

Annual Report 2007



ARUP





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In July 2007 the new **Amsterdam Public Library** in the Netherlands opened its doors to the public, officially becoming the largest library in Europe. Designed with architect Jo Coenen & Co, the 28,000m² building includes seven collection floors and provides storage area for books, a theatre, a readers' cafe and a restaurant overlooking the city. Arup was instrumental to the project from the very early stages, providing structural and building services design and specialist lighting advice. We designed a system incorporated into the flooring for distributing fresh air to building occupants. The atrium also serves as an outlet for air. The lighting design enhances the spatial experience by creating contrast between the various zones on the large collection floors. We also designed an innovative energy system for the library, which was realised through a holistic approach to architecture and engineering.

Original photograph © Frank Van Berge Henegouwen



Influenced by: People

Terry Hill reflects on what has influenced him throughout his life – people, from family members to mentors. As Chairman of Arup Group he is “inspired by the focus that my 10,000 Arup colleagues around the world have on implementing practices that promote economic security, social betterment and environmental stewardship. Together, we can positively influence the future.”

Pictured: Terry Hill, Chairman, in St Pancras International Station, London, UK

Sphere of influence

Creating change for good

The world is changing rapidly, and the things that are driving that change are profoundly affecting our business. Arup is a firm that strives to make a difference. The work we have accomplished this past year is proof of our ability to understand, create and manage change and to do so conscientiously. As planners, designers, engineers and managers of the built environment, we have a great responsibility to ensure that our contribution leaves a lasting, positive legacy. It is no overstatement to assert that, as we deliver our projects described in this Annual Report, we change people's lives for the good.

Arup financial results			
Financial year	2004/5	2005/6	2006/7
Turnover	£430m	£475m	£572m
Profit*	4.5%	7.3%	8.5%
Growth in turnover	5%	10.3%	21%

* Before tax and profit share

The financial year 2006/07 saw an increase in income of 21% to £572m. Profitability was on target at 8.5%. But the return is much more than that – it can be seen in the creative, solutions-driven way that we approach what we do, and win accolades for successes with our clients. As a firm, we have a unique trust ownership that allows us to shape and influence our own direction, creating a unique environment for our people to develop, empowering them to implement their ideas and in turn to influence others.

Our theme for this year's Annual Report is influence. With our range of activities and our global presence we have the capacity to touch people's lives in many ways. You can see the results in this Report.

How we influence our clients and the world around us is the key to ensuring this. I think about the people who have influenced me: my father with his infectious inquisitiveness into how things work, my mother who had overwhelming faith in me, and the mentors, clients, and colleagues in Arup – from our founder Ove to the present – who continuously challenged and inspired me. I have also been influenced by the communities we work in for over 20 years. When we listen to the people whose lives will be affected by our work, our work improves. This brings us right up to the present with our responsibilities in creating a more sustainable future. Our Sustainability Policy states that we will adopt "practices that promote economic security, social betterment and environmental stewardship".

Sphere of influence (continued)

We work collaboratively with our clients to achieve, and in many cases exceed, their goals. We are the creative force behind some of the most significant projects in existence today. I recently accompanied a number of British and Chinese government leaders and officials around the 2008 Olympics-related projects we have delivered in Beijing. We are making a real impact – from the 'Bird's Nest' stadium to the National Aquatics Centre to Terminal 3 at Beijing Capital International Airport to the China Central Television Headquarters building.

Towards the end of 2007 I had the privilege of attending the opening at London's St Pancras International Station of High Speed 1 (formerly known as the Channel Tunnel Rail Link). It was the culmination of more than 18 years of work by thousands of Arup staff as part of the Rail Link Engineering team. Her Majesty the Queen warmly congratulated all of those who had been involved in the project and told attendees that it gave her great pleasure to launch Britain's first high-speed railway and to re-open the magnificent St Pancras terminus. She said:

"The remarkable re-birth of this great and gleaming station means that people across the whole of Britain, not just the South East, are suddenly quite a bit closer to Europe. From now on, Sheffield is closer to Paris, Nottingham closer to Brussels. And as we look forward to the London Olympics in 2012, it is good to know that a journey from here to the new High Speed 1 station at Stratford will take spectators a mere seven minutes.

"All these things will bring real differences to people's lives."

We strive for that kind of influence. Every day, everywhere.

Terry Hill

Terry Hill, Chairman

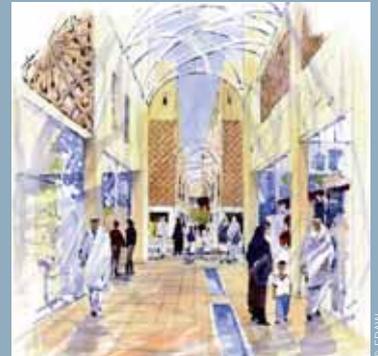


© Sydney Opera House.
Model created by Utzon Architects/Johnson Pilton Walker (Architects in Collaboration) and Arup.

At the Association of Consulting Engineers of Australia Awards in Melbourne in November 2007, *Project of the Year* was awarded to the development of a facilities management tool for the Sydney Opera House, created by Arup, CRCCI, and the Sydney Opera House, using advanced Building Information Modelling. When fully developed, it will allow our client to monitor all the building services systems fixtures and fittings, using a virtual model as interface, with two-way interactive links to existing facilities management database schedules. The model has already been used with analysis packages to study future refurbishment proposals. The project also won the Gold Award in the Information and Communications Technology category. In June 2007 the Sydney Opera House was officially included on the UNESCO World Heritage List along with 22 other global sites, including Kathmandu Valley and the Galapagos Islands.



Nicholas Faith, the distinguished author and veteran journalist, has written an account of Arup's role in selecting *The Right Line* (published by Segrave Foulkes) for **High Speed 1**. His story ends in October 1991 with the UK Government's acceptance of the Arup alignment entering into London from the east via Stratford. Professor Sir Peter Hall says in the foreword: "This, by any standards, is an extraordinary tale: a story of a grand engineering project...conceived by a tiny group of mavericks inside an extraordinary company... as the Queen opens the Channel Tunnel Rail Link, this small band will celebrate a moment of euphoria known to very few in a lifetime... a moment of recognition of their extraordinary achievement."



© EDAW

Arup is working as principal consultant, supported by EDAW, for the detailed masterplan stage of a major project to regenerate an important district known as the **Heart of Doha, Qatar**. It is strategically placed adjacent to the royal palace and the centre of government (Amiri Diwan), and is close to the Bay and the main historic Souk Waqef. The redevelopment of the 35 hectare district aims to merge traditional and modern themes in a sustainable, high-quality, mixed-use district that will set a new benchmark of civic pride for Doha.



