Our work

We are a vibrant, diverse firm working across five Regions, yet scale alone isn’t our strength. We’re united by a common ethos, enduring values and a desire to harness our global expertise for the benefit of the clients and communities we work for.

With over 12,800 staff operating across 35 countries, this year Arup has grown even larger. For many of our peers that would be an achievement in itself – part of a strategy for growth that’s driven by financial markets. For us, as an independent business owned in trust, expansion is driven by other goals.

Creating a consistent experience

In today’s connected world, clients in markets like property, retail and manufacturing look at their operations with the goal of setting the same standards and ensuring the same experience wherever they are.

Our work for fashion retailer Zara is a case in point. In the last five years we have worked with the business in Melbourne, Rome, Porto and Barcelona. In the latter we helped create the first store in Spain to gain LEED® CI Gold certificate. This year’s work in Oslo expanded that relationship still further, providing Zara with the assured access to quality and innovation that comes from working with a firm with a global footprint as wide as their own.

Expertise across the world

Whilst some clients look to work with our teams in multiple locations, others benefit from the access our global network gives them to world-class expertise.

Our Skills Networks underpin part of this story, allowing our engineers and consultants to seek input from experts in their field, anywhere in the world. Sharing best practice and innovative thinking in this way means every client has access to our best minds, 24/7.

Whilst advice from experts in other parts of the world is hugely valuable, some projects require deeper, hands-on involvement from our world-class specialists.

The National Forum of Music in Wroclaw, Poland (see page 28) is a perfect illustration. Across a 12 year development process, experts in our Wroclaw, Amsterdam and New York offices provided specialist advice on pre-design planning, auditorium design, theatre consulting, acoustic consulting, and audiovisual systems. The 1,800-seat facility that opened in September 2015 demonstrates the benefits an integrated way of working can bring.

Meeting the world’s challenges

Our strength and growth as a global firm provides one further important benefit.

As the world faces increasingly pressing challenges in areas like climate change and the management of important natural resources, perspective on the most effective responses is vital.

As our Chairman, Gregory Hodkinson explained (see page 4), we draw on global insight in support of this year’s COP21 agreement. We also recognise that impact at an individual city level will be critical if we are going to play our part in building a more sustainable future. The work described on the opposite page shows what this means in practice. We combined local knowledge of specific challenges with access to the latest thinking on global issues ranging from community energy to sustainable transport systems. For us, this work is a perfect illustration of what being a global firm can mean for our clients and partners.

We are working in partnership with The Rockefeller Foundation and with 100 Resilient Cities, to help cities understand and measure their capacity to endure, adapt and transform, demonstrating the social value our expertise can have.

In the 21st century cities face diverse challenges ranging from climate change to ageing infrastructure, and from rapid growth to pandemics. We’ve developed a new planning and decision-making tool called the City Resilience Index, with support from The Rockefeller Foundation. It helps cities measure their resilience through a range of indicators associated with 12 goals relating to health and well-being; economy and society; infrastructure and environment; and leadership and strategy.

The City Resilience Index helps cities understand and plan for such challenges and stresses, and is being used by 100 Resilient Cities, a network pioneered by The Rockefeller Foundation.

As part of 100 Resilient Cities, we have helped Byblos in Lebanon and Vejle in Denmark, for example, develop and release tailored Resilience Strategies. We’re currently supporting ten more cities to do the same, including Glasgow, Rome and Santa Fe.

At a glance

146 Countries where we have worked on projects in 2015/16

89 Number of offices

Number of permanent active staff by Region

Total percentage income by Region (%)
Our work in the Americas has had a positive impact on millions of lives by adapting to environmental changes and focusing on people’s future needs.

Across the Americas a constantly evolving mix of social, economic, environmental and technological developments pose new questions for our clients. Our breadth of expertise and holistic approach have seen us well equipped to meet these challenges – whether we are securing dwindling water supplies, providing leading-edge earthquake protection or creating inspiring places to live, work and learn.

**Energy efficiency, naturally**

At 246m Torre Reforma in Mexico City is Mexico’s tallest building. It also stands out for its sustainable design. The slim structure maximises natural light to illuminate interior spaces and facilitate natural ventilation. Windows open automatically before dawn, releasing warm air and allowing cool air in, and wind power helps to supply its energy needs. Its triangular shape is not only iconic, but is designed to be resilient by twisting with strong winds or earthquake tremors.

