

AN INSIGHT TO SINGAPORE'S ABC WATERS MANAGEMENT STRATEGY



Introduction

The Active, Beautiful, Clean Waters (ABC Waters) Programme is a long term strategic initiative by PUB, Singapore's national water agency, that aims to transform utilitarian canals, drains and reservoirs in Singapore into clean flowing rivers, streams and lakes that blend naturally into the urban environment. The objectives of the programme is two-fold: to (1) create inviting and vibrant spaces around our waterways and waterbodies to bring people closer to water so that they appreciate and cherish our valuable water resource, and (2) to adopt a sustainable stormwater management strategy to detain and treat stormwater runoff close to source before discharging to downstream waterways and reservoirs. This sustainable approach in managing runoff is also termed as Water Sensitive Urban Design (WSUD) in Australia, Low Impact Development (LID) in USA, or Sustainable Urban Drainage Systems (SUDS) in much of Europe.

Under the ABC Waters Programme, PUB has embarked on a journey to harness the full potential of our waters by integrating them with our environment. Over the years, other public agencies and private developers have also embraced ABC Waters design, leading to improvement in water quality, enhanced biodiversity and new recreational spaces for people to get closer to water. The use of ABC Waters design features (environmentally sustainable green features made up of soil and plants) such as rain gardens, bioretention swales, vegetated swales and constructed wetlands will help to minimise the hydrological impacts of urbanised catchments and also safeguard water quality in our reservoirs and waterways.

Workshop Objective

- To provide participants an insight to the Active, Beautiful, Clean Waters concept to manage our stormwater sustainably, while at the same time enhancing our urban environment.
- To give an overview of the principles and applications of ABC Waters design features

Date	: 7 – 9 November 2018
Time	: 9am – 6pm
CPD	: ABC Points, PDU Points
Venue	: IES Academy @ Jurong East
Fee	: Early Bird by 19 October 2018: \$800 excluding GST Regular Price: \$880 excluding GST

Course Outline

Day 1

1. ABC Waters Management Strategies *(2 hours lecture by Mrs Ong Geok Suat)*
 - ABC Waters Programme
 - ABC Waters Design Guidelines
 - Considerations on Safety, Public Health & Maintenance
 - Understand Multi-disciplinary Nature of ABC Waters Management
 - ABC Waters Certification Scheme

2. Integrating ABC Waters Design in Project Planning & Integration of Waterbody Design in Master Plan and Architectural Concept *(1 hour lecture by Mr Owen Wee)*
 - Site Context & Analysis of Existing Site Conditions

3. Integrating ABC Waters Elements into Landscape Planning Strategies & Case Study *(1 hour lecture and site visit by Mr Koh Jiann Bin)*
 - ABC Waters Elements and their Implementation
 - Opportunities: Activities, Aesthetics, Ecology & Bio-diversity, Access & Crossings, Education
 - Case Study & Site Visit (TBC)
 - Design Calculation
 - Soil Specification
 - Plant Selection
 - Maintenance Checklist

Day 2

1. Stormwater Quality & Quantity *(5 hours lecture by Prof Ong Say Leong and another lecturer to be identified)*
 - Stormwater Quality Management
 - Stormwater Quality
 - Storm Water BMPs (Sedimentation basins, Swale / Buffer systems, Bioretention Systems)
 - Hydrology (Stormwater Quantity Aspects) and MUSIC
 - Stormwater Quantity
 - Rainfall Analysis
 - Sea-level Analysis
 - Runoff Estimation
 - Hydraulic Design of Drainage
 - MUSIC
 - Interface, Modelling Approach, Output
 - Applications

2. Alternative Stormwater BMPs - Constructed Wetlands *(1 hour lecture by Dr Michelle Sim)*
 - Introduction to Wetland Treatment Technology (history, benefits and uses)
 - Design of Treatment Wetlands (design features and different types of wetland systems)
 - Pollutant Removal Mechanisms and the Role of Wetland Plants

- Plant Selection and Common Species used in Treatment Wetlands
 - Wetland Monitoring, Management and Maintenance (wetland performance, plant management, water quality monitoring)
 - The use of Wetland Systems in Singapore
3. Cleansing Biotopes & Bio-engineering Techniques (*1 hour lecture by Dr Stephen Tan*)
- Definition, Background, Sense, Use, Function, Technical Details, Construction Method and Maintenance