© Arup/Frank P. Palmer

The headquarters for China Central Television (CCTV) in Beijing were designed by architect OMA and Arup. We provided multidisciplinary services for the 234m-high building. The typology of the building is a first: two leaning towers connect dramatically at high level through a 14-storey 'bridge' section, cranked in plan. The towers were permanently connected on 8 December 2007 at seven locations. The main building (*pictured*) is a continuous loop of horizontal and tower sections that establishes an urban site rather than pointing to the sky as a single tower does. A second tower on the site provides a hotel, visitors centre, public theatre and exhibition spaces. This building serves as a counterpoint to CCTV.



The **California Academy of Sciences** in San Francisco, designed by the Renzo Piano Building Workshop and Arup, was recognised in the Top Overall Project Architectural Building Design and Green Building Categories by *California Construction* magazine. The wide range of sustainable elements impressed the evaluation panel about the building that will be the country's first Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ Platinum museum and it will definitely express the Academy's mission to explore, explain and protect the natural world. Judges commented that it was the "top project of the year, no doubt about it" and was "totally unique".

In our hands

Influencing our own direction

Influencing others requires us to lead by example. Our company is rich in culture and is firmly independent. This gives us the freedom to shape our own direction. Our founder, Sir Ove Arup (*opposite page*), provided us with 13 principles in his Key Speech of 1970, which are as relevant today as when they were first articulated. Being owned in trust on behalf of our employees gives us flexibility and collective dynamism, but to influence others requires yet more.



Our **East Asia Region Design School** – one of five held around the world in 2007 – took place in Hong Kong from 29 November to 2 December with a theme of 'Inventing

the Future City' – very appropriate to Arup's business of designing cities and the rapid pace of urbanisation many Asian countries face.



We must encourage and leverage the skills and passions of our staff, as well as ensuring their well-being and professional development. Without our people, we are nothing. If we make bold decisions about how we develop our people, we will empower them to make bold decisions in turn. Such decisions develop the firm, challenge us all to stay at the leading edge, and make our staff feel they belong to something bigger than themselves: a place where their input is valuable – and valued – and where they are proud to work. We believe that if we build our people, our people will build the firm.

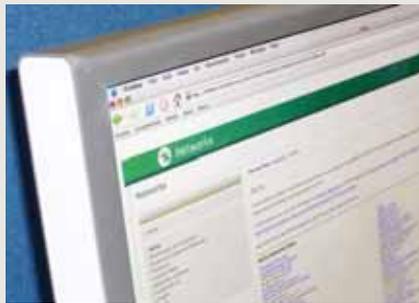
In 2007, four new appointments were made by the Trustees of Arup to our **Group Board**. **Robert Care**, Sydney, **Gregory Hodkinson**, New York, **LM Lui**, Hong Kong, and **Mahadev Raman**, New York, joined the existing eight Group Board members charged with determining the leadership, strategy and direction of the firm. Their presence creates a wider global strength, reflecting our continued international growth. Pictured left to right: Group Board members Robert Care, Tristram Carfrae, Mahadev Raman, David Whittleton, David Singleton, Gregory Hodkinson, Andrew Chan, Stella Littlewood, Terry Hill, John Miles, Jenny Baster, Philip Dilley, Alan Belfield, Matthew Tweedie, LM Lui and Martin Young.



We are developing a corporate level **Research Roadmap** – a living document which evolves and is updated to reflect the latest market developments and research needs, allowing us to plan our business activity against overarching market, environmental, societal, industry and business trends.

We conducted a second **Working at Arup** survey in early 2007 to give our staff a chance to provide their opinions of working life at Arup and to measure our progress from the last survey, conducted in 2004. In addition, 29 action-planning meetings were held around the Arup world to explore priority issues, look for trends and listen to suggestions for improvement. In general, there is a remarkable consistency across the firm about issues that are seen as problems as well as areas where we do well. The results from the 2007 survey place us in the upper decile of the *Fortune 100* companies who also form 'the world's most admired companies'.

Our network strategy team drives engagement with **skills networks** across the firm. Arup now has more than 50 skills networks catering for our diverse portfolio. We are determined that every member of staff participates in sharing their expertise through this dynamic and effective mechanism. Through meetings, online forums, learning events and the promotion of best practice we are able to provide a stimulating and rich learning environment for staff. This is critical in enabling us to provide our clients with the best available advice.



"...the question is how to influence for the good..."

Sir Ove Arup
BBC documentary 'Builder Extraordinary', 1967



Sustainability Director, **David Singleton** says: "At Arup we believe there is an overwhelming case for taking a sustainable approach to business; it is an intrinsic part of the way we do our work. For all of our 60-year history, we have aimed to operate sustainably and we therefore recognise the need to set ourselves challenging targets to improve our sustainability performance. A team of Arup's business leaders has formalised a **Sustainability Policy** that is shaping the firm's global strategy. The policy provides a central framework around our business, our people, our facilities and our external relationships. It provides a sustainable knowledge toolbox that can be easily referred to by Arup businesses on behalf of our clients. It is also driving the development of sustainability strategies that are being rolled out across our global operations. The policy is expected to evolve and support a process of continuous improvement."

Agents of change

Thought leaders

As a firm that has a positive impact on the world, we attract people that strive to make a difference – people with a vision for innovation and progress. The Arup culture is so strong it attracts many of the brightest thought leaders in the industry. Our culture encourages our people's talent, their understanding, drive, and skill, all of which positions Arup for continued growth and positive change.

Our people get results and provide solutions with a constant focus on creativity, integrity, quality and sustainability. The relationships we forge with our clients reinforce their values and visions alongside the focus on commercial success.

Our people are known for their desire to challenge themselves to push the boundaries of what is possible in order to innovate and bring about positive change. This leads us to find new answers for our clients, helping to create new ways of thinking. Our contributions add value. They create trends. They influence with implicit and explicit purpose.



Kate Hall was named one of '35 women under 35' by leading business publication *Management Today*. '35 women under 35' is the publication's annual list of women whom it thinks have the potential to rise to the very top of their game. Kate impressed them with her role as project manager for Arup's involvement in the **London 2012 Olympics**.

Angus Low was honoured by the British Group of the International Association for Bridge and Structural Engineering (IABSE), receiving the *Milne Medal* on 29 November 2007. The accolade recognises his work on three iconic bridges: **Nesciobrug**, a foot and cycle bridge in Amsterdam; **The Drachten Ring**, the A7 cycle bridge in the Netherlands; and the **Arstaviken Railway Viaduct** in Stockholm. Each year, the Milne Medal is awarded in memory of the late Bob Milne, long-serving Secretary of the British Group of IABSE, to raise the profile of individual design engineers.



Acoustic engineer, **Dr Jingfeng Xu**, was awarded the Australian Institute of Building New South Wales Chapter *President's Award* and the Chartered Institute of Building Australia's *Excellent Building Postgraduate (Research) Award* in 2007. Both awards for his entry, *Flat-walled multi-layered anechoic linings: optimisation and application*, recognise his innovative design, which provides a solution to the decade-long problem of optimising the composition of anechoic (no-echo) linings.



