We shape a better world | www.arup.com

Foreword

Water-related risks are at the forefront of global thinking. Resilience to too much water (flooding) and too little water (drought and water stress) is particularly front of mind following recent activity around the world.

Global interest in the sustainable management of water has resulted in increased growth in the water sector over the past few years. As we look towards the current year, this trend looks likely to continue.

Arup is well placed to advise our clients on these global issues. We have developed our Design with Water conceptual framework to ensure we manage water across the water cycle in a more integrated and sustainable way.

Our focus on the benefit we provide to people and clients will continue, as we explore further exciting market opportunities across the globe. We aim to 'shape a better world' by helping a significant number of people through our water business projects.

We are undertaking industry leading green infrastructure projects in New York, Singapore and Melbourne and developing our asset management of major river barrage structures on the River Rhein in the Netherlands and the River Humber in the UK. We continue our success on mega projects with the 800Mld Tai Po Water Treatment Works in Hong Kong.

The success we've seen this year is a measure of the creativity and dedication of our clients, our people and our partners. This passion is reflected through our great projects which we undertake and deliver with pride.

Mark Fletcher
Director, Arup Global Water Leader

Global water issues

Market overview

- Resilience to too much and too little is becoming a significant issue for the world.
- There is an increasing focus on smart water management.
- The value of water is increasing within both the urban space (public realm) and the rural catchment.
- There are a number of mega projects taking place around the world which are contributing to providing solutions to water related issues.
- Asset management requirements are likely to expand as water infrastructure is out of date and needs replacing.

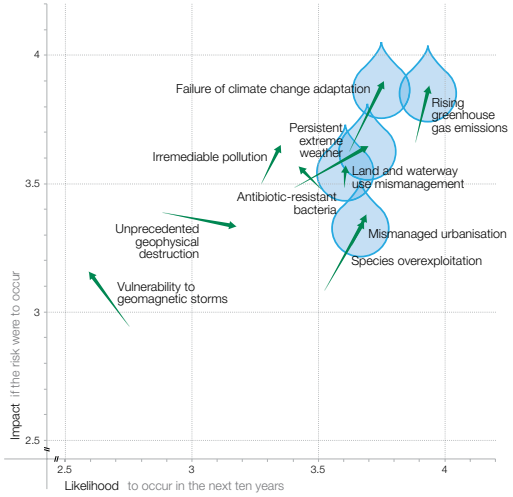
Global water risks

The World Economic Forum Global Risk 2013 Insight Report states that of all the possible risk events (covered by the report), water supply crises have the greatest likelihood of occurring in the next ten years and will have the greatest impact.

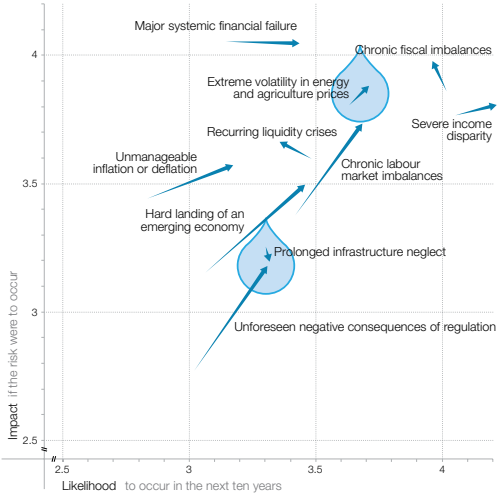
These graphs show water-related issues moving towards the high impact and high likelihood scale of the diagrams.