Day 3

1. Overview and Landscape Design of Swales (*2 hours lecture by Dr Lydia Ma*)
- Overview of Swale
 - Understanding ABC Waters Design Features as Applied to Housing Development, Parks and Streetscape
 - Overall ABC Waters Design and Stormwater Quality Management
 - Landscape Design of Swale
 - Swale in Urbanized Landscape
 - Plant Selection and Common Species used
 - Case Studies on Swales and Buffer Strips
2. Engineering Design of Bioretention Basins and Bioretention Swales (*2 hours lecture by Mrs Ong Geok Suat*)
- Introduction to Bioretention Basins and Bioretention Swales
 - Design Considerations for Bioretention sSstem
 - Step by Step Procedure for Design
3. Soil Specification and Testing (*2.5 hours lecture by Prof Chew Soon Hoe*)
- Soil Considerations for Vegetated Swale
 - Soil Composition and Specification for Bioretention System
 - Soil Testing for Hydraulic Conductivity and Particle Size Distribution for Different Layers in Bioretention System
 - Subsoil Drainage for Bioretention System

Speaker's Profile

Mrs Ong Geok Suat

Mrs Ong Geok Suat graduated with a Bachelor in Civil Engineering from National University of Singapore. She also obtained a Master of Applied Science in Environmental Engineering from University of Toronto, Canada. She has over 20 years of experience in planning and designing both drainage and used waters infrastructure as well as in the operation and management of water reclamation and NEWater facilities. She is currently working in PUB. She is involved in the formulation of ABC Waters Design Guidelines, ABC Waters Certification, ABC Waters Professional Programme and pilot testing of ABC Waters Design features. She is currently involved in the implementation of an ABC Waters Precinct in Punggol East C39, monitoring of ABC Waters pilot projects and applied R&D in catchment characterization and bioretention system.

Mr Owen Wee

Owen Wee has been working in the architecture field since graduating and has been involved in a wide range of projects that include a National Park Board East Coast Park Master Planning, public housing, private housing, competition for Fire stations and Lasalle Arts School. He was involved in a number of large scale projects in China, such as, master planning of Shenyang (Su Jia Tun), Yanlord Guiyang mixed development etc. He was the contract administrator and as well as design and project architect for most of the projects he was involve in while posted to Shanghai for 2 years.

Owen joined Surbana International Consultants in November 2004 and has been working on various projects in Singapore since then. With his vast experience and knowledge in architecture and master planning he has won the SIA GOLD Design Award 2006 for his involvement in the Marina South Pier as well as BCA's Buildability Award 2007 and BCA Barrier Free and Accessibility 2008 for his work for the Sengkang public housing project 'Coris II'. His contractual and project delivery knowledge are also important assets that the company has tapped on by setting up the computerised guide for commissioning of buildings.

Mr Koh Jian Bin

Jiann Bin is the director for consulting at Netatech Engineering and leads a specialist consulting team in design and engineering of integrated solutions for such systems as ABC Waters, stormwater management & detention, rainwater harvesting, non-potable water treatment, and auto-irrigation. He has excellent experience in the projects for condominiums, public housing, as well as institutions. As a landscape architect, Jiann Bin was intensively involved in the design work and site implementation of landscape design for hotels, resorts and condominiums. Jiann Bin is an accredited landscape architect. He is a registered ABC Waters Professional and currently sits on the ABC Waters Programme committee. He is a council member of the Singapore Institute of Landscape Architects, and a member of the Institution of Engineers, Singapore. Jiann Bin holds a master's degree in landscape architecture and a degree in civil engineering. He is also a CUGE Certified Practicing Horticulturist and an ISA Certified Arborist.

Dr Michelle Sim

Dr Michelle Sim obtained her degrees in the field of aquatic sciences and completed her PhD on constructed wetland in August 2007 from Malaysia. She joined PUB in April 2007 and she leads a team of engineers and biologists in monitoring and managing the water quality of waterways and reservoirs and providing technical solutions to improve water quality in waterways. She has 14 years of experience in water pollution control using constructed treatment wetlands and wetland monitoring. Dr Michelle Sim has involved in construction and monitoring of the 200 ha Putrajaya Wetland in Malaysia. In Singapore, she works closely with consultants on the design of wetland systems under the ABC Waters programme and her team is monitoring the performance of many wetland systems.

Dr Stephen Tan Boon Kean

Dr Stephen Tan is currently a Technical Director of AECOM Singapore. He has over 15 years' experience in water resources engineering, covering a broad range from hydrology, hydraulics to water quality. Dr Tan has completed over 20 ABC Waters Projects in Singapore and oversea; with technical experiences on sediment basin, rain garden, soakaway rain garden, bio-retention swale, vegetated swale, wetland and cleansing biotope.

Prof Ong Say Leong

Professor Ong Say Leong graduated from the University of Singapore with B.Eng(Civil Engrg) in 1979. He obtained his MEng (Biochemical Engrg) from the University of Western Ontario in 1980 and PhD (Civil Engrg) from the University of Toronto in 1983. His research interests lie in the study of membrane technology for water and wastewater treatment, water quality enhancement, water reclamation and reuse, modelling of water quality enhancement systems, bio-treatment processes and sustainable urban water resources management.