At the Inspire Awards on 6 July 2007, **Joanna Kennedy** (pictured left), the leader of our project management business in Europe, was named as the *Inspire Woman of the Year*. At this celebratory event launched by *The Architects' Journal*, *Construction News*, *New Civil Engineer* and *QS Week*, Joanna was recognised as an outstanding individual who the judges considered to be a testament to the achievements of women within the industry. At the event, **Jo da Silva**, leader of Arup's international development business, won the *Future of the Industry Award*, acknowledging the contribution of an individual in a job role that addresses 21st century issues facing businesses working in the built environment.



Influenced by: Challenges

The belief that every question has an answer drives **Mike Glover**. When faced with a technical challenge, Mike is determined to find the solution. This drive, coupled with his analytical skills and creative edge, enables him to achieve success in the major projects he has undertaken. Case in point, Mike was named as the seventh winner of The Royal Academy of Engineering's *Sir Frank Whittle Medal* in 2007. The Medal is awarded to an engineer for outstanding and sustained achievement that has contributed considerably to the well-being of the nation, and acknowledges his key influence and involvement in the UK's **High Speed 1** project.

© James Harris Photography



On a three-month assignment to WaterAid Nigeria in late 2007, engineer **Zak Kostura** visited many communities where WaterAid is working with local communities to provide clean water and safe sanitation. With the support of Arup colleagues he developed solutions to a number of technical and logistical challenges – including the innovation of lining household latrine pits with indigenous materials in areas where poor soil conditions have prompted them to collapse. Zak is back in New York and working to engage other Arup staff in support of WaterAid's work in Nigeria and elsewhere.

Agents of change (continued)



Dervilla Mitchell was one of 30 pioneering engineers elected to the Royal Academy of Engineering in 2007. Academy President Lord Browne of Madingley said: "Our new Fellows demonstrate the importance of engineering in the modern world. They are the cream of the UK's engineering talent and many of them are actively involved in meeting some of the world's greatest challenges: energy provision, climate change and sustainable use of materials. We salute their achievements and invite their help in moving engineering to the centre of society." Dervilla is the project director responsible for delivering all of Arup's work for the new **Terminal 5** at London Heathrow Airport.



Pictured above middle: Graduate geotechnical and tunnelling engineer **Rob Harding** won first prize – and was named *Graduate of the Year* for 2007 – at the *New Civil Engineer* magazine's Graduate Awards. He was selected out of 103 competitors based on an interview with the judges and based on his detailed written submission, which required him to outline how a reduction in carbon footprint could be achieved within his company and also the wider engineering community.

Chris Field's patented noise control product Silenceair has been named in the 'Top 10 Green Building Products for 2007' by the *US Sustainable Industries Journal*. The *Journal* writes: "Designed to fit into the space of two bricks (of British dimensions), the Silenceair provides open ventilation to the outdoors while stopping sound waves inside the walls. The inside of the Silenceair acts for sound much like polarizing lenses do on light. Different surfaces block sound waves of different frequencies, while still allowing air to pass through."



Adeline Teo won the *Design Excellence Award* at the Queensland branch of the National Association of Women in Construction Awards in recognition of her dedication to the fire safety design of the new **Brisbane Airport Expansion**. Adeline developed the concept design for fire safety for the whole terminal, liaising with the design team and client, undertaking and supervising the fire engineering analysis and negotiating with approving authorities. She also played a key role in developing temporary fire safety measures during the construction phase.



Will Emery and Giulio Antonutto-Foi (pictured from left to right) both won awards at the Generations 4 Collaboration (G4C) New Generation Awards ceremony, which was held in London on 30 November 2007. The G4C Awards recognise outstanding young achievers in the built environment. Will won the *Ambassador Award* for his previous and ongoing work to raise awareness of the role of engineers within society, and for encouraging young people to enter the engineering profession. Giulio won the *Innovation Award* for his contribution to the development of analytical, design and communication tools for lighting and building design.

Gregory Hodkinson, Chair of our Americas Region, was elected Chair of WaterAid America's Board of Directors in September 2007. The Board of Directors is responsible for ensuring that the charity is well managed and abides by its charitable aims. WaterAid's vision is of a world where everyone has access to safe water and sanitation – the basic human rights which form the first, essential step in overcoming poverty.



This past year saw more new Arup offices open around the world, including **Abu Dhabi**, UAE, **Wuhan**, China, **Mumbai**, India, **Belgrade**, Serbia, **Rome**, Italy, and **St Petersburg**, Russia.



Joop Paul (pictured above right) was appointed Professor in Structural Engineering Design at the Faculty of Architecture at Delft University of Technology in the Netherlands. Through his teaching and research at the faculty, Joop aims to develop complex geometry buildings supported by information-based design approaches and production technologies, as well as forming a strong link between Arup and the Dutch architectural academia in this emerging field.



Graduate engineers **Anthony Lau** and **Ching-Ling Lau** (pictured right) were each presented with a *Best Student Award* at an annual dinner organised by the Joint Hong Kong Institution of Engineers and Institution of Structural Engineers Division on 23 November 2007. The awards were given to structural engineering students on the basis of academic results, projects and other performance at their respective universities.

Pioneering the way

Industrial evolution

The pioneering insight that our people are known for helps keep us at the leading edge of the industry. It also moves the industry forward, shaping and determining best practice. We continually test our current knowledge and explore potential future scenarios. The depth and breadth of our offering allows us to take this best practice in new directions, influencing other firms, organisations and institutes. We successfully exploit new, innovative ideas that improve and raise the game across the industry. Our work has a significant effect on the built environment. With that comes a huge responsibility to create appropriate and sustainable solutions for our environment and the communities in which we work. Individually, we can all do our part, but together we can effect positive change on a more profound scale.

We will be the lead industry partner in an Australian Government-funded research project called *Development of a Multi-Threat Risk Assessment Model for Critical Infrastructure Using Scripted Agents*.

As analysis of low-probability, high-impact events is not amenable to traditional risk paradigms, this project will develop tools capable of dynamic risk evaluation in real time, for use by emergency response teams, with potential application in other complex network analysis problems.



We have been commissioned over a number of years as a corporate responsibility consultant to **British Land**, one of the UK's largest quoted property companies. Our commission includes the development of corporate-wide policies, objectives and targets, and the provision of specialist support to their acquisition, design and construction teams. The impact of our work is immediately apparent: British Land recently won *Sustainable Developer of the Year* in the annual Building Sustainability Awards and was previously market leader (Financial Sector) in the Dow Jones Sustainability Indices for three years in a row. Unsurprisingly, British Land is recognised as a leader in the corporate responsibility field.