Water

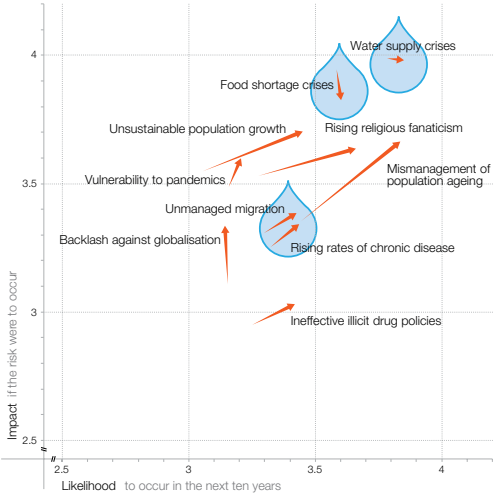
Environmental



Economic



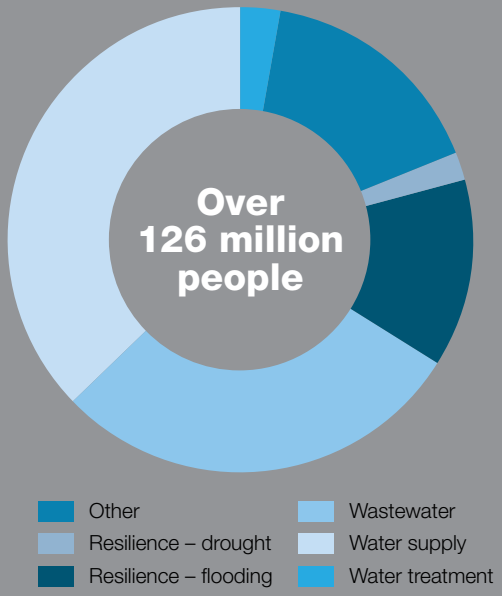
Societal



Source: The World Economic Forum

"More than 120 million people will benefit from the water projects Arup worked on globally in 2012/13. Our goal is to increase this to 0.5 billion over the next 10 years."

Mark Fletcher, Global Water Business Leader, Arup



Global social benefit by category

Social impact

Sustainable Water Management impacts almost all aspects of the economy, in particular, health, food production and security, domestic water supply and sanitation, energy, industry and environmental sustainability.

Delivering social benefit

All communities require effective water management – whether it is through improved hygiene management of waste water to safeguard human health or recognition of the value of water as demand increases. Arup works alongside the decision makers who have a fundamental responsibility to these communities to address these issues.

Resilience

The effects of global warming on water supply represent one of the greatest challenges for cities in the 21st century. City administrations are seeking ways to meet increasing demand for water from growing populations while grappling with the issues presented by climate change – extreme rainfall and drought, rising sea levels and flooding. Arup's global water, climate change and planning experts can offer practical recommendations and case studies to help cities build water resilience as part of a programme of climate change mitigation.

Year in review

Wet Networks

Arup and Pinsent Masons showcase innovation in the water sector.

This technology innovation event for the water sector is part of a regular series of seminars designed to bring together new technology companies within the water sector and its investors. The event attracts interest from around the globe.

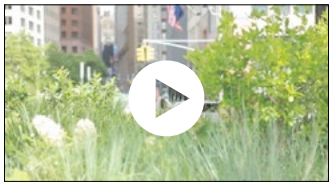
Arup is the technology and engineering partner and we select companies to present. Martin Shouler, Associate Director and organiser says: "Wet Networks gives us unique access to new and emerging technology in the water sector, it provides valuable networking opportunities and it positions Arup well within the water industry."

The invitation-only event attracts an international audience of water sector, legal and investment professions and showcases five new and emerging technology companies seeking investment. Run as a 'Dragons Den' format, the participants are given the opportunity to make a pitch for funding.

Making the most of water

The need to reuse water can be driven by various factors including restrictions on water resource availability, regulation and sustainability requirements as well as in providing financial savings.

Watch the films on the right to see how we can help make the most of water.



East River Waterfront: Rainwater Harvesting

Desalination

Arup hosts Israeli water technology companies

On 4 March, 14 Israeli water technology companies participated in an innovation workshop hosted by Arup. The day provided an opportunity to meet like-minded experts in the global water sector, share market knowledge and discuss investment opportunities. The event was organised in partnership with the UK-Israel Tech Hub, whose mission is to strengthen water technology partnerships between the two countries.

Matthew Gould, HM Ambassador said: "The British Government is convinced that the creativity of Israeli innovation, partnered with the strength and reach of the UK's companies, can be a world-beating combination. Together we can offer solutions to some of the world's most important problems – new therapies for diseases, new systems for harnessing energy, new ideas for exploiting the internet, and new ways to address the world's rising demand for safe, clean water."

View the output of the workshop.

CIRIA UK Best Practice Guidance for Water Sensitive Urban Design

Design with Water

Water Sensitive Urban Design (WSUD) is the process of integrating water cycle management with the built environment through planning and urban design. Arup addresses critical issues relating to resilience, flood risk, water supply and wastewater treatment by placing a re-integrated water cycle at the heart of sustainable planning, design and delivery. By aligning with, and supporting other socio-economic and environmental drivers, actions taken to protect and enhance the water cycle can deliver multiple wider benefits.

Read more about our conceptual framework.

Year in review

Global Water Link

In November 2012 we held our third Global Water Link in San Francisco. This internal Arup event saw over 20 engineers and scientists from around the globe come together with our Water Business Leader (Mark Fletcher) and other senior staff from across the water business. The GWL promotes a greater understanding of the global and regional nature of the water sector and provides invaluable networking and personal development opportunities for the team. External perspectives on the challenges facing the water sector were provided by Dr. Peter H. Gleick from Pacific Institute, Paula Kehoe from San Francisco Public Utilities Commission (SFPUC) and Shilen Patel from Veolia. Shared experiences, inspiration, ideas and the collective outputs from the working sessions will inform the development of the next 5 year plan for the global water business.