Our sustainability consultancy and engineering solutions ensured the new 1.1m ft² Samsung Headquarters in San Jose, California, saves energy while encouraging interaction. Energy efficient features include thermal energy storage, innovative LED lighting and low-flow water fixtures. The extensive courtyard helps maximise daylighting in the open plan office to create a healthy and productive working environment.

**Making Las Vegas water a safe bet**

Lake Mead is the biggest man-made reservoir in the US and supplies drinking water to over 25 million people, including 90% of Las Vegas’s supply. Its continued viability was in doubt as a decade-long drought saw water levels drop 100ft to within metres of the lake’s two existing intakes. We led the pioneering solution that secured the future water supply with a ‘race against time’ challenge described as the subaqueous equivalent of “landing on the moon”.

**Arup has been indispensable in helping to transform my architectural vision into an efficient and buildable structure.**

Benjamín Romano, Principal of LBR&A

4.6km

The length of the world’s deepest sub-aqueous tunnel, creating a vital new intake for Lake Mead, securing drinking water for more than 25m people.

Lake Mead Intake Tunnel No. 3

Bruce joined Arup in 2000. He is a principal in our Los Angeles Buildings team.
Lake Mead Intake Tunnel No. 3 was the most ambitious project ever undertaken by the Southern Nevada Water Authority, with Arup as an instrumental part of the team. Our focus was to work together to overcome the challenges, literally fighting for every inch of that tunnel alignment. Now that the work is complete, we can look back and clearly see the magnitude of what we accomplished and feel a great sense of pride for what we achieved as a team and for our community.

Erika Moonin, Engineering Project Manager, SNWA
Our innovative solution involved assembling the new intake structure on a floating deck and sinking it to the lake bed. We then drove a tunnel boring machine nearly 5km under water before hitting a ‘bull’s eye’ target a few centimetres wide to connect to the intake. The result is the world’s deepest subaqueous tunnel and the safeguarding of the region’s future water supplies.

Guiding San Francisco into the future
Presidio Parkway replaces San Francisco’s primary approach route to the Golden Gate Bridge, opening up new vistas and improving driver safety. We updated the 1.6-mile 1930s design with 1,800ft of cut-and-cover tunnels and extensive landscaping to blend the road into its surroundings and reconnect the core of the US’s only urban national park to the waterfront. Arup’s involvement covered everything from designing civil and structural aspects to advising the client on financing and delivery.

Our structural and geotechnical expertise is also proving vital to planning 181 Fremont Tower, a mixed-use 56 storey building in a high-density district of the earthquake-prone city. Arup’s approach is informed by the Resilience-based Earthquake Design Initiative (REDi) developed by our experts researching building responses to earthquakes around the world. The building has achieved REDi Gold certification, meaning the tower could be reoccupied almost immediately after a major earthquake.

Agile thinking
Bergeron is our first building in Canada’s York University engineering campus, and is typical of our work in this Region. Bergeron’s ambition is to educate the next generation of engineers – creative problem solvers and entrepreneurial leaders with a social conscience.

As you’d expect, the building is radically different. Student productivity drove design thinking. There are no lecture halls, fewer classrooms and more space for interaction, collaboration and project-based learning. For a project changing the present but determining the future, our involvement was wide ranging. It covered the civil, structural, mechanical, electrical, information technology and security engineering, as well as providing initial engineering advice for the unusual glass and metal façade. Our hope is that the building will be an exemplar for future campus building projects beyond those related to engineering.

In New York, we turned a former sawdust factory into an intimate music venue, meeting stringent technical requirements without losing the building’s character. Box-in-box construction isolates the National Sawdust performance hall from outside noise and height-adjustable staging rises out of the floor. Our SoundLab in New York was used to auralise the hall’s acoustics to ensure optimum sound quality and integrity.

Agile thinking can also be required before any ‘traditional’ design begins. The Long Beach Civic Center in Southern California will regenerate the city’s downtown area through a ‘design-build-finance-operate-maintain’ public-private procurement process brokered by Arup. A new city hall, port headquarters, library, and new residential, hotel and retail developments will be built, while Lincoln Park will be revitalised. The integrated procurement is a first in the US and provides a model for other cities to follow in public-private partnerships.