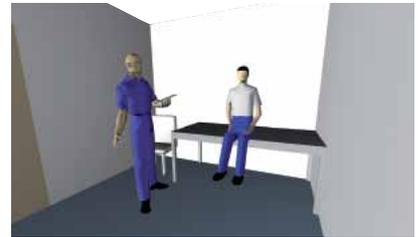
Offshore wind is fast becoming wind energy's next revolution in the UK. Arup is helping **London Array Ltd** with a project in the Thames Estuary, some 19km off the Kent coast. Constructed in phases, the wind farm is the largest of the Round 2 developments, providing up to 1GW of power. When complete, it will make a significant contribution to the UK's target for renewable energy. The success of the London Array project will lead to a more sustainable energy supply for the South East, spearhead a new enthusiasm, and provide an important benchmark in this growing market.



© Skanska

On 6 September 2007, UK Prime Minister Gordon Brown opened the **Bristol Brunel Academy**, the first school to be rebuilt under the Government's Building Schools for the Future (BSF) programme and the first of 3,500 countrywide BSF schemes to open. Working with Wilkinson Eyre Architects we provided structural and civil engineering for this challenging project. Grouting of historic mine workings increased the design and construction pressure on a project with an already tight timescale. Nevertheless, three months were shaved off the normal timescale for construction of a 1,000-pupil school.

The Fire Department – City of New York (FDNY) recently asked our fire engineers in New York to teach a course on smoke management. We developed and presented a course covering requirements from the building codes, and fire Computational Fluid Dynamics modelling and design fires. Over the last several years the group has worked very closely with FDNY on building and fire code issues.



Arup is working with Yale University Health Services to design the **Yale University Health Services Center** in New Haven, Connecticut. Recent legislation means that privacy of conversations has taken on a legal importance for healthcare facility design, pushing acoustics to the forefront. We invited a team of doctors, nurses and hospital executives to our New York Soundlab to let them listen to a scripted discussion occurring in an exam room of their future building. We then allowed the project stakeholders to listen to how well the adjacent conversation was heard and understood. We instantaneously and virtually changed the partitions and doors with types of varying effectiveness (and cost) so they could subjectively assess how different constructions affect oral privacy. The result was that in the span of one short demonstration, the project success criteria for privacy was established, as were the sound isolation strategies for the exam room partition, door, and transom constructions.

Sustainability challenges are global in their nature and require world-class solutions. An international network of **Institutes for Sustainability (IfS)** is being developed to address this need and to capture knowledge and create value from the work needed to develop the **Thames Gateway** in London, **Dongtan eco-city** in Shanghai and other related initiatives around the world. The IfS in the Thames Gateway will put the UK at the leading edge of understanding the best way to design, build, live and work in sustainable communities through sharing this information to promote good practice, conducting research and evaluating technologies in real settings. The opportunity to link the Thames Gateway IfS with the Dongtan IfS has been identified as a key UK-China deliverable for 2010.

In October 2007, **Peter Budd** was invited to serve a three-year term as Chairman of the UK Trade & Investment Government Airports Advisory Council. The Council's primary role will be to advise UK Trade and Investment on its strategy, objectives and activities to develop business overseas in the airports sector for UK companies. Peter's part-time role will involve advising Ministers on airport issues and chairing high-level events in the UK and the world.

Pioneering the way (continued)



Facing strong competition in one of the most fiercely contested categories, we were chosen as **Sustainable Engineer of the Year** at the 2007 Building Sustainability Awards. One of the factors contributing to Arup's selection for the award was our display of innovation and extensive list of 'firsts' – from our eco-city masterplan at Dongtan in China, to the Kingspan 'Lighthouse' in the UK, the first net zero-carbon house to meet the Code for Sustainable Homes Level 6. Our success was underpinned by our commitment to delivering sustainability throughout our work globally.

In 2007, **Fiona Cousins** was elected Chair of the New York Chapter of the US Green Buildings Council. The Council's mission is to transform the way buildings are designed, built and operated and to create environmentally responsible, profitable and healthy places to live and work in the greater New York area. Fiona specialises in sustainable design. Originally a mechanical engineer, this background informs her sustainability work, lending a particular strength in energy use.



As the airport industry seeks to expand its facilities and increase capacity, it is becoming increasingly important that the industry demonstrates that such growth can occur in a sustainable manner. Arup was selected as the principal investigator for the **US Transportation Research Board Synthesis S02-02** to identify a range of 'triple bottom line' airport sustainability practices. The directors of nine US airports voted unanimously to award the project to us on the strength of our reputation in airport planning and sustainability. We developed a survey of airport sustainability practices to address over 60 aspects of sustainability performance across the triple bottom line and administered the survey to more than 50 domestic and international airports within and outside of the US. The survey also prompted respondents to disclose the drivers for and barriers to implementing sustainability practices at their airports. *Pictured left:* Phoenix Sky Harbor International Airport.

We recently helped the **New York Power Authority (NYPA)** extend its credentials as one of the 'greenest' utility companies in the United States with a five-year Sustainability Action Plan that addresses environmental, economic and social concerns in one framework. Produced collaboratively by both the NYPA and Arup, the plan takes a holistic view of workplace, marketplace, operations, community, and environmental factors. It sets goals for increasing renewable power use and energy efficiency for NYPA and its customers. The plan "establishes a roadmap for injecting sustainability practices into virtually all facets of NYPA operations", NYPA Chairman Frank S. McCullough, Jr. said after NYPA trustees approved the plan in late June 2007.



Based on a brief we created for an ergonomic, future-proofed bench system for use in our offices globally, we collaborated with Kinnarps to design the **Bench F** – a new office bench system which allows individual segments of the bench to raise and lower according to the user requirements. Unlike in traditional systems, the bench legs do not define the working area of an individual employee. The resulting design is applicable to the greater market where an office manager desires the neat rows of a benching system with the versatility of a height adjustable desk system that allows a taller or shorter employee to sit anywhere in the floor plan.



We worked in collaboration with the Warwick Manufacturing Group, part of the University of Warwick, to produce a report called *Sustainable Manufacturing – a study into UK manufacturers' perceptions* which surveyed over 300 companies to establish a comprehensive picture of how UK manufacturing organisations are embracing sustainability.

Arup won *Project Management Company of the Year* at the Association for Project Management Awards in London. This award goes to companies that can demonstrate that the discipline of project management is ingrained into their culture, structure and everyday working. The judges were particularly impressed by our ability to retain a strong focus on individual talent, despite our size. They emphasised our ethos of recruiting and developing the best people, and the range of communications, social occasions, networking tools and opportunities employed to unite individuals within a shared culture.

