

# Water Forum 2018

## Summary Report



### Introduction

Water Forum 2018 was the flagship event of Friends of the Earth (HK) Charity Limited (FoE (HK)). It was the fifth forum since its successful inauguration in Shenzhen in 2014. The theme of the forum was “*Sponge City and Coastal Defence against Extreme Weather Events*”. We invited speakers from government departments, academia, and the business sector. They covered content from potential threats of extreme weather and climate change on water resilience, to water management strategy and long term action plans for fighting climate change. It was an inspiring platform where the best minds met to exchange the latest insights on water security under growing climate change challenges.

The forum was held on 22 March 2018 at the Zero Carbon Building in Kowloon Bay, Hong Kong. With the support of the government in the form of the Drainage Services Department (DSD) and Water Supplies Department (WSD), and other professional associations, the forum was well-received. About 150 industry leaders, professionals, scholars, and NGO partners joined the event. Below are some highlights of the forum:

- FoE (HK) Chairman, Mrs. Mei NG welcomed all the speakers, VIP guests, and audience at the opening speech.
- The Director of the Drainage Services Department, Ir. Edwin Ka Hung TONG, JP, was the event’s officiating guest. He delivered the officiating speech, outlining the strategy of DSD in helping Hong Kong adapt to and mitigate climate change.
- FoE (HK) Head of Research, Development and Strategy, Dr. Jeffrey Hung gave an introductory remark on what Hong Kong should do for climate change.



*Ms. Mei Ng giving the welcoming speech*



*Officiating speech by Director of Drainage Services*



*Introductory remarks by Dr. Jeffrey Hung*



*Group photo of speakers and distinguished guests*

- Impacts of climate change and extreme weather on Hong Kong were discussed by Mr. LAI Sau Tak Edwin, Assistant Director of the Hong Kong Observatory.
- Prof. Chris ZEVENBERGEN from the Water Engineering Department of IHE Delft, the Netherlands, presented his experience and wisdom gained from combating flooding challenges in various countries.
- Prof. Wu Xiaoming from the Pearl River Hydraulic Research Institute presented the strategy of climate preparedness in the Pearl River estuary.
- Ms. Phyllis LI, Deputy Director of the Planning Department, presented the green and blue space conceptual framework under Hong Kong 2030+ development.
- Mr. LAI Cheuk Ho, Deputy Director of Civil Engineering and Development Department, gave an overview of the design of coastal structures and resilience of critical infrastructures in Hong Kong.
- The first panel discussion was hosted by Dr. Vivian WONG TAAM Chi-woon, board member of FoE (HK), on the topic “*What Kinds of Challenges are We Facing in These Coastal Districts with More Frequent Extreme Weather Events? Can We Survive?*”, which generated debate among panelists as well as the audience;



*AM Panel Discussion*

- Sponge city progress in Mainland China was discussed by Professor CHE Wu, of the Beijing University of Civil Engineering and Architecture.
- Ir. Dr. David GALLACHER, Executive Director of Environment Hong Kong, AECOM, presented his international experiences and best practices for urban surface water management
- Mr. ZHU Jialin, Director of Guangdong Huayu Eco-City Water Resources Research Institute, gave an overview of the sponge city deployment in southern China.
- Chief Engineer of the Drainage Service Department, Ir. LAU S.C. Edwin, presented the application trail of flood resilience in Hong Kong.
- Mr. CHUNG Siu Wing, Joseph, Chief Engineer, Water Supplies Department, discussed the water resilience development of Hong Kong.
- Mr. Tony IP hosted the afternoon panel discussion on the topic *“How Can a City Fully Adopt Sponge City Approach for its Master Development Plan?”* The discussion provoked important points from the participants and thoughtful questions from the audience.



*PM Panel Discussion*

- We extend our gratitude to our voluntary emcees, Mr. Simon Frusher

and Ms. Cynthia Wong of Morgan Stanley.

## **Objectives**

The objective of Water Forum 2018 was to construct a platform for different stakeholders – all concerned about extreme weather events, their increase due to climate change, and their impact on the Greater Bay Area – to exchange insights, experiences, and opinions. We hoped to arouse awareness of the dangers of extreme weather events, which are exacerbated by climate change, as well as hear from industry professionals and academics about new infrastructure developments and strategies, such as “sponge city”, that Hong Kong and other cities could use to combat the growing threat of extreme weather events. Further emphasis was placed on climate change, as its potentiating effect on extreme weather events poses extra social, economic and environmental risks to human settlements in the Greater Bay Area, meaning that city planning must account for the weather modifications brought about by climate change.

## **Forum Theme**

This year marks the 5<sup>th</sup> Water Forum organised by FoE (HK). The theme of the 2018 Forum was “*Sponge City and Coastal Defence Against Extreme Weather Events*”. With the help of the DSD in co-organising, and the Water Supplies Department (WSD) as a strategic partner, we were able to hear from a wide range of experts from academia, industry, and government about the threats we face in the Greater Bay Area from climate change-enhanced extreme weather events, as well as how we can combat them, from both city planning and infrastructure perspectives.