Optimising acoustic performance through our SoundLab facility, we’ve enabled a disused New York sawdust factory to become an intimate music venue.
Across Australasia we’ve created positive links of many kinds – connecting people with places, cities with the natural environment and design with conservation.

It takes agile minds to better connect people without sacrificing the environment or risking the character of their cities. We’ve applied intelligence and imagination as always. But most of all, we understand what change entails on the ground to successfully regenerate areas posing a complex combination of geological and conservation concerns.

**Thoughtful architecture**

*Elizabeth Quay Pedestrian and Cyclist Bridge* in Perth, Australia, adds to our history of delivering iconic bridges that unite urban landscapes with nature. Our complex, curved design features a 110m ‘S’-form bridge deck. This provides the necessary length to clear the navigation channel whilst providing dynamic and changing viewpoints. The deck has the width to allow simultaneous enjoyment by pedestrians and cyclists and is accessible to all. We also redesigned aerials on public ferries to reduce channel clearance by 1.5m, which saved 75m of bridge length and delivered sizeable cost savings. A key component in the transformation of Perth’s waterfront, the bridge gives substance to the Metropolitan Redevelopment Authority’s (MRA) vision: ‘The River. The City. Together Again’.

**Creating new connections**

Our work on Singapore’s Downtown Line (DTL) is making stations more accessible as well as saving on construction costs. Arup has played a number of significant roles on Downtown Lines 1, 2 and 3. We provided advanced consultancy on DTL1 and 2, producing the concept designs and base-lining for 10 underground stations and 11km of running tunnels. Our work on DTL1 included detailed design for the award winning Bugis Station – a busy interchange in the heart of the Central Business District.

**Arup’s design excellence has resulted in a 110-metre bridge that responds exceptionally to the MRA’s core brief of an iconic structure that is timeless and refined in its simplicity.**

Sean Henriques, Chief Executive Officer, MRA

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**Project**

Elizabeth Quay Pedestrian and Cyclist Bridge

**Location**

Perth, Australia

**Client**

CPB Contractors (formerly Leighton and Broad) for the Metropolitan Redevelopment Authority (MRA), West Australian Government

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**Opening the Channel**

It’s projected that Perth Airport’s passenger numbers will grow from 14 million per annum in 2015 to 28.5 million per annum within the next 20 years. With the future firmly in mind, Perth Airport committed to a AU$1bn redevelopment plan to cater for passenger growth.

The design at Elizabeth Quay is everything the MRA sought to achieve in terms of simple and pure structural forms, complemented by our thoughtful, modular architecture. The design solution overcame every technical and construction challenge whilst ensuring the bridge’s visual appeal remained at the forefront.

Nick Birmingham
Associate, Elizabeth Quay Pedestrian and Cyclist Bridge

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**At a glance**

11%
Percentage of total Arup income

1,347
Number of permanent staff

12
Number of offices
Public transport is the most efficient way for our people to get around in a compact city like ours. Ultimately we aim to make Singapore a safe, green, car-lite city.

Prime Minister Lee Hsien Loong on DTL2 opening 26 December 2015, reported in the Straits Times
Australasia

On DTL 2, our specialists in station planning, geology and tunnelling focused on minimising depths to platforms and passenger transfer distances, as well as enabling barrier-free access to platforms. Due to open in 2017, we continue to deliver excellence on the design for five underground stations and 5km of tunnels on the DTL3 Package A.

We’re working on three Light Rail schemes in the Region following our work on Queensland’s Gold Coast Light Rail, which opened in 2014. On the other side of Australia, our services ensured the new Perth Airport, T1 Domestic Terminal and T1 International Departures Expansion worked efficiently right from its opening. The facility allows passengers to transfer seamlessly between regional, interstate and international services. Working with airport and airline stakeholders, we used our Operational Readiness, Activation and Transition (ORAT) process to deliver 28 trials testing systems, people and processes.

Pushing for platinum performance
We faced challenging conditions working on the South Beach mixed-use eco-quarter under construction in Singapore. The site sits on filled earth and soft marine clay with several conservation buildings nearby. Our geotechnics team designed 90m and 85m diameter cofferdams to stabilise the soil and provide dry pockets for safe excavation. The design exemplifies Singapore’s ideal of a ‘city in a garden’ and the project has already won Green Mark Platinum awards.