Pioneering the way (continued)



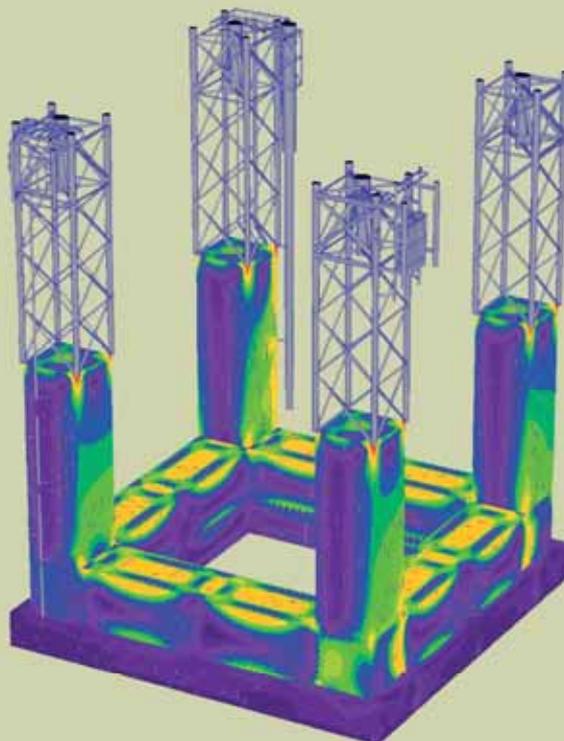
© Timothy Hursley

Designed by Burns Wald-Hopkins Architects and Arup, the **Northern Arizona University's Applied Research and Development (ARD) Building** has been awarded Platinum Certification by the US Green Building Council, the highest rating for sustainability under the LEED® program. It is the only building in Arizona to receive the top rating. The three-storey, 5574m² building scored 60 out of 69 points available, eight points higher than the LEED® Platinum minimum threshold – making it one of the highest-scoring Platinum projects ever awarded. All design and engineering credits for which Arup was responsible were successfully earned.



Steven Luke was awarded an MBE in the UK New Year's Honours List for services to business and the community in Wales. Steven joined Arup in 1975 and now leads a combined structural and building technology group specialising in multidisciplinary prime agency work, and is the network leader for the design of aircraft maintenance facilities. Throughout his career, Steven has developed strong links with many community-based organisations and is a trustee for several charities. Through his association with the organisation Arts & Business, he facilitated the production of a primary school book, *The Enchanted Lake*, which was launched at the Welsh Assembly in February 2007.

We have partnered with researchers at the University of New South Wales in winning two **Australia Research Council (ARC) Linkage grants** for collaborative investigation of sprinkler water droplet/fire interaction, and research into new risk-based techniques for prediction of rare events with catastrophic consequences. In addition, we partnered with the University of Canterbury to fund and drive the fire engineering research agenda for doctoral and masters students in New Zealand. We have also partnered with the Australian Building Codes Board and the fire authorities to seek a further ARC Linkage grant to improve the national fire statistics model and dissemination of fire risk data in Australia.



Arup's Perth, London and Houston offices are working together on the detailed design of the **Gravity Based Substructure** for the PETRONAS Carigali **MCR-A Platform** in the Caspian Sea offshore Turkmenistan. We are working for the EPC contractor, MMHE/ Technip JV. Due to the extreme seismic conditions at the platform, we have adopted innovative nonlinear time domain analysis techniques to validate the platform using a performance-based design philosophy. Our scope of services also include construction support in Malaysia and Turkmenistan, and offshore installation support.



Our lighting and environmental consultancy groups are sponsoring a PhD investigating the **effects of artificial lighting on bat activity and diversity**. In areas inhabited by bats, lighting schemes associated with construction activities and new developments represent a significant consideration in the planning approval process. The study will establish Arup as an expert in this aspect of ecological and lighting consultancy, as well as strengthen our relationship with organisations researching this and similar fields. The study will also result in a guidance manual on the design of lighting schemes and mitigation in relation to bats.