## **Summary of Speeches**

Speakers delivered their speeches and shared their insights with all participants on various topics under the overarching theme of *Sponge City and Coastal Defence against Extreme Weather Events*. Below are the summary of their speeches.

### **Speech 1 (Keynote): Impacts of climate change and extreme weather events to Hong Kong presented by Mr LAI Sau-tak, Edwin, Assistant Director at the Hong Kong Observatory**

Summary: Mr. LAI discussed the high CO<sub>2</sub> concentration of our atmosphere; it has reached 400ppm; the last time this happened was 2-3 million years ago, where the mean sea level was 10-20 metres higher. Sea level is rising, and ice sheets are retreating. This led to events such as Super Typhoon’s Hato and Haiyan, as well as an enhanced hydrological cycle leading to an increase in extreme rainfall. In Hong Kong, climate change will cause more extremely hot days, fewer cold days, more extreme rainfall and a rising sea level. Mr. LAI emphasised that this could cause a decreased return period of extremely high maximum sea levels, affecting areas such as Quarry Bay, which was flooded to chest height in 2008 and 2017, during Typhoon’s Hagupit

and Hato, respectively. Increase in extreme rainfall also has the consequence of increasing landslide risk. Certain low-lying areas, like Oi Tung Estate, including three exits of the Shau Kei Wan MTR, could be flooded, emphasising that the problem of more extreme weather events is something that could affect our daily lives.

**Speech 2 (Keynote): Experience and Wisdoms on Fighting Flooding Challenges from Climate Change and Extreme Weather Events by Prof. Chris ZEVENBERGEN, Water Engineering Department of IHE Delft, the Netherlands**

Summary: Professor ZEVENBERGEN's presentation demonstrated the challenges presented by floods, as well as possible solutions, both emerging and existing. Storm surge barriers in the Netherlands were shown as case studies. The challenge of uncertainty in the face of climate change was discussed, as it leads to two distinct strategies: waiting for scientific consensus to best prepare, or preparing for the absolute worst scenario. Both of these strategies' advantages and disadvantages were discussed, and consequently, a shift from a risk-based approach — a reduction of extreme events by hardening of infrastructure systems — to a resilience-based approach was advocated, as a resilience-based approach involves using flexible infrastructure to respond to low probability, high-impact disruptions such as large typhoons.

Examples of risk-based approaches (The Netherlands Delta Plan 1.0) and the new resilience-based approaches (Delta Plan 2.0, Copenhagen Cloudburst Management Plan) were shown and discussed, as well as the unproven nature of Green Infrastructure, which needs more research and innovation. Professor Zevenbergen also advocated an increase in funding for science and innovation in information systems, as these would help us predict and anticipate flood events instead of wantonly building seawalls and other hard infrastructure.

**Speech 3: Coastal and Fluvial Defence around Pearl River Estuary: Strategy for Climate Preparedness by Professor WU Xiaoming, Deputy Chief Engineer, The Pearl River Hydraulic Research Institute**

Summary: Professor WU discussed the Pearl River Delta (PRD) region; its large economy, inherently complex river system, and rich biodiversity were all touched on. Professor WU demonstrated that the PRD region is suffering from various water issues, including urban water management, water security, floods, pollution and ecological protection. Both short-term and long-term solutions were suggested, including pumping stations and flood barriers for now, and seawalls in conjunction with tide gates to manage sea level rise in the long-term. The Pearl River Estuary Comprehensive Management Plan was discussed. Cases of flooding in Macau and Hong Kong were also talked about. These included torrential rains and overtopping. Professor WU also discussed how in large-scale engineering projects, such as the HK-Zhuhai-Macau Bridge, need to take into account how they affect the water around them, for example in terms of blocking water flow.

**Speech 4: The Opportunity of Tackling Climate Change – The Green and Blue Space Conceptual Framework under Hong Kong 2030+ by Ms. Phyllis LI, Deputy Director of Planning/Territorial, Planning Department**

Summary: Ms. LI focused on the opportunities that we could take in Hong Kong under the future climate change regime, based on three key planning initiatives; creating and regenerating environmental capacity, a smart, green and resilient city strategy, and green and blue space planning. Environmental capacity can be increased by retrofitting degraded urban areas while simultaneously optimising development to be green as possible in new areas. Ms. LI emphasised that we have vast green and blue assets, i.e. 737 km<sup>2</sup> of woodland/shrubland/grassland/wetland for green assets, and Victoria Harbour, Lam Tsuen River, HK Wetland Park and High Island Reservoir for blue assets. These green and blue assets provide valuable advantages to us, by acting as carbon sinks, moderating the urban heat island effect, providing habitat and water catchment, and regulating water flow.

Ms. LI hopes to create a “green and blue asset system network” whereby the assets are protected and integrated into new planning and developments, and green and blue infrastructure is developed simultaneously. Case studies in Hong Kong were shown, such as Hung Shui Kiu New Development Area. The potential for green-blue networks in the wider Pearl River Delta region was also touched upon.