Six Arup projects named Hong Kong's Engineering Wonders

On 20 March 2013, six Arup engineered projects were named 'Hong Kong People Engineering Wonders' in a public voting campaign organised by the Hong Kong Institution of Engineers. The top three are all Arup projects and two of these were Arup water projects – Harbour Area Treatment Scheme and Hong Kong West Drainage Tunnel.

Top: Harbour Area Treatment Scheme
Above: Hong Kong West Drainage Tunnel

Global Water Summit

Our Global Water Executive attended the Global Water Summit organised by Global Water Intelligence in April 2013. Held in Seville, the summit brings together water leaders and high level delegates from around the world and the strong Arup presence allowed us to contribute to and influence the conversation on key challenges. Water scarcity is seen as a key risk for the global economy over the next decade and together the delegates explored how we can work towards managing its impact through better water management.

New York Water Environment Association (NYWEA) Annual Conference

In February 2013, Arup made a strong showing the New York Water Environment Association (NYWEA) Annual Conference as the Americas Region continues to position itself as a major player in the water industry. On the first day of the conference, Janine Witko moderated a session on succession planning. With support from GWEX, Arup had global representation during the technical sessions with three technical presentations: Water scarcity and water rating schemes – OPEN HOUSE; Hunters Point South – A Pilot for Green Infrastructure and Retrofit Water Sensitive Urban Design (WSUD) in the UK. Arup also had a presence in the exhibition floor throughout the conference with a booth showcasing our innovative global experience and our local work on resilience in a post-Sandy NYC.

Year in review

Bradford City Park wins British Construction Industry Regeneration Award – October 2012

Arup provided civil, structural, mechanical and electrical engineering, acoustic and lighting design, geotechnical, hydrogeological, water treatment and site supervision services.

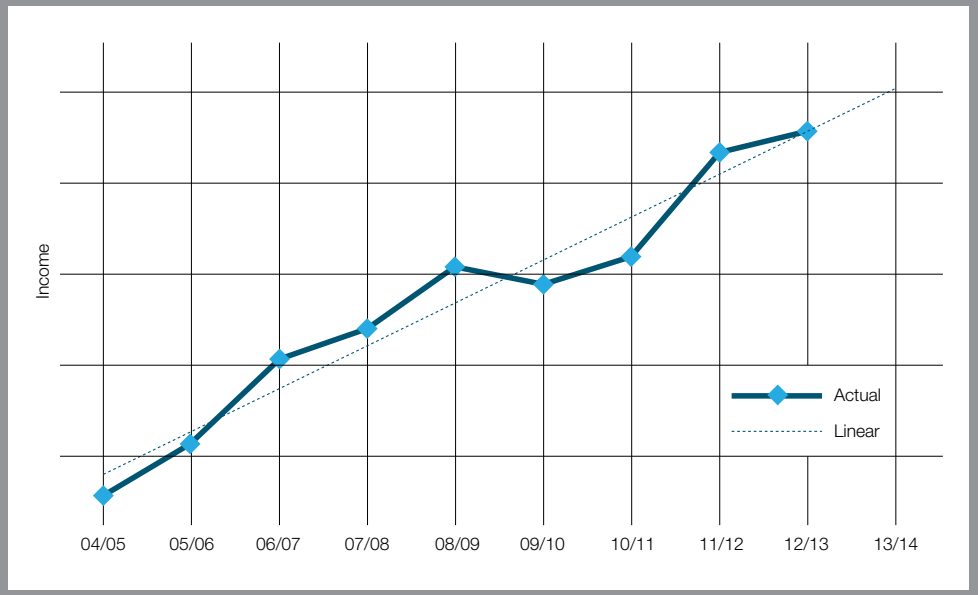
The BCI Awards are widely regarded as the construction industry's Oscars. They are the most rigorously judged Awards in the construction sector, with all shortlisted projects visited by members of the judging panel.

City Park, Bradford, UK

A superb landmark public space comprising water features, trees and attractive green spaces, public conveniences and office/retail space.

Arup created a world class water feature and multi-functional public space which will stimulate the regeneration of the city centre. Building on the idea of a lake, the design evolved, encompassing the concept of tidal rock pools and causeways, to create a shallow pool offering different sound, light and mist effects throughout the day. The pool can be drained to create a space for events and allow easy maintenance.