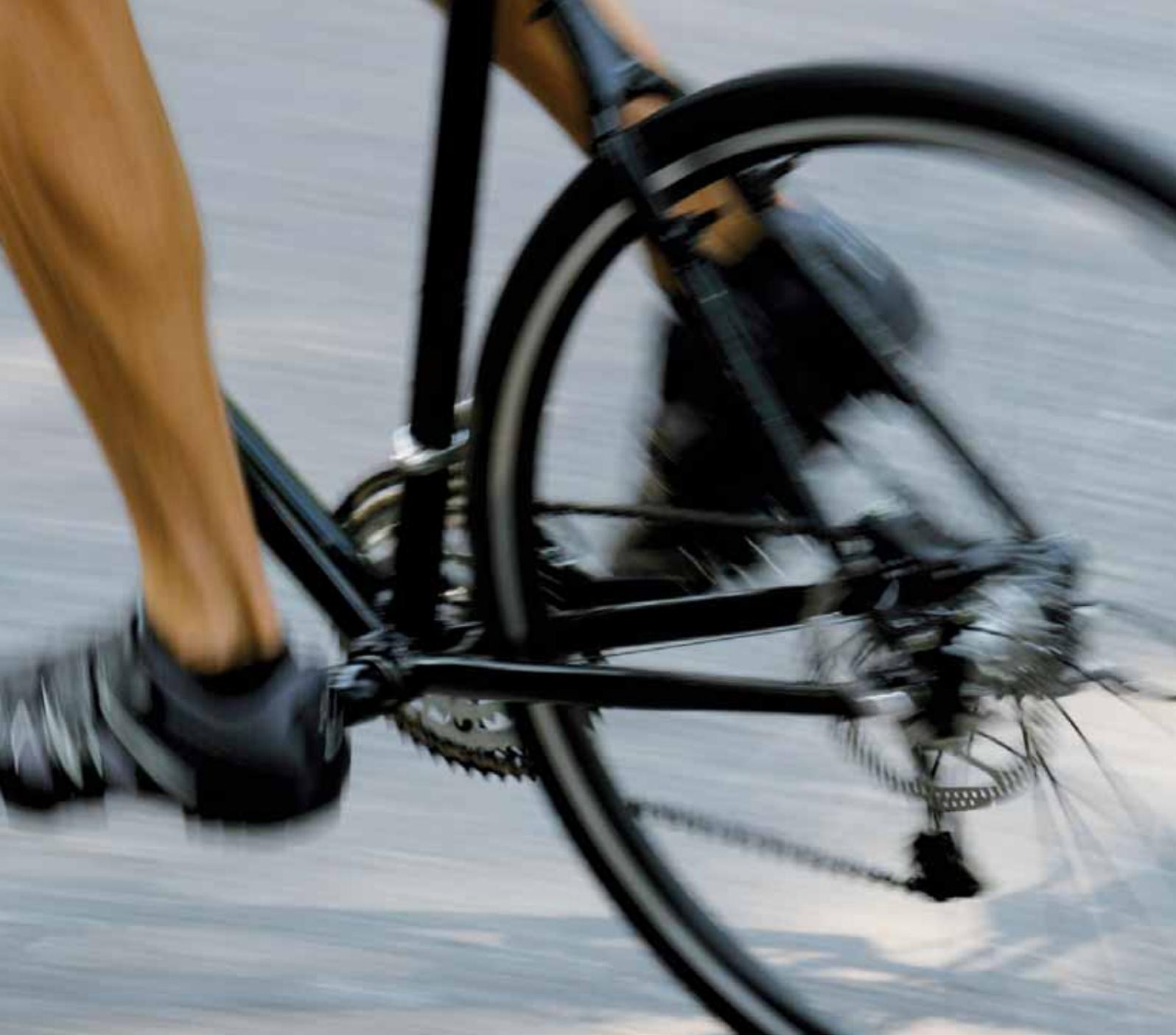


The Polish Ministry of Regional Development and the Polish Association of EU Funds Beneficiaries named Arup as the *Ecological Investment Leader 2007* in the Contract Engineer category for our management and supervision on **Waste Water Treatment Plant LYNA** in Olsztyn. The prize, consisting of a king-size golden cup and a diploma, was presented by the Minister of Environment and the Minister of Regional Development at the Environmental Congress Gala in Poznan, which included over 300 representatives from the government and local authorities, water companies, engineering consultants, environmental companies and various other organisations.

Influenced by: Design

Kylie Lam is passionate about what she does. The motivation that comes with collaborating with architects to bring a design to fruition has been a major influence in her life. Her passion and skill are recognised by others and on 20 March 2007 she won the **Hong Kong Institution of Engineers Young Engineer of the Year Merit Award**. She has been involved in a number of major projects in China, the most notable being the 2008 Olympic Games **National Stadium** in Beijing (*pictured below*) and the 610m-tall **Guangzhou TV Tower**. Recently, she was invited by Radio Television Hong Kong to be one of the interviewees for their prestigious television programme *The Generation of Professionals*.





From the top

Helping society deal with change

Policy determines the way society organises its resources, conducts its business, and expresses its values. In order to effect wide-reaching change, we sometimes need to push for a change in policy. Our groundbreaking technical expertise and the combined knowledge that we bring from across our many disciplines give us the credibility to influence decisions made by those with the power to shape policy and practice across the built environment.

Pictured left: **Cycling England** is a government-funded agency with the aim of encouraging more cycling, more safely, more often. We were appointed to provide professional support services to the organisation, providing expert help in developing policy and implementing practical schemes. We have prepared advice on policy and planning for local authorities and established an e-mail discussion group for elected members with an interest in cycling matters. At a national level, Arup has provided technical information to the Cycling England Board enabling them to make the funding case for increased government expenditure, and has worked directly with the Department for Transport to help them allocate and distribute grant-funding for Cycling England-backed initiatives such as Bikeability – the new cycle training for the 21st century.



While previous water supply planning studies have been undertaken for specific purposes within the region, Arup was selected to provide an independent and holistic perspective for the **Far North Queensland Regional Water Supply Strategy**. This will map out the provision of water resources for Cairns, Australia, and the surrounding region up to 2050. We developed a draft strategy for the Department of Natural Resources and Water that is focused on providing water security and managing the potential impacts and combined effects of climate change, continuing rapid population growth, and the movement of people and industries from regions where water may become scarce.



As a founding member of the **Emirates Green Building Council**, Arup is helping to develop a UAE-relevant version of the LEED® rating system – the nationally accepted benchmark for the design, construction, and operation of green buildings in the US. With suitable, localised benchmarks in place, designers will be able to specify sustainable materials and techniques that comply with international sustainability standards for the construction of green buildings in the Gulf.



In February 2007, Arup joined 36 of the most influential companies in the built environment as founding members of the **UK Green Building Council (UK GBC)**. More recently, we contributed leadership and staff to the UK GBC's groundbreaking preparatory work that may form part of a consultation document for the *Code for Non-domestic Buildings*. **Thomas Briault** was presented with the UK GBC's inaugural *Gold Award*, by CEO Paul King, for an outstanding individual contribution following his management of the production of its first major piece of work: *Carbon Reductions in New Non-Domestic Buildings*. This report, which will be put out for consultation, informed a recent government budget statement that aims for all new non-domestic buildings to be zero carbon by 2019.

From the top (continued)



The planning system in Scotland has been subject to significant change in the past two years. Arup worked with the **Scottish Government** to define the scope of resources needed to drive performance in the new planning system, and to calculate the impacts of that new system. Arup has also been working to evaluate the effectiveness of the Planning Development Programme, a series of initiatives intended to improve the performance of local authority planning services.



We are working as part of an international panel of experts to assist **Latvia** in the creation of a **regional tier of economic and spatial planning**. Arup and the Organisation for Economic Co-operation and Development are not only providing technical advice on administrative reform and policy production, implementation and evaluation, but also in engendering buy-in from several diametrically opposed stakeholders and Government sections.

We have been appointed by the Hong Kong Government's Environmental Protection Department to carry out a feasibility study for its **review of the Air Quality Objectives (AQO)** and to develop a long-term strategy for air quality management. The study will carry out detailed feasibility to assess the need for, and the implications of, revising the AQO, as well as to identify other options. The outcome will be a proposal for an interim and long-term strategy on air quality management needed for achieving the revised AQO, by taking a balanced and sustainable approach to various factors.



In a time of significant change in Lower Manhattan – with multiple large-scale redevelopment projects, changing development patterns and transportation network changes occurring – its historic street network is under great pressure. The **Lower Manhattan Street Management** project, based on a strong partnership between Arup and the New York Department of Transportation (NYCDOT), has created an opportunity to rethink the role that these downtown streets play in the city. The project involves a number of strategies to manage these streets more effectively and to strike a balance amongst the many different demands placed on the street system, working with the highest levels of City Hall. Recently, the City announced significant changes to their system of placard parking. This decision to reduce them by 20% was influenced by work completed by Arup in collaboration with NYCDOT and the New York City Economic Development Corporation.



© Image provided courtesy of the Queensland Government

On 14 November 2007, the team behind the **South East Queensland Infrastructure Plan and Program (SEQIPP)** in Australia won the *Innovation and Creativity Award* at the 2007 Queensland Premier's Awards for Excellence in Public Sector Management. SEQIPP outlines the Queensland Government's investment blueprint to fund regionally significant infrastructure over the next 20 years. With the expected delivery of more than 450 individual programs and projects, it is Australia's largest public infrastructure program. Laura Doughty, Executive Director of the Program Management Office for SEQIPP, said: "What we are asking Arup to do is very complicated. It involves over 20 government agencies, and billions of dollars of investment over a range of infrastructure types. In order to get a good outcome, it has required flexibility, responsiveness, and the ability to think creatively. Arup has delivered that."