**Speech 5: Implication of Climate Change on Design of Coastal Structures and Resilience of Critical Infrastructures in Hong Kong by Mr. LAI Cheuk-ho, Deputy Director of Civil Engineering and Development, Civil Engineering and Development Department (CEDD)**

Summary: Mr. LAI’s presentation focused on three areas: port development in Hong Kong, climate change effects on Hong Kong, and our adaptations to said effects. Seawalls and breakwaters are often overtopped, and low-lying areas like Tai O are flooded. Furthermore, damage to pier facilities is often recorded. Climate change will have an amplifying impact on storm surges due to sea level increase, and stronger winds will also result. To this end, the CEDD will review the climate change situation in Hong Kong focusing on storm surges and wind speeds, study the implication of climate change on the design of coastal structures, and will continually update the Port Works Design Manual (updates began in January 2018) to take into account the effects of climate change and its associated uncertainties; for example, when the IPCC publishes a new report, or new climate change parameters are released by the Hong Kong Observatory. Mr. LAI demonstrated that, the higher the sea level, the higher the risk of wave overtopping. This, in conjunction with storm surges, will lead to more severe flooding. Furthermore, with stronger winds, waves will be larger, and their effect on coastal structures will increase.

Critical infrastructure such as police stations, typhoon shelters and water treatment works will be upgraded accordingly, with reinforcements such as crest wave walls, breakwaters, wave walls, and more as possible solutions. Mr. LAI emphasised the site-specific approach to adapting to sea level rise, suggesting that a matrix of public

safety, valuation of assets, land use and risk of flooding will influence strategies at different sites, such as retreating from the shoreline or installation of hard infrastructure. Lastly, case studies of improvement works at Tai O were shown, and the formation of the Climate Change Working Group on Infrastructure (CCWGI), which serves to coordinate efforts and carry out studies among government departments to enhance adaptation capacity to climate change, was discussed.

**Panel discussion #1: What Kinds of Challenges Are We Facing in These Coastal Districts with the More Frequent Extreme Weather Events? Can We Survive?**

**Participants: Mr. LAI Cheuk-ho, Ms. Phyllis LI, Prof. WU Xiaoming, Prof. Chris ZEVENBERGEN, Mr. LEE Sai-ming**

**Moderator: Dr. Vivian WONG TAAM Chi-woon, Board Member of Friends of the Earth (HK)**

Summary: The effects of climate change on transport were discussed by various participants, and negative consequences, such as the possibility of flooding of the MTR and certain roadways, public areas and coastal areas (e.g. Eastern Hong Kong Island) were reflected upon. Some ideas to prevent transport being affected by flooding were floated, including elevating the MTR entrances, as has been done in Mainland China. Mr. LAI emphasised the importance of upgrading coastal infrastructures including port infrastructure, as the heavy machinery and large containers need to be managed safely in order to protect port workers, and for the ports of Hong Kong to remain a key shipping hub. Ms. LI focused her discussion on the importance of blue-green infrastructure for urban planning, as it might lead to a spongier city that can reuse more of its excess water.

**Speech 6 (Keynote): Sponge City Development and Progresses in Mainland China by Professor CHE Wu, Beijing University Of Civil Engineering And Architecture**

Summary: Professor CHE focused on the objectives, typical engineering projects, and examples of systematic implementation of sponge cities. A total of 30 pilot sponge cities in China have been designated over two phases in 2015 and 2016 respectively, with the third upcoming phase consisting of carrying out sponge city initiatives on a national scale. It was during 2015-16 that the Sponge City Development Technical Manual was published, and the performance evaluation and assessment methods of sponge city development were devised. Since there are a wide variety of issues sponge cities are meant to contend with in China, ranging from drought and groundwater shortage to flooding and pollution of waterways, there is a varying degree of success in the effectiveness of sponge city measures in the pilot cities, as they themselves have very different weather conditions. Professor CHE emphasised that although the “sponge city” initiative itself is new, there are pre-existing “sponge communities” that operate without stormwater sewers in China, for example in Beijing, in operation since 2001. Another example given was Shenzhen’s Vanke Centre, a LEED-platinum certified building with green stormwater and rainwater harvesting facilities. Professor CHE also discussed the use of bio-retention, wetlands for retention and natural restorations in sponge city developments in Xixian and Chizhou.

Typical engineering projects in a sponge city were discussed, including drainage and flood control, low-impact development (LID), river flood control, wastewater treatment, green roads, wetland protection and restoration, and landscape architecture. The overarching aspects of sponge city that lead to its success were detailed to be source control via LID, flood control, bio-restoration and synergy between grey and green infrastructure. Professor CHE concluded by advocating a multi-target systematic approach to engineering, synergy between green and grey infrastructure as well as between source and end-of-pipe control, short/long-term plans, and sustainability of design, construction and maintenance practices.

**Speech 7 (Keynote): Urban Surface Water Management - International Experience and Best Practice by Ir. Dr. David GALLACHER, Executive Director, Environment Hong Kong, AECOM**

Summary: Ir. Dr. GALLACHER concentrated his presentation on the key issues surrounding urban water management, such as pollution, altered hydrology, flood control, and climate change. He discussed the necessary shift from current urban water balance to “Water Sensitive Urban Design” (WSUD) water balance, which includes measures for reducing runoff, wastewater discharge and potable water use, and increasing stormwater reuse, evapotranspiration, and infiltration. The methods for achieving WSUD include sustainable drainage systems (e.g. Broadwater Parklands, Gold Coast, Australia), innovative coastal planning and design, and river/wetland restoration (e.g. Kai Tak Nullah in Hong Kong).