Prof Ong is a registered professional engineer and has been involved in consulting jobs on water and wastewater treatment system and water quality management. He is also active in the professional circuit and has been serving in several environmental engineering committees and editorial boards for international journals in the area of water environment. Prof Ong is a Fellow of The Institution of Engineers, Singapore and a Fellow of the International Water Association. In addition, he is a Diplomat of the American Academy of Water Resources Engineers (D.WRE) and a Board Certified Member of The American Academy of Environmental Engineers (BCEEM). Prof Ong is currently the Deputy Director (Technology) for the NUS Environmental Research Institute (NERI)

Dr Chew Soon Hoe

Dr Chew Soon Hoe received his PhD from University of California at Berkeley. He is currently an Assistant Professor in the Department of CE, NUS and also holds the position of Deputy Director of the Centre for Protective Technology, NUS. His research interests include geo-synthetics, slope engineering, land reclamation, soil improvement, soil erosion, numerical modelling in geo-technical engineering and geo-environmental engineering. In the past 15 years, he has conducted extensive research on geo-synthetics, especially on the reinforcement, filtration and drainage applications of geo-synthetics material. His other research interests include survivability of geo-textiles, geo-synthetics for erosion control, vertical drains testing and applications. He has been very actively promoting the use of geo-synthetics in civil engineering and construction, and has been engaged as consultant to government agencies and private consultants and contractors on geo-synthetics related projects and construction in this region. He is also actively consulted in general area of geo-technical engineering including slope stability, pile foundation and excavation related problem.

Dr Ma Cheng Yi Lydia

Dr Ma Cheng Yi Lydia is the Deputy Unit Head of Landscape Unit in Housing & Development Board (HDB), which oversees the landscape design in new housing estates as well as estates undergoing upgrading. She received her PhD in landscape architecture from Edinburgh College of Art/Heriot-Watt University in Scotland. Her research on theoretical principles of landscape architecture is the key for her to guide the consultants in achieving quality landscape design. Since she joined HDB in 2007, she has been actively practicing ABC waters design approach. She initiated the design of vegetated swale drainage for the park of Greenwood Sanctuary @ Admiralty, which was awarded the inaugural ABC Waters Certificate for completed project.

Dr Lydia has participated in PUB's pilot rain garden in HDB's Balam Estate. She has been equipped to design bioretention swale by PUB's consultant Prof Tony Wong, through the workshops and the pilot projects done in Balam Estate and Sengkang. Her first bioretention design was constructed in Dawson as a pilot project accommodating tree planting between bioretention swales. She is devoted in promoting quality landscape in public housing through the creation of an environmental-friendly and sustainable green home for people to live, work and play.

TERMS & CONDITIONS COURSE REGISTRATION

Registration

Registration will be on a *first-come-first-served basis* and will only be confirmed upon receipt of full payment by Engineers Singapore Pte Ltd.

Closing Date & Payment

The closing date of the event will be 1 week prior to event commencement date or earlier. Cheques should be crossed 'A/C payee only' and made payable to **Engineers Singapore Pte Ltd**, with the ***Title of The Event indicated clearly written on the back of the cheque***, and submitted with the duly completed registration forms to:

Att: _____

IES Academy@Jurong East

Devan Nair Institute for Employment and Employability,
80 Jurong East Street 21, #04-10
Singapore 609607

Confirmation of Registration

Confirmation of registration will be given at least 1 week before the commencement date via email. *If you do not receive the said confirmation email, you are required to contact IESA at 6463 9211 during office hours.* IESA reserves the right to allow only confirmed registrants to attend the Event.

Withdrawals/Refunds of Fees

Written notice *at least 1 week in advance* before the commencement of the event. Full course fee shall be refunded subjected to 4.5% transaction charge. NO refund otherwise. No show of participant would not be accepted as a valid reason for withdrawal/refund. One time replacement is allowed only if written notice is received by us at least 1 week before the commencement of the event. However, when an IES member is replaced by a non-member, the participant has to pay the difference in the relevant fees.

Cancellation/Postponement

Changes in Venue, Dates, Time and Speakers for the Events can occur due to unforeseen circumstances. IES reserves the full rights to cancel or postpone the Event under such circumstances without prior reasons. Every effort, however, will be made to inform the participants or contact person of any cancellation or postponement. Fees will be refunded in FULL if any Event is cancelled by IESA.

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I consent to the processing by Institution of Engineers, Singapore of personal data, including sensitive personal data as defined in the Data Protection Act 2014, about me for the proper purposes of Institution of Engineers, Singapore (IES). I undertake to observe the provisions of the Data Protection Act 2014 in relation to any personal data I may myself hold and process as a Members of Institution of Engineers, Singapore, and I agree to indemnify Institution of Engineers, Singapore from liability for any claims or damages that may arise from the processing of this data. For more information kindly refer to: www.ies.org.sg/PDPA.

Enquiries

For further enquiries, please contact IESA general office at Tel: 6463 9211.