We have been named *Planning Consultancy of the Year 2007* at the annual Royal Town Planning Institute Awards. The event recognises the diversity of the planning consultancy sector and its clients. This year's Consultancy of the Year award celebrates the breadth of our work in both shaping policy and delivering projects for the public and private sectors. The judging panel commented: "Arup's planners are as much **involved in shaping policy** as in delivering it and their approach focuses on outcomes as much as outputs. [Their] contribution to areas such as climate change, energy, skills and capacity is exemplary."

Mike Edmonds will take up a part-time role as Director of Construction Strategy at the Welsh Assembly Government – Value Wales. The aims of this one-year secondment will be to evaluate the construction sector in Wales, engage with the public sector stakeholders and, through Constructing Excellence Wales, establish a set of 'best practice' strategies to support a wide range of construction deliverables. Experiences gained on collaborative working and innovative procurement strategies will be brought to this important public sector position.



Responding to a government consultation on the proposal to construct a sixth terminal at London's Heathrow Airport, Arup is **exploring the benefits of connecting a new terminal** to international and domestic rail networks. We are investigating how a significant portion of the environmental harm associated with delivering additional capacity at Heathrow could be mitigated by extending High Speed 1 to a new terminal located close to the airport on the Great Western Main Line. Introducing international rail services to Heathrow would enable air to rail substitution for short haul flights to and from Paris, Brussels and Amsterdam, and strengthening domestic rail connectivity would increase road to rail substitution.

We are leading the creation of the largest and most detailed **regional review of brownfield sites within London**. We are currently engaged in developing cross-issue best practice guidance, working with all constituent authorities to establish detailed knowledge of sites and site attributes, and working alongside the London Development Agency and English Partnerships to produce a robust action plan to drive the reuse of previously developed land.

Making an impact

Enriching communities with exemplar projects

We have the potential to create sweeping change by influencing policy and leading the industry, but we are also able to create change with each individual project we work on. We create, plan, develop, engineer and manage projects that enrich the fabric of the communities in which they exist. Precedents are set for future progress.

We create settings where people want to be, spaces where people can afford to live, and places in which people choose to stay. Best practice gained with every new challenge helps us to enrich working relationships with our clients and partners. We provide them with valuable solutions, plus the tools they need to help make solid decisions for their business, and the communities in which they operate.



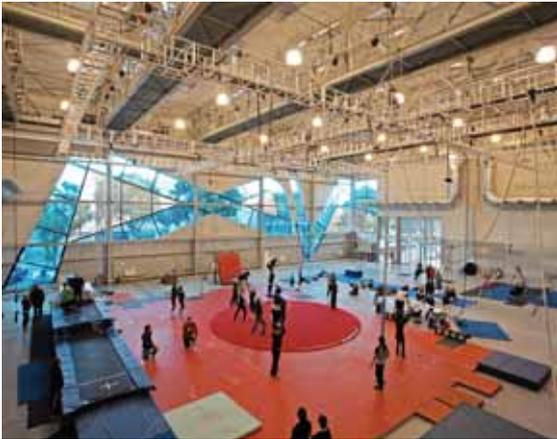
Our data centre design for **Citibank** won the *Green Data Centre Award* at the Green Data Centre Awards dinner on 4 December 2007. The building won two further accolades at the Financial Services Technology Awards, including *Overall Winner* and the *Data Centre Excellence Green Energy Efficiency Award*. This project with Citi is redefining the standard for sustainable data centres in an industrial sector responsible for 2% of global carbon emissions and, therefore, an important target for emissions reduction.



We designed the embankment improvement works for the **Dartford Creek Flood Defence Works** which combined both hard and soft engineering solutions along critical areas of frontage. The installation of steel sheet piling through potential slip surfaces reduces the risk of deep-seated slope failure. An innovative system of brushwood revetments – sourced from sustainably-managed Dutch woodland – counters the effects of scour by encouraging silt accretion.

We completed a new, state-of-the-art environment for **Condé Nast** in New York. The café is lit with LED nodes consisting of red, green and blue (RGB) diodes. The space has over 90,000 individual addressable RGB LEDs which are nestled in a cavity behind monolithic diffusing glass. They wrap the walls and ceiling, allowing images to wrap from the wall, up on to the ceiling. Each of the three colours in each individual LED node is controllable for 100% dimming, meaning that there are 270,000 individual lighting control channels. This was accomplished through advanced bespoke programming akin to data traffic mapping.





© Arup/Peter Hyatt

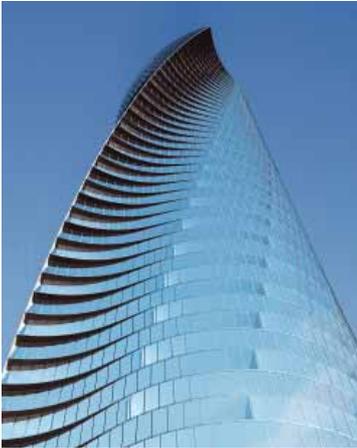
Due to its increasing popularity and changing performance requirements, the **National Institute of Circus Arts (NICA)** facility in Melbourne, Australia, was quickly being outgrown. As such, a new purpose-built training facility was commissioned by NICA, which engaged us to provide full multidisciplinary engineering design services for Australia's first world-class training and performance space for circus acrobatics. Working with Cox Architects, we incorporated innovative design elements and delivered to a tight budget; the new building's versatility caters equally to both training and performance activities alike.

Influenced by: Sport

Ryan Biziorek, an acoustic consultant in our New York office, likes to push himself to improve his skills; be daring and try new things. A focused, technical sport like skiing gives him the opportunity to do just that. He can take steeper runs, be out in different weather conditions, and hone his rhythm and form. It follows that the team he was part of won first place in the US Green Building Council's *Emerging Green Builders Natural Talent Design Competition* for their proposal to transform the NY State Pavilion in Queens into a LEED® Platinum performing arts center. Other Arupians on the winning team included bridge engineer **Mia Tsiamis** and acoustic consultant **Denis Blount**.



Making an impact (continued)



© HOK

Arup joined forces with **Louis Vuitton**, working in close collaboration with its architecture atelier to develop a lighting scheme that underlines its brand image of tradition, sophistication, luxury and innovation. The result is a fully integrated lighting concept that forms a seamless part of the Louis Vuitton experience. The extremely cost-effective lighting solution combines an exciting visual experience with benchmark energy savings. The roll-out process across its 350 stores worldwide is completely automated and offers the client a five-day turnaround time for the lighting layouts.