Other awards during 2012/13:
Urban Design Group – Public Sector Award Project of the Year
Academy of Urbanism – Great Place Award
LUX – Urban Lighting Project of the Year Award
Considerate Constructors Scheme Gold Award
CECA Award – For Construction Excellence
Local Government Making a Difference in Yorkshire & Humber Award
RICS Pro-Yorkshire Regeneration Category – Highly Commended



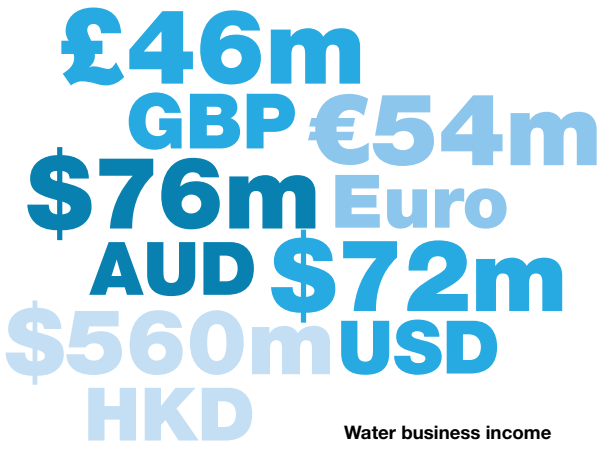
"2012/13 has seen real challenges around the world and we have played our part in helping to mitigate the impact of these."

Mark Fletcher, Global Water Business Leader, Arup

Financial overview

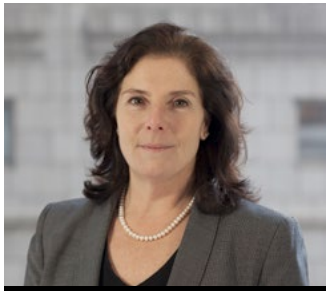
Our water business grew significantly in 2011/12 and this continued in 2012/13, reflecting the global interest in the sustainable management of water, with a particular focus on water scarcity, flooding and resilience.

The income trend reflects the increasing maturity of our water business and our success in challenging markets around the globe.



Water business income

Regional activity


Janine Witko

Americas

The influence of work performed by staff in the Americas stretches around the world – we are designing water management solutions for the US Embassy in London, implementing green infrastructure on NYC streets, and assisting in the master plan of the King Abdulazziz City for Science and Technology in Taif, Saudi Arabia. We provide transaction advice to financial institutions in the P3 market which is growing in the Americas. We continue to see a growing need for our Green Infrastructure/Resiliency, Asset Management and (water) Tunnel capabilities. Our water team is also becoming more active and involved in local water organisations through committee involvement such as the NJAWWA, NYWEA and National AWWA Asset Management Committees and industry conference participation.


Daniel Lambert

Australasia

Water has been identified as one of the strategic businesses in Australasia and as a result we have recently expanded our offering into Sydney and consolidated our offering in South East Asia and Melbourne. The focus of our offering is providing strategic advice to clients and to this extent Arup has undertaken a number of first of a kind projects throughout the region. These include the MCG Sewer Mining Scheme and Bandar Lampung Water Supply Scheme, which is the first water supply PPP in Indonesia. Our innovative approaches and technical excellence are also highlighted by the project we are undertaking in water supply and treatment in mining.


Andrzei Kamler

Europe

Our water business in Europe is doing well despite difficult present economic conditions. We see a lot of opportunities in Ireland and Poland where flood related projects are being developed. Also in the Balkan region EU financial institutions and World Bank involvement are creating new possibilities.


Fergal Whyte

East Asia

This year has seen a marked geographic diversification of our water projects, with new wins in Malaysia, Vietnam, India and China and our water team has continued to expand. Meanwhile, our established team in Hong Kong is delivering the detailed design of an 800MLD water treatment plant and won the Jiang-Hai Wetland Master-planning design competition, for which Phase 1 design is now underway.


Mark Fletcher

UKMEA

Our influence across the water cycle continues to grow. Through our key frameworks in the UK water sector we are delivering transformative projects including Bathing Water schemes on the east coast of the UK, water sensitive design projects in Wales and the nationally significant flood alleviation scheme in Leeds, where our creativity and ability to innovate has been integral to delivering the project. We have raised our profile outside the UK water sector significantly, with two key milestones being our commission with the 2030 Water Resources Group to develop a catalogue on Managing Water Use in Scarce Environments and a desalination study for a mining company in southern Africa.

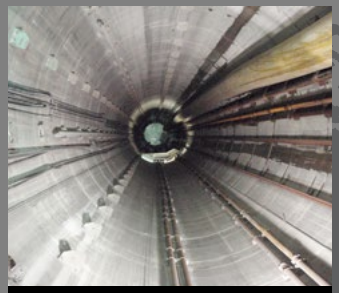
Global projects

To see a small selection of regional projects from 2012/13, click or tap on a country

Knowledge and community

Arup's pool of talent and expertise grows every year, as does the global water skills community which is now 1,100 strong. Arup employs 11,000 people in 90 offices across the globe.

