$	$\sqrt{}$	\checkmark	\checkmark	\checkmark	\checkmark
		Operational reliability	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	\checkmark	\checkmark	\checkmark
		Space requirement							$\sqrt{}$	
		Site adaptability							√	
		System flexibility	√	√	√	√	√	√		
	System performance	System complexity		V	$\sqrt{}$	V	V			
		System								
		accessibility and								
Stormwater		security								
system		Suitable system								
		layout/structure								
		Conformity to								
		technical					1			
		specifications and					V			
		standard construction								
		System								
		maintainability								
	Economic	Self-sufficiency						V	V	
	sustainability	Capital cost		V				√		V
		Operation and		.1			.1	-1	.1	.1
		maintenance cost		$\sqrt{}$			$\sqrt{}$	V	V	ν
	Technical	System operation								
	innovation	intelligence								

		Adoption of								
		innovative design								
		and equipment								
		System								
		optimization								
		Restore water body								
		and ecological		$\sqrt{}$			$\sqrt{}$	$\sqrt{}$	\checkmark	$\sqrt{}$
		environment								
		Improve the								
		quality of surface							\checkmark	
		water source								
		Water security and			-1		.1	-1	-1	
		sanitation			$\sqrt{}$		$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	
	Environmental governance	Increase biological								
		diversity								
		Restore ecological								
		habitat								
		Protect areas with								
T		high ecological								
Integrated		values								
management		Improve		-	-					-
		groundwater					$\sqrt{}$			
		quality								
		Groundwater	1				1			1
		recharge	$\sqrt{}$				$\sqrt{}$			V
		Watershed wide			1			1		1
		impact			$\sqrt{}$			$\sqrt{}$		٧
•		Flood control and	.1		. 1	.1		. 1		.1
	Disaster resistance	defense	$\sqrt{}$		$\sqrt{}$	$\sqrt{}$		$\sqrt{}$		V
		Drought mitigation								
		and defense								V
•		Stormwater								
	Resource	harvesting and					\checkmark	$\sqrt{}$	$\sqrt{}$	
	efficiency	reuse								

		Reduce cost of					
		grey infrastructure		 			
		Pipe damage control	$\sqrt{}$	\checkmark	\checkmark		
		Reduce energy consumption					
		Reduce greenhouse gas emission					
		Reduce potable				√	√
		water supply		 			
		Citizen's					
		willingness to pay					
		Increase waterside					
		activities					
		Increase public educational					
		significance					
		Increase public					
		activity space					
		Shared ownership,					
Social	Public	management and					
engagement	participation	responsibility of					
engagement	participation	the public					
		Preparedness for					
		and response to					
		extreme weather					
		events					
		Local community					
		participation in					
		water-related					
		planning					

		Organize and carry	
		out community	
		activities	
		Information	$\sqrt{}$
		transparency	
		Water-related	
		business	
		opportunity	
		(industrialization)	
		Assessment of	
		professional	
		capacities.	
	Scientific	Inter-disciplinary,	
	governance	inter-agency	
		cooperation	
		Participation of	
		stakeholders and	$\sqrt{}$
		policy makers.	
		Assessment of	
		leadership	
		capability	
		Multi-sectoral	
		benefits	
		City livability and	
		landscape	
		improvement	
	I Iulaan oo aa	Consider water	
Urban	Urban space	as a major factor	
development	quality	of urban	
	improvement	planning and	
		design	
		Activate blue-	
		green space	
<u> </u>		-	

	Increase vegetation						
	coverage.						
•	Improve city						
	aesthetics						
	Increase						
	recreational space						
	Increase property						
	values						
Public	Construction of multifunctional water-related infrastructure						
infrastructure renewal	Accessibility and affordability of water-related public facilities						
City	Adaptability to extreme weather	$\sqrt{}$	١	1	$\sqrt{}$	$\sqrt{}$	
resilience enhancement	Urban heat island effect mitigation					V	

SWMM - Storm Water Management Model, SUSTAIN - System for Urban Stormwater Treatment and Analysis Integration, MUSIC - Model for Urban Stormwater Improvement Conceptualization, DAnCE4Water - Dynamic Adaption for eNabling City Evolution for Water, UrbanBEATS - Urban Biophysical Environments And Technologies Simulator.