Dr. GALLACHER emphasised the “triple bottom line” of urban surface waters: proper management of urban surface waters should maximise direct and indirect environmental, social and economic benefits. These include potential ecological value, flood management, erosion control, carbon sequestration, reduction of urban heat island, etc. for environmental benefits; public enjoyment, walkability, improved health and education opportunities for social benefits; and direct employment, increased land and property value, private sector investment and numerous “avoided costs”, such as for storm water damages, for economic benefits. The Hong Kong Biodiversity Strategy and Action Plan (BSAP) is a possible catalyst for increased attention towards ecological benefits.

Many case studies were shown by Dr. GALLACHER, including river restorations in the UK, coastal planning and design in New York, USA, to Sustainable Drainage Systems in Australia. Best practices and their applications in Hong Kong were discussed; technical solutions such as WSUD in Shui Chuen O Estate, the bio-retention system planned for Anderson Road Quarry, a residential development site housing a planned population of 25,000 and the Tung Chung East Seawall were shown. Lastly, Dr. GALLACHER discussed the best practices for going forward in Hong Kong. These included setting objectives and data acquisition at a high standard, monitoring of sensitive sites in conjunction with adaptive management, collaboration amongst government departments, and multi-disciplinary design and construction. Dr. GALLACHER particularly emphasised the importance of co-operation amongst

landscape architects, engineers, ecologists, engineers in order to manage urban surface water in a way that satisfies the triple bottom line.

**Speech 8: Sponge City Rollout and Deployment in Southern China by Mr. ZHU Jialin, Director, Guangdong Huayu Eco-City Water Resources Research Institute; Chairman, CRWT Technology Development Co. Ltd.**

Summary: Mr. ZHU began by discussing the large “biological debt” we have accumulated by the rapid urbanisation in China. He then discussed the ways we can combat this by ensuring that development of new areas somewhat mimics the function of a natural green environment. Examples were shown, like Guangzhou Canton First Estate, which utilises rain gardens, ecological purification systems, and wetlands to counter 1-in-50 year droughts and floods, while enhancing the ecological value of the landscape. Mr. ZHU also discussed Huiyang Palm Island, which uses a permeable landscape, rainwater storage and drainage system to deal with heavy and frequent floods and reuse the water for irrigation.

Mr. ZHU also discussed patents from CRWT Technology, which include recessed parks that serve as recreational areas for human enjoyment in dry times, and retention ponds during floods, and micro-ecological artificial wetlands that can be built into parks and provide habitat for species. Other patents include ecological rainwater systems for streets (sponge roads that allow infiltration and subsequent storage) or building rooftops, and a smart car wash that reuses collected water from the sponge system. Like other speakers, Mr. ZHU emphasised the site-specific nature of sponge city development, honing in on the diversity of weather conditions experienced by pilot sponge cities in China, and reiterating that the progress of sponge cities is not meant to happen overnight.

**Speech 9: Building Flood Resilience for Adaptation to Climate Change and an Application Trial in Hong Kong by Ir. LAU S. C., Edwin, Chief Engineer/Land Drainage, Drainage Services Department (DSD)**

Summary: Ir. LAU began by pointing out the combined danger of storm surges coupled with high tides to low lying areas like Tai O and Heng Fa Chuen. He reiterated that climate change would lead to increased extreme rainfall events and thus risk of flooding. Ir. Lau presented on the DSD’s “three-pronged approach” to deal with increased stormwater, consisting of upstream interception of water by drainage tunnels, midstream storage with an underground storage tank of 100,000m<sup>3</sup> capacity, and downstream upgrades to drainage pipes and river channels. Since the effect sizes of climate change are highly uncertain, Ir. LAU suggested that grey infrastructure on its own is not enough to combat the growing threat. The introduction of green-blue infrastructure was proposed to be the answer; therefore a variety of revitalisations and developments are planned.

Ir. LAU discussed that, with the core objective of flood prevention in mind, blue-green infrastructure will be and have been developed in a variety of forms. Existing examples include lakes as retention ponds, as constructed in Shenzhen River, green

channels in Lam Tsuen River constructed with ecological monitoring and translocation of species during construction times to maintain ecological value, construction of eco-ponds and planting of local aquatic plants, as in Kwan Tei River, and river revitalisations, such as Lower Lam Tsuen River, which used to be concrete and dry. Future projects include revitalisation of Tsui Ping River, and the development of Anderson Road Quarry site, which includes a stormwater attenuation lake, bioswales, grey water reuse, green roofs, solar panels, porous pavements, and other spongy developments. Furthermore, blue and green elements are planned for New Development Areas, which includes Kwu Tung North, Fanling North, Hung Shui Kiu, Kam Tin South, Yuen Long South, Tung Chung, and the East Lantau Metropolis.