Sydney’s Barangaroo is one of the world’s most ambitious urban renewal projects and will redefine the famed harbour’s western edge. As an old industrial site, the area has historic contamination dating back to early colonial times. Our global expertise in zero carbon developments, precincts, and benchmarking has been crucial in achieving its sustainability objectives. We’ve also developed responsive public interfaces to communicate information on water and energy use to residents and visitors.

Close collaboration
Arup’s many professional collaborations help us ensure we explore different solutions to get the best for our clients. We’re part of a partnership providing engineering and specialist services for the new Melbourne Park Administrative and Media Building. Our work has helped put the new home of Tennis Australia and Melbourne and Olympic Park Trust on track for a LEED gold sustainability rating. Features include deep shade overhangs ensuring comfort for those inside, while reducing glare for train and tram drivers. Our work on three Curtis Island LNG Jetties in Queensland further demonstrates the value of close collaboration. Lessons from one project were quickly applied to the others and all three are now exporting liquefied natural gas.

We worked with the Australian Water Association to undertake a national survey and produce the 2015 Water Consumer Outlook. Key insights included strong consumer support for alternative sources of drinking water such as desalinated and recycled water.

Combating challenging geotechnical conditions with innovative ‘cofferdam’ designs, we’ve turned ambitious plans for a mixed-use eco-quarter in Singapore into award-winning reality.
A dynamic region like East Asia demands dynamic thinking. From efficient mass transport to inspiring cultural centres, we’ve brought fresh ideas to a wide range of client challenges.

Designing for large populations, improving resilience and making the most of resources are just some of the challenges that faced our teams in East Asia. Their technical excellence and imaginative design approach has seen them develop solutions in all our markets from crucial public services to buildings that reflect their location and cultural heritage.

Buildings that inspire and protect

This year, Arup has created inspiring environments that integrate efficient use of resources and resilience against natural disasters. Traditionally, museums have been ‘closed boxes’ but Oita Prefectural Art Museum on Kyushu island in Japan offers a modern, accessible alternative. Visitors enter through bi-folding glass doors that form a two storey high transparent façade whilst easing energy consumption for heating, cooling and ventilation. Inside, invisible walls of jetted air protect against heat, humidity, dust and insects. The geometric outer grid of the upper exhibition space is made of timber, making full use of this sustainable material. Finally, the whole structure is set on rubber bearing devices to protect against earthquakes.

At 530m high and with 111 floors, CTF Finance Centre in Guangzhou, China is one of the world’s tallest buildings. To make the most of the fabulous views over the Pearl River, our client wanted to minimise the exterior columns. Our solution of eight mega columns and a central core was unusual in China but has now set a precedent for the country’s future seismic skyscraper design.

Connecting people through culture, business and travel

We have experience in developing leading-edge solutions for modern airports. Hong Kong International Airport Midfield Concourse offers more than 35 green features to maximise sustainability while providing a 10 million passengers per year.

Hong Kong International Airport

Midfield Concourse

Aspiring to be one of the first buildings to be awarded with a BEAM Plus Gold Rating by the Hong Kong Green Building Council. The building provides a comfortable environment to in excess of ten million extra passengers a year.

Oita Media Cosmos

Ground source heat pumps, photovoltaic and solar thermal panels reduce energy consumption by 50%, compared to a typical Japanese library.

‘We were driven to think outside the box – both literally and figuratively. To realise Shigeru Ban’s vision of an open-box museum, we implemented a base isolation system to attain the highest level of earthquake performance while enabling the desired long span obstruction-free exhibition space.

–Ryota Kidokoro
Associate, Oita Prefectural Art Museum

Keita Sugai, Director, Shigeru Ban Architects

The Agency for Cultural Affairs in Japan made various detailed requests for the air environment to keep the artworks in optimal conditions at the museum. With Arup’s flexible mindset and skilful simulations, we were able to propose a deliberate solution at the planning stage. Arup has played an important role to realise this open-box museum.