Americas



Lake Mead intake tunnel,
Nevada, USA

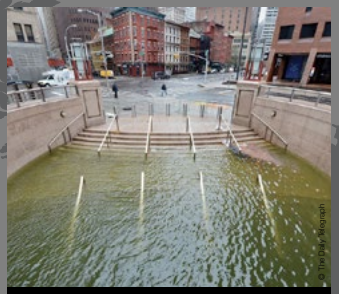
Arup is leading the design of this critical new intake tunnel at Lake Mead, a source of water for millions in south-west USA. It will safeguard future water quality and supply and involves a six mile tunnel and innovative water intake structure.

Client: Impregilo Spa

City of Rialto – Water Due Diligence,
California, USA

Arup advised the equity investors in this landmark water P3 deal in California. Our unique mix of technical, commercial and financial specialists worked with the client to make a number of adjustments to the Concession that will ensure the highest quality project with minimal risk to bondholders. Our work enabled the project to gain a positive bond rating, raise the required debt financing and meet an aggressive financial close deadline.

Client: Table Rock Capital



New York State 2100 Commission, USA

Arup received a grant from the Rockefeller Foundation to assist in the preparation of the New York State (NYS) 2100 Commission report. NYS 2100 was one of four commissions announced by Governor Cuomo in response to the recent, severe weather events experienced by New York State and the surrounding region. The Governor asked the Commission to examine and evaluate key vulnerabilities in the State's critical infrastructure systems, and to recommend actions that should be taken to strengthen and improve the resilience of those systems. Arup's work included project management of the five technical areas of transportation, land use, energy, insurance and infrastructure finance, as well as overall project management. We also carried out research and analysis to support and develop the recommendations.

Client: Rockefeller Foundation

Hunter's Point South,
Long Island City, USA

As one of the most ambitious waterfront projects in New York City's history, Hunter's Point South is being rejuvenated and transformed into a prominent piece of waterfront. Located on the East River in Queens, this new 12 hectare mixed-use neighbourhood development incorporates a waterfront park as well as housing, retail, schools and community space. Arup was able to achieve consensus and deliver pilot water sensitive urban design interventions in the public rights of way, including sidewalk stormwater planters, porous pavement covering 33% of all sidewalks, and bioswales in the waterfront park.

Client: New York City Economic Development Corporation (NYCEDC)

Award: American Institute of Architects (AIA) New York Chapter Design Awards – Urban Design Merit Award 2013

New York City Economic Development Corporation (NYCEDC) Green Infrastructure Design, USA

The NYC Department of Environmental Protection (NYCDEP) intends to leverage the use of green infrastructure to reduce combined sewer overflows and to meet and exceed the water quality standards of New York City's waterways. The NYC Economic Development Corporation will be managing the process for NYCDEP to achieve the goals set forth in the NYC Green Infrastructure Plan. Our specific tasks will be to undertake the site selection process and develop design/construction plans to retrofit the public R.O.W. with 578 'Bioswales' or 'Stormwater Green Streets' within 531 acres of the Newtown Creek watershed in Brooklyn, NY. The design needs to be completed within one year, and construction completed within three years.

Client: NYCEDC

Australasia

Bandar Lampung Water Supply Scheme PPP, Indonesia

Arup acted as Technical Advisor in the development of the first water supply public private partnership (PPP) guaranteed by Indonesia Infrastructure Guarantee Fund. This project will provide drinking water to over 500,000 residents who don't have access to piped potable water.

Client: Singapore Cooperation Enterprise

Melbourne Cricket Ground Water Recycling Facility, Victoria, Australia

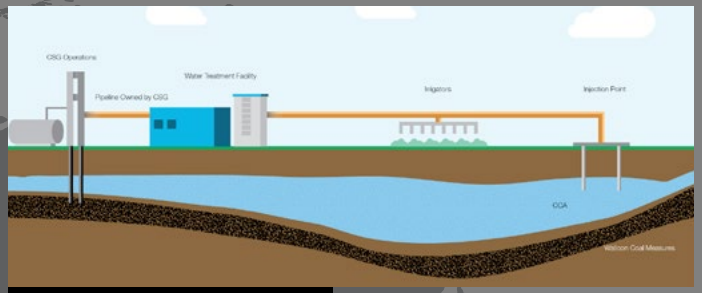
As a result of an integrated water strategy developed by Arup for the Melbourne Sports Precinct, a sewer mining scheme was identified as a viable alternative water source for the Melbourne Cricket Ground (MCG) and surrounding Yarra Park. In addition to the treatment plant, Arup undertook the design and specification of the third pipe system within the MCG to transfer the Class A water from the treated water tank a to service the irrigation, wash down and toilet flushing demands for the MCG, Yarra Park and Richmond Football Club. Arup delivered this 600m^3/day membrane bioreactor project from its initial identification through to construction and commissioning.