Ir. LAU called for a roadmap and implementation framework to steer Hong Kong's resilient blue-green development, citing Copenhagen's CPH2025 Climate Plan and Cloudburst Mitigation Plan as examples to follow.

**Speech 10: Climate Change - Water Resilience Development of Hong Kong by Mr. CHUNG Siu Wing, Joseph, Chief Engineer / Development (2), Water Supplies Department (WSD)**

Summary: Mr. CHUNG discussed three key water aspects in Hong Kong; water supply, its challenges, and building up water resilience. He emphasised the competing demand for scarce water resources and noted that water rationing has taken place in Hong Kong in the past. Our three-pronged supply currently consists of Dongjiang water (52%), local yield (26%) and seawater flushing (22%). Mr. CHUNG emphasised the necessity of increasing our resilience in the face of climate change, as it may impact the Dongjiang water source. To this end, the WSD has implemented a "Total Water Management" (TWM) strategy to constrain the growth of water demand through conservation and strengthen water supply management by developing alternative resources.

Mr. CHUNG suggested co-operation between NGOs, schools, catering and hotel businesses, and the government is key in reducing demand for water. He also presented a "soft and hard" approach to attenuating water demand from the public. This approach combines promotional and educational efforts (soft), such as the Water Conservation Week, Water Education Resources Centre, and the Best Practice Guidelines for Hotel & Catering manuals, with use of water-saving devices (hard) such as flow controllers and the Voluntary-to-Mandatory Water Efficiency Labelling Scheme that would see the existing voluntary nature of the scheme move to a mandatory one. Mr. CHUNG also detailed the Water Intelligent Network (WIN) of the WSD, which is expected to reduce water loss and mains burst via active leakage control, pressure management, replacement and rehabilitation of aged water mains, and pressure management, facilitated by data collection and monitoring of the pipelines themselves.

Lastly, Mr. CHUNG discussed three new climate-resilient water resources that we could use; desalinated seawater, reclaimed water, and recycled grey

water/harvested rainwater. Examples of these include Tseung Kwan O desalination plant, Shek Wu Hui Treatment Works (convert water from treated sewage effluent and supply for non-potable use for Sheung Shui and Fanling from 2022 onwards), collecting grey water from sewage and processing in a centralised government treatment plant (tentative), and rainwater harvesting in green government buildings such as the WSD's New Territory West Regional Office cum Water Resources Education Centre.

**Panel discussion #2: How Can a City Fully Adopt Sponge City Approach for its Master Development Plan?**

**Participants: Mr. CHUNG Siu Wing, Joseph, Ir. LAU S. C., Edwin, Mr. ZHU Jialin, Ir. Dr. David GALLACHER, Prof. CHE Wu**

**Moderator: Mr. Tony IP, Vice Chairman of Hong Kong Architecture Centre**

Summary: Professor CHE suggested that neighbourhoods in cities with local waterways could benefit from revitalisations of said local waterways and their conversion into true green infrastructure would provide social and ecological benefits to the residents.

Mr. ZHU emphasised that the difficulty of creating a sponge city often lies in whether it is development or re-development work that is being done, as developments can be done on a large-scale with a comprehensive plan, whereas re-developments are often limited to retrofitting and working with whatever space is left, both of which do not provide as many sponge city features as an area that has been designed as a sponge city from the start. Mr. ZHU also emphasised the importance of “reforming” people to realise the true value of water, and said that much needed to be done in schools to ensure the next generation has an adequate value perception of water resources.

Ir. Dr. GALLACHER took the opportunity to discuss his company, AECOM, to demonstrate that private developers and businesses can take measures and aim for sponge city developments of their own accord. Dr. GALLACHER emphasised that sponge cities are technically not difficult, and many of the implementations have been tested and used in various countries. He sees lack of co-ordination among different stakeholders as the most important barrier to sponge city development on a wide-scale, more so than funding or technical issues, as funds are plenty and technical issues are few, at least with existing sponge city technology.

Ir. LAU and Mr. CHUNG both emphasised the danger of climate change as one of our biggest challenges to face, and lamented the lack of a complete plan for sponge city implementation in Hong Kong. Mr. CHUNG drew attention to the overtly commercial nature of Hong Kong, saying that we must be prepared to sacrifice increased capital and running costs in order to gain greater safety and resilience against climate change, and they both called for government departments to collaborate to renew old safety standards. Ir. LAU also agreed with an audience member's suggestion that the excess rainwater collected in upstream DSD storage tanks during heavy rainfall events should be re-used for flushing and other non-potable uses, instead of simply

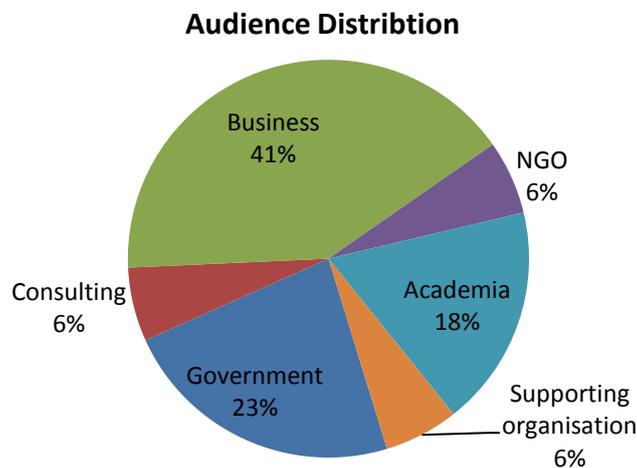
being flushed out to sea. Mr. CHUNG also agreed that since reverse osmosis desalination technology is well-proven, the WSD should supplement the existing reverse osmosis plant in Tseung Kwan O with a new one.