Ryota Kidokoro
Associate, Oita Prefectural Art Museum

Hong Kong International Airport

Midfield Concourse

Location
Oita, Japan

Client
Shigeru Ban Architects

Oita Prefectural Art Museum

Location
Oita, Japan

Client
Shigeru Ban Architects
Using their capabilities in structural, MEP and environmental design, Arup provided us with comprehensive and coordinated solutions for this complex project, and successfully helped us achieve a unique mixed-use development of high performance and sustainability. We see Arup as our long-term partner, and value their commitment to quality and professionalism.

Albert Chan Kain Bon, Director of Development Planning and Design, Shui On Land Limited

Office locations
Brunei
Bandar Seri Begawan
Cambodia
Phnom Penh
Greater China
Beijing
Chongqing
Guangzhou
Hong Kong
Macau
Shanghai
Shenzhen
Taipei
Tianjin
Wuhan
India
Hyderabad
Mumbai
Japan
Tokyo
Malaysia
Kuala Lumpur
Kota Kinabalu
Penang
Philippines
Manila
Thailand
Bangkok
South Korea
Seoul
Vietnam
Ho Chi Minh City
comfortable environment to in excess of ten million extra passengers a year. North-facing skylights increase natural lighting while also reducing solar heat gain. This in turn saves on air-conditioning, which runs on water-cooled chillers using recycled water. The five level concourse is located between the two runways and the extended automated people mover to Terminal 1 provides ready access.

Gifu Media Cosmos is an avant-garde cultural centre in central Japan. Our teams were intimately involved in all aspects of the design and construction, from the iconic roof and globes, to lighting design and embedding high levels of energy efficiency. The 11 giant ‘globes’ suspended from the roof are the most distinctive feature of the design. In keeping with the organic design, each forms a ‘bell-mouth’ that enhances natural ventilation and defines reading, resting and study zones without physical walls. Non-dazzling daylight is filtered through the polyester globes ensuring visitors enjoy an optimal reading environment.

In collaboration with the design and construction teams, we developed new methods for the structure of the timber roof to realise the fluid geometry of the space.

The Hub, Shanghai, features a range of sustainable solutions to help make Hongqiao Central Business District (CBD) a low-carbon and green construction zone. We deployed energy-saving strategies such as a solar hot water system, stormwater and greywater recycling, and supplying chilled and hot water through co-generation from a central district plant. A futuristic ‘Starship’ exhibition centre for art, cultural and business events appears to float at the CBD’s heart, surrounded by offices, hotels and malls.

The development connects to a transport hub that is a gateway to China’s prosperous Yangtze River Delta (YRD) region – 75 million people live within an hour by high-speed rail.

Working with water
Baotou is situated in northern China’s Inner Mongolia region. It suffers water scarcity due to wide seasonal variation in rainfall and flooding caused by poor drainage. We’re helping tackle these issues through a report on Water-Sensitive Urban Design as part of China’s ‘Sponge Cities’ initiative. Green corridors, open space, parks and pocket gardens will help manage and provide routes for extreme rainfall and mitigate flood risks. We also aim to revitalise the river as a setting for public recreation.

Hong Kong’s Harbour Area Treatment Scheme, Stage 2A (HATS2A), is significantly improving water quality in Victoria Harbour. Our sewerage infrastructure project is helping to protect marine life while enabling the city to meet its future development needs. It also means the entire HATS system now serves a population of more than five million people. We designed and project managed HATS2A, which has been operational since late 2015 and provides a positive example of how to engineer utilities for high-density cities.

Green corridors, open spaces, parks and pocket gardens are key elements of our approach to mitigating and managing flood risks in China’s ‘Sponge Cities’.

Office locations

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At a glance

- 20% Percentage of total Arup income
- 3,644 Number of permanent staff
- 22 Number of offices

Project

Hong Kong International Airport Midfield Concourse

Location
Hong Kong, China

Client
Airport Authority Hong Kong

Jack So Chak-kwong, Chairman of the Airport Authority Hong Kong

**The Concourse is an important development project that will help Hong Kong International Airport meet increasing traffic demand in the medium term, as we work towards completion of the Three-runway System. Incorporating numerous green features, the facility was designed with environmental sustainability in mind.**
Across Europe our teams carefully balance respect for the region’s rich heritage with the need to create a built environment that’s fit for the future.

This year our major European projects have seen us link architectural expression to human behaviour, promoting sustainable 21st century travel and regenerating areas of major historic cities.