Client: Melbourne Cricket Club

Brisbane Airport Domestic Terminal Recycled Water Supply, Queensland, Australia

Arup is significantly involved in the design of the Domestic Terminal expansion at the Brisbane Airport providing services across a broad range of disciplines. As part of this broader project, Arup undertook the design of the Purified Recycled Water (PRW) supply scheme and rain water harvesting systems. The scheme aims to reduce potable water consumption at the airport by utilising purified recycled water for use in cooling towers, urinals and toilet flushing, landscape irrigation and car washing. Rainwater is also captured from the multi level car park and used for irrigation, toilet flushing and wash down.

Client: Brisbane Airport Corporation and Laing O'Rourke



Coal Seam Gas (CSG) Water Options Study Business Case, Queensland, Australia

As part of the Australian Government's 'Water for the Future' initiative, our team has recently completed a business case to look at options for the beneficial use of CSG water in the upper reaches of the Murray Darling Basin. One of the key challenges of the CSG industry is finding useful ways for using the water which is a by-product of the gas extraction process. Given depleting groundwater levels, this water presents a significant opportunity to address challenges faced by the agricultural industry.

Client: Queensland Department of Natural Resources and Mines

Asset Management Advisory Services, Indah Water Konsortium (IWK), Malaysia

We have been engaged by IWK, Malaysia's national sewerage company, as their expert consultant to determine ways to implement their Asset Management Strategy and Plan. This appointment builds on our previous engagement for IWK where we assisted in the development of their Asset Management System. Our work will also involve the development of a plan of action to bring IWK's Asset Management Practices in line with the British Standards Institution PAS 55:2008 provisions.

Client: Arup Jururunding Sdn Bhd

East Asia

Genting Wastewater Treatment Works, Malaysia

Arup will conduct a process review of the existing wastewater treatment works and design the expansion of the wastewater treatment plant for this new casino and resort.

Client: Arup Jururunding Sdn Bhd

Liwasan Ng Kagitingan at Kaliksan Wastewater Treatment Plant , Manila, the Philippines

Arup is providing project management services to client Manila Water Company Inc on their 75 MLD Wastewater Treatment Plant. We carried out the outline design for the project – specifying an underground plant with landscaping so it enhances the environment around the adjacent national heroes cemetery. On site nearly 2 million working hours have been achieved without lost time injury, which is due the close working relationship between all parties and the high degree of focus on safe working methods; Arup has brought its wide ranging experience of safely managing work around the world to this project to support this focus.

Client: Manila Water Company Incorporated

Hangzhou Wetland Masterplan, Hangzhou, China

Arup's conceptual masterplan brings a broad vision for diverse habitat creation and conservation as well as wetland tourism, managed agriculture and aquaculture, education and research, eco-resorts and aquatic recreation zones. Using microcosmic organisation of wetland ecosystems, Arup created macrocosmic harmony for one of China's largest ecological planning projects – at just over 55km². Specific studies of local wetland systems, endangered species, hydrology and flood control, transportation and economics supported the masterplan's development. The vision at Jianghai Wetlands is to create greater ecological diversity than other wetlands in the region by establishing large areas of five unique wetland types including salt marsh, freshwater marsh, riparian floodplain forests, swamp and wet meadows. While the primary intent of the plan is to increase populations of threatened and endangered species it will also bring unique outdoor recreation and educational experiences to new city residents and visitors.

Client: Hangzhou Jianghai wetlands planning and protection headquarters

Duong River Water Supply System and Treatment Plant, Vietnam

Design review, technical and costing aspects review of a feasibility study for a water supply project located in one of the major cities in Vietnam adopting Build, Operate & Transfer (BOT) model. This will include transmission pipelines approximately 30km in length and a water treatment plant with capacity of 300,000m³/day.

Client: Confidential

River Flood Risk Study, Hong Kong

The study will assess the potential flood risk to people living in the vicinity of 14 rural catchment areas (RCAs) across Hong Kong. The project includes various stages such as the prioritisation and verification of river reach flood risk identified, hydrological and hydraulic calculations and modelling, formulation and design of flood warning system as well as the development of a long term improvement scheme to mitigate flood risk for all 14 RCAs.