Mr. ZHU then reminded the audience that degrees of success of the pilot sponge cities in China vary greatly, and the difficulty of promotion to the public was touched upon. Lastly, Mr. ZHU stated that a realistic timeline of sponge city implementation has a minimum of 10 years, reaching up to 30 years. He noted that increased public engagement regarding flooding and the possibility of using sponge cities to solve the problem, combined with government co-operation, would reduce implantation time, as public pressure on the government and businesses could lead to faster adaptation times.

The participants discussed barriers to increasing sponge city developments in Hong Kong; these included lack of interdepartmental co-operation, lack of unifying goals across government departments, lack of political will, site-specific nature of developments resulting in slow progress as different departments need to be involved in different sites, and lack of overarching plan for sponge city implementation in Hong Kong.

## Audience

There were 109 participants at Water Forum 2018; including the speakers, VIP guests and FoE (HK) staff, there were around 150 people total.



The makeup of the audience shows that the Water Forum was appealing to different stakeholders. The photo below shows the scene at the Forum in the AM session.



*Full house at the Forum*

## **Acknowledgement**

FoE (HK) appreciates the supports and helps from the parties listed below:

### **Co-organiser:**

Drainage Services Department



### **Strategic partner:**

Water Supplies Department



### **Sponsor:**

Dunwell Group



### **Supporting Organizations:**

(In alphabetical order)

CIWEM Hong Kong – Chartered  
Institution of Water and Environmental  
Management



HKGBC – Hong Kong Green Building  
Council



HKIE – Hong Kong Institution of  
Engineers (Environmental Division)



## Appendix I Distinguish Speakers

FoE (HK) invited distinguished speakers on 22 March to meet with the audience and share their views, experience and insights on sponge city and coastal defence against extreme weather events at the Water Forum 2018. These distinguished speakers' short introductions and highlights are shown in the table below.

 <p>Mr. LAI Sau-tak, Edwin</p>	<p>Mr. LAI Sau-tak, Edwin is a Fellow of the Hong Kong Meteorological Society, and is a Fellow and Chartered Meteorologist of the Royal Meteorological Society since 2005. He graduated from the University of Lancaster with a Bachelors in Environment Science and from the University of Reading with a Masters in Meteorology. Mr. LAI joined the Hong Kong Observatory as Scientific Officer in 1986. He later became Assistant Director in 2012, and is currently looking after matters relating to development, research and administration. Mr. LAI has decades of experience in operational forecasting, tropical cyclone analysis and research, development of operational forecasting systems, public weather services, and climate services and studies. He has international consultancy experience under both World Meteorological Organization (WMO) and UNESCAP/WMO Typhoon Committee.</p>
 <p>Prof. Chris ZEVENBERGEN</p>	<p>Prof. Chris ZEVENBERGEN is professor at the Water Engineering Department of IHE Delft and at the Department of Hydraulic Engineering, Faculty of Civil Engineering of the TuDelft, The Netherlands. He is a visiting professor at the Southeast University (SEU) , China. He is also Project Director of DeltaCap, a Capacity Development Program funded by the Dutch Government to support the implementation of the Delta Plan in Bangladesh, and of AFMA, a seven years SWF program to develop and implement Anticipatory Flood Risk Management in Alexandria, Egypt. As of 2016 he is advisor of Bax &amp; Company (Barcelona, Spain), a leading European innovation consultancy. From 1999 to 2012 he was Director Research and Development and member of the Management Team of the Dura Vermeer Group NV, one of the largest contractors in The Netherlands. He was a Member of the Board of the Public Private Innovation Platform Clean Tech Delta, The Netherlands in 2013 and 2014.</p> <p>In the past 20 years he has accumulated extensive national and international experience with integrated approaches to manage floods in urban environments. His research interest is specifically on (i) innovative concepts to mitigate urban flood impacts, (ii) on flood proofing building designs and technologies and (iii) on decision support tool development in urban planning with practical application in urban flood management. He has a strong affinity with the ecological, socio-economic, institutional aspects of urban planning and water management. He has worked extensively on application of theories of resilience to flood risk management systems, including the theory of socio-ecological resilience.</p>



Prof. WU Xiao-ming  
吳小明教授

Prof. WU Xiaoming is deputy chief engineer of the Pearl River Hydraulic Research Institute. He is also the chief expert of the Pearl River Estuary Coast Engineering Research Center of the Ministry of Water Resources of PRC. He is a part-time lecturer at the North China University of Water Resources and Electric Power, and a doctoral advisor at the Graduate School of Hohai University. He is an emergency management specialist for the Guangdong Province.