A virtuoso performance

The National Forum of Music in Wrocław, Poland, is a landmark venue in a city with a proud musical heritage dating back to the Baroque era. The project involved four Arup offices in New York, Wrocław, Warsaw and Amsterdam, whose challenge was to create a versatile, acoustically state-of-the-art facility that does justice to the city’s historical musical roots. The 1,800-seat concert hall features a range of adjustable elements that enable both the acoustics and the scale of the stage and seating areas to be tailored for each performance. We sat the entire building on rubber vibroisolators to help provide silence in which artists can work. Wrocław is a 2016 European Capital of Culture and the forum, which also features three smaller performing spaces, is already being hailed as one of the world’s best concert halls. We were awarded a Medal of the City of Wrocław for our contribution to the cultural life of the city.

Revitalising great cities

Distrito Castellana Norte Madrid is one of Europe’s largest regeneration schemes, extending the north of the Spanish capital across more than 300 hectares. We’re leading design and planning of the scheme, which also features three smaller performing spaces, is already being hailed as one of the world’s best concert halls. We were awarded a Medal of the City of Wrocław for our contribution to the cultural life of the city.

We have planned a very people-focused development model, promoting social exchange and the interaction between neighbours. Castellana Norte will provide an identity to represent the values of Madrid as an open and high-quality city.

Flavio Tejada
Project Director, Distrito Castellana Norte Madrid

Flavio joined Arup in 2004. He is an associate director in our Madrid office.

Arup’s support, advice, global experience, and multidisciplinary skillset were indispensable throughout development. We chose them for the amazing track record they have in concert hall design around the world and they’ve really delivered a fantastic facility for us. They’ve been a great partner in this project.

Dr. Andrzej Kosendiak, CEO of National Forum of Music
Problems and challenges in the project were dealt with in close collaboration with the contractor. Knowledge and expertise combined to enable progress and to arrive at the right solution for everyone concerned. Arup helped drive this project, and the ultimate goal was achieved: a bridge that can last another 30 years.

Cecile Haffmans, Surroundings Manager, Rijkswaterstaat
In Ireland, we’re helping to create a vibrant new city quarter with diverse uses in Dublin’s north inner city through the Grangegorman Masterplan. After winning an international competition, we became the master planners and undertook an early sustainability appraisal to ensure a focus on sustainable approaches. We’ve adapted six 200-year-old protected hospital structures (approx. 8,300m²) into educational facilities for the Dublin Institute of Technology. New facilities include a new glass entrance, lecture theatres, a library and an IT hub.

Previously an unfinished hotel in central St Petersburg, our work on this new global headquarters for Gazprom Export involved the reconstruction and shell and core layout rearrangement of the building premises. The total area of this upper floor structure is 20,000m² and significant changes to the building have been made. These include transforming its atrium extension and functional modification from its previous life as a hotel into a high-end corporate office. Besides administration and support areas, the building also houses a bank, catering and recreational space. We provided architectural support, planning, structural, mechanical, electrical, public health services, along with site supervision.

Intuitive transport infrastructure

The tight building footprint for Den Haem Central Station in the Netherlands posed a difficult engineering challenge. Working with architect UNStudio we solved this challenge with a column-free structure, designed around the people who use it. We understood the city’s vision for a modern facility that makes transfers between modes of transport quicker and more efficient. Our freeform use of concrete generates elegant, sweeping shapes and gently inclined surfaces. Passengers are intuitively guided from the platforms to the transfer hall and on to their next connection. Building above and below ground created room for offices, shops, homes, an additional platform, an underpass, a car tunnel, bicycle storage and expanded parking, as well as the spacious main hall.

Also in the Netherlands, Galecopper Bridge is a 326m long steel cable stayed bridge that was built in 1970. Heavy freight traffic caused fatigue problems in the deck. Strengthening the bridge involved the addition of a layer of high strength concrete to the top of the deck, along with two large steel box girders alongside the full length of the bridge. Each girder weighs 1,500 tonnes and was installed in three pieces. The installation of these girders and the jacking of the bridge was a complicated process, involving large floating cranes, pontoons and mobile cranes all in action simultaneously. Together with our joint venture partners we worked on this project as managing contractor. Arup was responsible for technical management, site engineering, project and contract management.