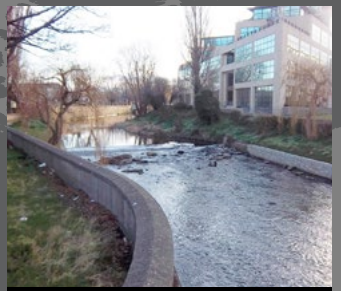
Client: Hong Kong Drainage Services Department

Europe

Lower Lee Flood Alleviation Works, Cork, Ireland

Our team will be the engineering consultants for the delivery of what will be the largest single flood relief scheme ever to be implemented in Ireland. We produced a proposal for flood risk management measures and defences to reduce the frequency and severity of fluvial and tidal flooding in the Cork City area from the River Lee and Bride River. Cork City suffered severe flood damage in 2004 (tidal) and 2009 (river), with losses estimated at several hundred million euros.

Client: Ireland Office of Public Works



Dodder Flood Alleviation Works, Dublin, Ireland

The River Dodder has a history of flooding and is known as a "flashy" river with a quick response to rainstorms. Arup is designing the flood defences along the river between Lansdowne Road and Clonskeagh Road, and conducting the environmental appraisal and site supervision.

Client: City of Dublin

Stavros Niarchos Foundation Cultural Center, Athens, Greece

Due to the arid environment the water strategy is a key design consideration and is being led by Arup Infrastructure. The water strategy includes grey water recovery to reduce the buildings potable water and parkland irrigation demand. Due to the sites proximity to the coast the ground water is saline. This will be desalinated during evenings by desalination plant then used for non potable water and irrigation.

Client: Renzo Piano Building Workshop Srl

Dobczyce Reservoir Study, Poland

Dobczyce Reservoir is the biggest clean water reservoir near Krakow. For almost 20 years the reservoir has been closed to any public activities and has been safeguarded by a significant protection zone. Arup carried out a masterplan to investigate options and possibilities of opening this reservoir for public and recreational use without causing any damage to water environment and water quality.

Client: Miejskie Przedsiebiorstwo Wodociagow I Kanalizacji SA

Renovatie Stuwensemble Nederrijn & Lek, the Netherlands

Arup has been appointed as technical advisor to the Dutch Ministry of Transport and Environment during the contract preparation phase of a large scale renovation project of three weir and lock complexes in the Nederrijn en Lek rivers. Arup studies will identify and help reduce the risks associated with the large scale renovations works. The weirs have a crucial function in controlling river levels to allow shipping traffic, prevent flooding, and generate power. The renovation will modernise and introduce remote control operation of the complexes.

Client: Rijkswaterstaat

UKMEA

Greener Grangetown, Cardiff, UK

Surface water in the area is collected in a combined network and is pumped approximately eight miles to be treated at Cog Moors wastewater treatment works, incurring energy and carbon costs. The wider benefits of the implementation of water sensitive urban design (WSUD) to this neighbourhood include education, health, well-being, sense of place, as well as developing more sustainable transportation routes - in particular the cycle and walking routes linking the city to a regenerated and vibrant Cardiff Bay.

Client: Cardiff City Council

Thames Estuary 2100, UK

Arup worked with the Environment Agency to develop a tidal flood risk management plan for the Thames Estuary through to the end of the century. The plan recommends what flood risk management measures will be required, focusing on how to integrate defences into the surrounding landscape and townscape, enhancing the river frontage and achieving other environmental objectives for a range of different situations. The focus included the creation of a continuous public walkway along the River Thames, connecting to a series of public realm opportunities, and ecological enhancement.

Client: Environment Agency (NEECA2 Framework)

The Crystal Sustainability Centre, London, UK

Designed to be among the most sustainable buildings in the world, The Crystal is an exemplar 'building of the future' targeting the highest international benchmarks – LEED® 'Platinum' and BREEAM 'Outstanding'. The public health design adopts a water sensitive design approach, focusing on water efficiency and advanced treatment, resulting in a 90% reduction in mains water use and a closed water loop in the winter season. By integrating water and wastewater industry expertise into the team, Arup was able to advise on selection of Siemens technologies for blackwater recycling, configure the public health systems to allow for rainwater treatment to potable quality, and advise on licensing and approvals for the innovative water systems.

Client: Siemens Rail Estate Ltd

London 2012 Olympic Park water infrastructure design, UK

Arup provided multidisciplinary engineering services for the infrastructure design of the southern section of the 2012 Olympic Park, as well as for three of the major venues. One of the main water strategy objectives was to reduce potable water consumption by 40% compared to industry standards. Through a combination of water efficiency, water re-use and water substitution measures, this target was exceeded and a 57% saving in water was achieved. 20% was through water efficient fittings in venues, and measures such as rainwater harvesting for toilet flushing. A park-wide non-potable water supply network used treated sewage for irrigation and toilet flushing, accounting for a further 37% reduction in potable water consumption, exceeding the Olympic Delivery Authority's sustainability target.