WU is mainly engaged in research related to estuarine coastal engineering and coastal city water. He has participated in several major hydraulic engineering research projects such as the Hong Kong-Zhuhai-Macau Bridge, Guangzhou Nansha Port, Zhuhai Gaolan Port, Shenzhen Dachan Port, and Lingdingyang channel. He has extensive knowledge on the hydrodynamics and water environment of the Pearl River Estuary.

WU has reviewed more than 300 scientific research projects, published over 40 papers, and edited two monographs. His research has won eight provincial and ministerial awards, and he owns two invention patents and five utility model patents. His main research achievements includes: composite simulation technology of the Pearl River Estuary's complex dynamic process, Qianhai Cooperation Zone water system planning, multi-scale hydrodynamic control method for water environment management of tidal rivers in the Pearl River Estuary, current flood control capacity and countermeasures in the Shenzhen River, sedimentation behaviour and countermeasures of interflow interception in box culverts, hydrodynamic control of Hengqin, Zhuhai Beautiful Bay construction planning, and Guangzhou deep tunnel engineering research.



Ms LI Chi Miu,  
Phyllis, JP

Ms. LI Chi Miu, Phyllis, JP is a Fellow of the Hong Kong Institute of Planners and Member of the Royal Town Planning Institute. She joined the Hong Kong Government in the 1980s and has been involved in new towns, district planning, strategic planning, major development projects, and planning and engineering studies. At present, she is Deputy Director of Planning/Territorial of the Planning Department overseeing Hong Kong 2030+ (updating of the territorial development strategy), cross-boundary planning, Lantau Development Strategy, New Development Areas in Northeast NT, Hung Shui Kiu, Yuen Long South and NT North, and the central technical services for the Department.



Mr. LAI Cheuk-ho

Mr LAI Cheuk-ho graduated from the University of Hong Kong in 1984. After obtaining professional qualification in civil engineering, he joined the Hong Kong Government as an Engineer in 1991. He has served in the Development Bureau, Drainage Services Department and Civil Engineering and Development Department (CEDD). He has been involved in port works, reclamation, sewerage and sewage treatment, and other infrastructure projects as well as formulation of works policies and the blueprint for Lantau Development. He is at present the Deputy Director of the CEDD.



Prof. CHE Wu  
車伍教授

Prof. CHE Wu is a professor of Beijing University of Civil Engineering And Architecture. He is also a committee member of Green Building Council (China GBC), and a committee member of the Committee of Landscape Architect of China GBC. His main research areas are urban rainfall and flood control and utilization, sponge city, water environment protection and restoration, and new drainage systems. In recent years, he has published more than 100 academic papers in different areas, such as the public-private partnership (PPP) for sponge city projects. In addition, he participated in various large project design and implementation in Beijing and Tianjin, accumulating lots of excellent case studies on sponge city projects.

In the early years, CHE studied in Karlsruhe University in Germany, and worked and conducted research in BASF's Wastewater Treatment Plant. He has won the Beijing Science and Technology Award, and owns two national invention patents and utility model patents.



Ir. Dr. David  
Gallacher

Dr. David Gallacher is an environmental consultant with over 20 years professional and academic experience. He has a PhD in freshwater ecology, and has worked on a wide range of project types including environmental planning and design, water sensitive urban design, ecological assessment and monitoring, habitat creation and land remediation. David has worked on numerous river revitalization, wetland design and sustainable urban drainage projects in Hong Kong and across Asia.



Mr. ZHU Jialin  
朱加林先生

Mr. ZHU Jialin is the director of the Guangdong Huayu Eco-City Water Resources Research Institute and the chairman of CRWT Technology Development Co. Ltd. He also holds various positions in professional associations, including director of the Southern Research Society of Soil & Water Conservation, executive director of the Guangdong Engineering Consultant Association, executive director of the Guangdong Environment Protection Industry Association, director of the Guangdong Hydraulic Engineering Society, director of the Guangdong Provincial Society of Soil and Water Conservation, vice chairman of the Guangzhou Municipal Engineering Association and director of the Rain Flood Management Committee, chairman of the South China Sponge City and Water Eco-Industry Innovation Alliance, chairman of the South China Rivers and Lakes Ecological Management Technology Innovation Alliance, permanent member of the International Rainwater Catchment Systems Association.

ZHU is one of the early advocates and promoters of sponge city in China. He has long been focused on the development and application of water environment management and low-impact development technology. He owns the independent intellectual property rights of "CRWT Intelligent Rainwater Resource Management" and aquatic ecological control technologies, winning 13 national invention and utility model patents. These innovations were used in projects like the Guangzhou Asian Games City and helped achieve social and economic benefits. Zhu is appointed by Shaoguan People's Government as one of