In Copenhagen, the Cityringen underground metro will form a 16km loop around 17 new stations, connecting key areas of the city and interchanging with existing metro, rail and bus infrastructure. We are working as part of a Joint Venture to create stations that meet travellers’ intuitive demands in a way that is as efficient and sustainable as possible. Our engineers, architects, acoustic consultants, wayfinding, lighting, façade and materials specialists are collaborating to realise this vision. When complete approximately 80% of all homes, workplaces and higher education institutions will be within 600m of a train or metro station.

The Irish city of Galway is challenged by traffic congestion, unpredictable journey times and lack of alternatives to cars. The Galway Transport Strategy sets out a series of actions and measures, covering infrastructural, operational and policy elements to be implemented in Galway over the next 20 years. The N6 Galway City Ring Road forms part of the Galway Transport Strategy and is the road component of the N6 Galway City Transport Project which is an integrated, sustainable solution that provides an alternative to the east coast corridor and recognises the area’s rich natural heritage and wide variety of species and habitats. We’re collaborating with local and national authorities to encourage cycling, walking and bus usage, and to create an additional crossing of the River Corrib to ease congestion.

Our designs for the 16km Cityringen metro will help bring 80% of Copenhagen’s homes, workplaces and higher education institutions within 600m of a train or metro station.
Taller, longer, further and safer – across the UK, Middle East and Africa, we’ve used our advanced technical and creative expertise to turn our clients’ diverse ambitions into practical reality.

Our work in UKMEA this year has been at the forefront of today’s essential efforts to enhance transport systems, create inspiring spaces for learning and adapt to rapid changes in technology and climate.

Upgrading urban transport

Our work on Crossrail Place in London’s Canary Wharf was informed by a desire to attract tenants and the public three years before the station below begins operation. The 115,000 sq ft development features a spectacular addition to the London skyline for which our team provided specialist technical advice – one of the world’s longest timber roofs. Five storeys of flexible retail units, restaurants and large landscaped gardens make it a destination in its own right. We also developed a solution that will allow future changes to Crossrail Place without disrupting the station’s operation.

Upgrading Birmingham New Street, the UK’s busiest railway station outside London, was a highly complex process and Arup’s biggest ever fire project. Our fire engineering expertise was critical to allowing rail and retail operations to continue throughout construction. Our team created a dynamic 3D model of the station, concourse and shopping centre that responded to the changing structure during construction. This helped us reassure stakeholders such as Network Rail and West Midlands Fire Service by showing how we mitigated each risk to arise. The five-year project was completed without fire incident in September 2015.

Our multidisciplinary consultancy services are ensuring the Midfield Terminal Building (MTB) at Abu Dhabi International Airport will be ready for 30 million annual passengers by its opening date in July 2017. Passenger facilities in the 700,000 sq m terminal will include extensive airline hospitality lounges and a transit hotel.

**UK Home Office’s Emergency Services**

The £1bn Programme will provide frontline responders with extensive communication and data coverage, high resilience and appropriate security. We are providing project management support, technical assurance and specialist training services to over 300,000 police, fire and ambulance staff. It’s the first scheme globally to manage emergency services operations at scale across a commercial network.

**UKMEA**

| Project | Crossrail Place |
| Location | London, United Kingdom |
| Client | Canary Wharf Construction Ltd |
| Architect | Foster + Partners |

At a glance

- 47% Percentage of total Arup income
- 5,320 Number of permanent staff
- 25 Number of offices

Office locations

- Botswana Gaborone
- Mauritius Bagatelle
- Nigeria Lagos
- Qatar Doha
- South Africa Cape Town Durban Johannesburg
- UAE Abu Dhabi Dubai
- UK Belfast Bristol Cardiff Edinburgh Glasgow Leeds Liverpool London Manchester Newcastle Nottingham Sheffield Solihull Winchester
- Zimbabwe Bulawayo Harare

**Birmingham New Street**

Over five years, we provided 24/7 site presence and made more than 400 Fire Risk Assessments, each detailing required changes to evacuation procedures. This allowed rail and retail operations to continue throughout construction on the UK’s busiest railway station outside London.

**+400 risk assessments**

**Bellevue Winsford**

Lead Structural Engineer for Crossrail Place

Our challenge was to create a leisure and retail development that will attract customers and tenants three years before the Crossrail station opens. We achieved this by creating a mixture of flexible retail and restaurant units, and a garden, covered by one of the world’s longest timber roof structures which makes this a destination in its own right.