Client: Olympic Delivery Authority

Yorkshire Bathing Water Directive – Scarborough and Bridlington, UK

Yorkshire Water are investing £110 million between 2010-2015 to help many of the region's seaside resorts achieve an 'Excellent' bathing water quality standard. Arup built the initial marine impact model and carried out studies which showed the feasibility of adopting an innovative approach to achieving improved bathing water quality and allowed Yorkshire Water to gain regulatory funding for their programme. Without the marine impact approach, £70 million of investment at Scarborough and Bridlington would have failed to achieve the blue flag status for these important resorts.

Client: Yorkshire Water Services Ltd

About Arup

Arup is the creative force at the heart of many of the world's most prominent projects in the built environment and across industry. From 90 offices in 38 countries our 11,000 designers, engineers, scientists and business consultants deliver innovative projects across the world with creativity and passion.

Water at Arup

Our capability encompasses water in natural catchment systems, including flood risk management, water treatment and supply, its uses in municipalities and industry, and its treatment, re-use, recycling and return to the environment. Arup provides the following services related to water and design:

Strategy

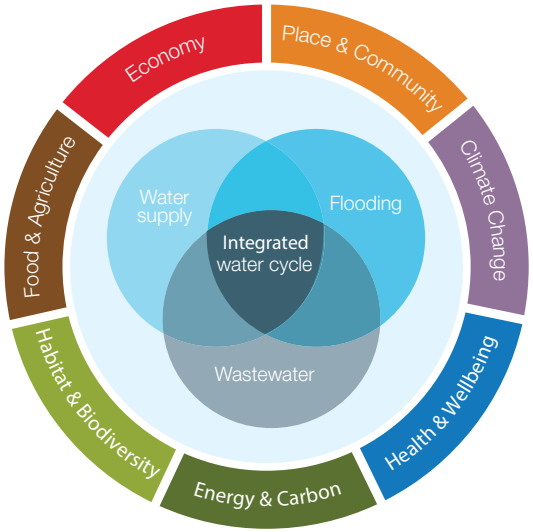
Catchment science
Masterplanning and urban design
Surface water management plans
Water cycle studies
Planning policy and spatial planning
Water resilience strategy and planning
Carbon management and climate change studies
Landscape and green infrastructure strategy
Economic assessments
Sustainability assessments
Asset management
Smart water management

Project development and funding

Feasibility studies 3D city modelling and visualisation
Community and stakeholder engagement
Development of partnerships and funding
Commercial strategy and management
Ecosystems services assessment
Analysis of social return on investment

Project design and delivery

Water efficient buildings
Green roofs and walls
Water re-use networks
Coastal management
Flood risk management
Natural flood management
Integrated drainage modelling
Mechanical, Electrical and ICA design
Resource efficiency and waste management
River design and management
Water supply and treatment
Wastewater treatment
Water resources management
Planning applications
Environmental services
Post-project appraisal



Design with water

"Our integrated water management experience informs smarter thinking about this essential resource and how to safeguard our future water supply."

Global water facts

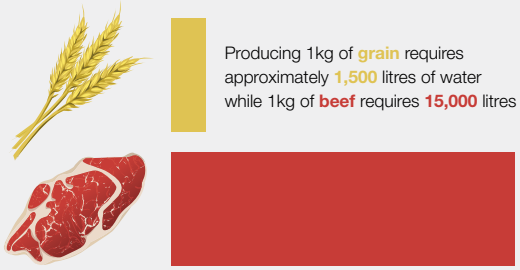
Much more water required to produce food

The daily drinking water requirement per person is 2-4 litres, but it takes **2000 to 5000** litres of water to produce one person's daily food.

Unsustainable lifestyles

Around **3.5 planet Earths** would be needed to sustain a global population achieving the current lifestyle of the average European or North American

Substantially more water required for meat



Producing 1kg of **grain** requires approximately **1,500** litres of water while 1kg of **beef** requires **15,000** litres

Water scarcity growth

In 2030, **47%** of the world's population will be living in areas of high water stress

Source: FAO, 2012/WWDR, 2012

Water scarcity already affects almost every continent and more than 40% of the people on our planet. By 2025, 1.8 billion people will be living in countries or regions with absolute water scarcity, and two-thirds of the world's population could be living under water stressed conditions.

FAO, 2012

By 2050, rising populations in flood-prone lands, climate change, deforestation, loss of wetlands and rising sea levels are expected to increase the number of people vulnerable to flood disaster to 2 billion.

WWDR, 2012

Further information

This review provides information on a small selection of projects across our global water business in the last year.

To find out more visit: www.arup.com/water

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