	<p>their water ecology experts. In 2014, he received the third prize on science and technology from People's Government of Guangdong Province.</p>
 <p>Ir. LAU S. C., Edwin</p>	<p>Ir. Edwin LAU is a civil engineer by profession and worked as an engineer in the Drainage Services Department (DSD) as an engineer in 1995. Mr. LAU obtained his master degree in Civil Engineering (Construction Management) in 1996 and Environmental Management in 2003. During his services, he has been involved in various stages of planning, design and construction of new drainage and sewerage works in DSD, and new development area projects in the Civil Engineering and Development Department. Mr. LAU is currently overseeing the Land Drainage Division of DSD, including review of drainage master plans, research &amp; development projects and climate change issue for the department.</p>
 <p>Mr. CHUNG Siu Wing, Joseph</p>	<p>Mr. CHUNG Siu Wing, Joseph is an engineer by profession. He has gained various exposures in the Highways Department, Transport Department and Development Bureau. He has been involved in the area of planning and contract administration of highway engineering projects, transport and traffic engineering matters, as well as formulation of works policies. Mr Chung joined the Water Supplies Department in 2016 and is currently overseeing the total water management strategy, promotion of water conservation and development of new water resources in Hong Kong.</p>

## Appendix II Programme Rundown

### Water Forum 2018

#### Sponge City and Coastal Defence against Extreme Weather Events

**Date: 22 March 2018, Thursday, 09:00 – 17:30 (Registration starts at 08:30)**

**Venue: City Gallery Multi-purpose Hall**

**Language: English**

#### Program Rundown

<b>Water Forum 2018</b> <b>Sponge City and Coastal Defence against Extreme Weather Events</b>	
<b>08:30</b>	<b>Registration</b>
<b>09:00</b>	<b>Officiating:</b> Ir. Edwin TONG Ka Hung, JP, Director of Drainage Services
<b>09:05</b>	<b>Welcoming Address:</b> Mrs. Mei NG, Chairman of Friends of the Earth (HK)
<b>09:10</b>	<b>Opening Ceremony:</b> Photos and Ceremony
<b>09:20</b>	<b>Introductory Remarks:</b> Climate Change – What Hong Kong Should Do? Dr. Jeffrey HUNG, Head of Research, Development and Strategy, Friends of the Earth (HK)
<b>AM Session: Are There Coastal Defence Measures in the Greater Bay Area?</b>	
<b>09:30</b>	<b>Keynote Speech 1:</b> Impacts of Climate Change and Extreme Weather Events on Hong Kong Mr. LAI Sau-Tak, Edwin, Assistant Director of the Hong Kong Observatory
<b>10:00</b>	<b>Keynote Speech 2:</b> Experience and Wisdoms on Fighting Flooding Challenges from Climate Change and Extreme Weather Events Prof. Chris ZEVENBERGEN, Water Engineering Department of IHE Delft, the Netherlands
<b>10:30</b>	<b>Coffee Break</b>
<b>10:50</b>	Coastal and Fluvial Defence around Pearl River Estuary: Strategy for Climate Preparedness Prof. WU Xiaoming, Deputy Chief Engineer, The Pearl River Hydraulic Research Institute
<b>11:15</b>	The Opportunity of Tackling Climate Change – The Green and Blue Space Conceptual Framework under Hong Kong 2030+ Ms. Phyllis LI, Deputy Director of Planning/Territorial, Planning Department
<b>11:40</b>	Implication of Climate Change on Design of Coastal Structures and Resilience of Critical Infrastructures in Hong Kong Mr. LAI Cheuk-ho, Deputy Director of Civil Engineering and Development, Civil Engineering and Development Department
<b>12:05</b>	<b>Panel Discussion:</b> What Kinds of Challenges Are We Facing in These Coastal Districts with the More Frequent Extreme Weather Events? Can We Survive? Moderator: Prof. Vivian WONG TAAM Chi-woon, Board Member of Friends of the Earth (HK)
<b>12:35</b>	<b>Lunch Break</b>
<b>PM Session: Sponge City - Trends and Impacts</b>	
<b>14:15</b>	<b>Keynote Speech 3:</b> Sponge City Development and Progresses in Mainland China Prof. CHE Wu, Beijing University Of Civil Engineering And Architecture
<b>14:45</b>	<b>Keynote Speech 4:</b> Urban Surface Water Management - International Experience and Best Practice Ir. Dr. David GALLACHER, Executive Director, Environment Hong Kong, AECOM

<b>15:15</b>	<b>Coffee Break</b>
<b>15:35</b>	Sponge City Rollout and Deployment in Southern China Mr. ZHU Jialin, Director, Guangdong Huayu Eco-City Water Resources Research Institute; Chairman, CRWT Technology Development Co. Ltd.
<b>16:00</b>	Building Flood Resilience for Adaptation to Climate Change and an Application Trial in Hong Kong Ir. LAU S. C., Edwin, Chief Engineer/Land Drainage, Drainage Services Department
<b>16:25</b>	Climate Change - Water Resilience Development of Hong Kong Mr. CHUNG Siu Wing, Joseph, Chief Engineer / Development (2), Water Supplies Department
<b>16:50</b>	<b>Panel Discussion</b> How Can a City Fully Adopt Sponge City Approach for its Master Development Plan? Moderator: Mr. Tony IP, Vice Chairman of Hong Kong Architecture Centre
<b>17:20</b>	<b>Closing Remarks:</b> Dr. Alfred Cheung, Head of Operations, Friends of the Earth (HK)
<b>17:30</b>	<b>End of Forum</b>