**300,000 emergency service professionals**

**Tim Worsfold**

He joined Arup in 1999. He is an Associate Director in our building engineering team in London.
“...The delivery of the BiBB in 12 months from conception to completion is entirely unprecedented in my experience. To design and deliver a unique timber framed building on this scale needs technical skill, dedication and collaboration on a level that only world-class teams can deliver. I have no doubt this was a world-class team who certainly delivered for Sky and who never stopped believing in better.”

John Nicholson OBE, Director, Sky Property
We enjoyed working with the Arup team who adopted a collaborative and inclusive working style to ensure the Plan reflected our aspirations. We also valued the team’s commitment and flexibility to the project and the high quality of their outputs.

Seychelles Planning Authority

Inspired spaces

The Believe in Better Building for Sky was briefed, designed and constructed in less than a year. This timescale meant that timber was the chosen material for the structure, floors, façades and many finishes resulting in the tallest commercial timber building in the UK. The form and transparency is driven by designing for people and a strong environmental response. The building also integrates many advanced features such as the Arup-invented rainwater harvesting WC, ecological and PV roof, mixed mode ventilation, and adaptable interiors. This multiple award-winning project forms a key part of our work on the Sky campus in West London, which also includes Sky Studios, Sky Central and the BskyB Health and Fitness Centre.

After our initial work for the Strategic Rail Authority on ‘High Speed Routes to the North’ in 2001, we have been working on HS2 since the UK Government announced the project in 2009. Our role as Environmental Overview Consultant on Phase 1 involved taking the route to Preliminary Design phase and producing the Environmental Statement, in order to provide HS2 Ltd with the level of detail needed to deposit a Hybrid Bill and obtain Royal Assent. In late 2015, we were appointed the civil engineering and environmental consultant contract for Phase 2a of HS2, helping develop the preferred route running 50 miles north from Birmingham to Crewe. Our involvement has widened to include work on behalf of local authorities, councils and other bodies, to help them realise the full benefits of HS2 as it passes through their areas.

Seychelles is predicted to experience over 30% population growth (30,000 people) in the next 25 years. To accommodate this growth, Arup has developed an integrated Seychelles Strategic Land Use and Development Plan (SSLUDP) that provides a spatial framework for Seychelles to 2040. We balanced the need for development and economic growth with the protection of the environment, along with gaining stakeholder and community buy-in. SSLUDP is the first strategic planning document of its kind in Seychelles and has been approved by the country’s Cabinet and integrated into the Government’s decision-making.

Our multidisciplinary consultancy services are ensuring the Midfield Terminal Building (MTB) at Abu Dhabi International Airport will be ready for 30 million annual passengers by its opening date in July 2017.

Arup is working to improve public safety as part of the UK Home Office’s Emergency Services Mobile Communications Programme. The project will provide 300,000 police, fire and ambulance staff with an extensive communication and data service using 4G technology. It’s the first scheme globally to manage emergency services operations at scale across a commercial network.

Leading the way

We led the design team for the Qatar Faculty of Islamic Studies (QFIS) in Doha’s Education City. Islamic symbolism informs every aspect of the striking design. Five structural pillars represent the five tenets of Islam, while two minarets rise 90m in the direction of Mecca. Quranic verses are embossed onto the mosque’s ceiling, which is also dotted with small lights resembling twinkling stars. Around 1,800 people can be accommodated in the indoor prayer halls and outdoor courtyard, while the five research centres serve over 100 students.

Outside, gardens based on an interpretation of paradise provide shade and calm, with flowing water representing the rivers of wine, milk, honey and water.

At a glance

Percentage of total Arup income

5,320 Number of permanent staff

25 Number of offices

Office locations

Botswana
Gaborone
Mauritius
Bagatelle
Nigeria
Lagos
Qatar
Doha
South Africa
Cape Town
Durban
Johannesburg
UAE
Abu Dhabi
Dubai
UK
London
Bristol
Cardiff
Edinburgh
Glasgow
Leeds
Liverpool
London
Manchester
Newcastle
Nottingham
Sheffield
Solihull
Winchester
Zimbabwe
Bulawayo
Harare

Believe in Better Building