Arup is working with HOK architects on the design of 'D24', one of a group of residential towers for the **New Songdo International City** in Incheon, Korea. Our proposed structural system of partition walls achieves a dramatic, twisted shape with entirely column-free apartments without increasing the quantity of structural materials that would be used in a typical 'column and slab' vertical tower. The design supports the client's desire for interesting architecture while minimising the embodied energy used in the materials to construct it.



Changchun, one of the major cities in Northern China, is joining the fast train of modernisation. Arup is masterplanning the **Railway South District** of the city, bringing a new urban planning strategy that incorporates an investment and financing plan, to inspire forthcoming urban development projects across the country. We also masterplanned Changchun's **North Lake eco-city**, recommending departures from the conventional land use planning practices in China (which have been focused on physical and spatial aspects) to ones that incorporate sustainable development indicators as driving principles. Our work at North Lake and in the Railway South District Changchun won the *Silver Medal* and *Merit Award*, respectively, from the Hong Kong Institute of Planners in 2007.

The new **Fulton Street Transit Center**, currently under construction, will be the focal point of New York City Transit's subway network in Lower Manhattan. It will handle at least 300,000 subway passenger movements per day, as it connects 14 existing lines. This new development has been tailored to help enliven the existing community, providing additional retail and upgraded passenger and public street-level mobility. Improved subway ridership connections and transfers between trains will reduce train platform dwell times, resulting in considerable network-wide benefits. The development, including the iconic Transit Center head house with its underground labyrinth of passenger connecting tunnels, stretches just over three city blocks. We have led the design, working with Grimshaw Architects on the Transit Center head house; Page Cowley Architects on the restoration of the federally-listed historic Corbin Building that dates from 1889; and HDR/Daniel Frankfurt architects on the various underground station architecture modification and revitalisations.



© MTA-CO/NYCT/Arup



The **Tempe Center for the Arts** is a new performing arts centre in the Arizona desert with a 650-seat main theatre, a 200-seat studio theatre, a 200-seat multipurpose room, gallery and lobby performance space. It won the *Gold Medal Building of America Award* in 2007. Judges stated that the centre “was rated as one of the most imaginative, unique, innovative and dynamic projects in Arizona”. *The Arizona Republic* newspaper said that the arts centre was a “triumph in aural architecture”: opportunities in the expression of aesthetics and acoustics were identified to enhance and expand the success of both. An achievement, especially as the arts centre sits directly under the Phoenix Sky Harbor Airport flight path. Working with Barton Myers Associates and Architekton, we provided structural, mechanical, electrical and public health engineering, and acoustics and audiovisual design.



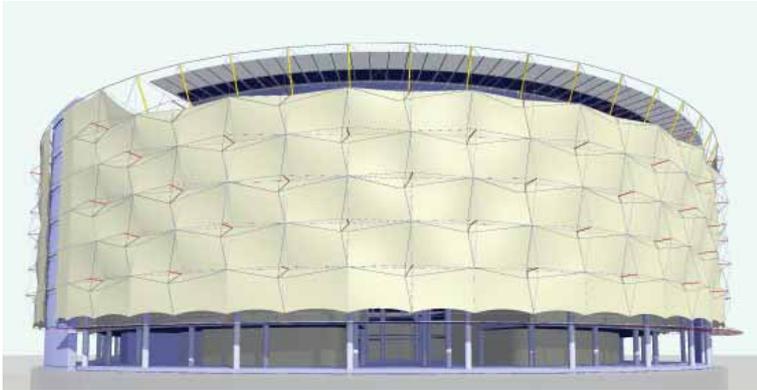
Each year there is an installation in the Turbine Hall at London's Tate Modern as part of the Unilever-sponsored series. In 2007, Columbian artist Doris Salcedo was invited. Her work, **Shibboleth**, involves a crack that runs from one end of the Turbine Hall to the other. We worked closely with the artist to develop the methodology and supporting technical detail to realise the project in a very tight timescale of six weeks.

Arup is providing specialist technical and construction support services for the **Machang Bridge**, which spans 1.7km. The bridge will join the cities of Masan and Changwon in the southern province of Gyeongsangnamdo in Korea. Part of the project is a 740m cable-stayed bridge with a main span of 400m and two side spans of 170m. A lattice girder steel deck with cable cross-beams is supported by slender 164m-tall H-shaped pylons and dual plane stay cables of the parallel wire system.



On 8 November 2007 the **Richard Desmond Children's Eye Centre** won the award for *Best Hospital Design* at the Building Better Healthcare Awards Ceremony. Working with architect Penoyre and Prasad, we provided a range of services including mechanical and electrical engineering, communications, lighting, acoustics and controls services for this specialist paediatric clinical and outpatient facility. It was opened earlier in the year at **Moorfields Eye Hospital** in London by HM The Queen.

Making an impact (continued)



The new **City of Justice** in Madrid, Spain will be the largest single site dedicated to justice in Europe, and will be composed of 15 new circular buildings housing Madrid's judicial departments in one location, providing easy access to all. Many of the buildings that make up the City of Justice, such as the Services Building, shown above, will be engineered by Arup. This major urban development project to centralise Madrid's sprawling and dispersed law-related institutions broke ground in August 2007.



The official dedication ceremony for the new **US Federal Building** in San Francisco was held on 9 July 2007. Working with architect Morphosis, we provided structural, mechanical, electrical, controls and public health engineering for the project. Our mechanical design provides natural ventilation in the perimeter office spaces for 13 of the 18 floors by taking advantage of the thermal mass available in the exposed concrete slabs, which incorporate blast furnace slag waste in lieu of 50% of the cement. We also assisted the third party commissioning agent to commission the natural ventilation system. To date, the San Francisco Federal Building has won several awards for its energy-saving design including *Best Innovation of the Year in Architecture* by *Time* magazine.



The **Ipswich Motorway** in Australia is the highly-trafficked, principal connection between Brisbane and Ipswich on the country's east coast. Our work, as part of the SAFELink Alliance team (The Department of Main Roads, Leighton Contractors, Maunsell and Arup), includes the upgrade of part of the Centenary Highway and part of the Ipswich Motorway from four lanes to six lanes and a new grade-separated free-flow interchange between the Centenary Motorway and Ipswich Motorway comprising three levels. In parallel, we developed existing planning work and assessed the impacts on the project, identifying several significant planning issues that needed to be addressed, which led to the development of a strategic delivery program that the Department of Main Roads could implement.



The 2007 RIBA Awards were recently announced at ceremonies held in London, Manchester and Reading in the UK. A host of our projects were again amongst those chosen for the annual awards, including: the **Heathrow Air Traffic Control Tower** in London (pictured above), **Dance City** in Newcastle Upon Tyne, the **Pallant House Gallery** in West Sussex and the **ss Great Britain** in Bristol.

© Arup/IBA pic

The **Toronto Central Waterfront** project received an award of excellence in the *Visions and Masterplans* category at the Urban Design Awards in Toronto on 17 September 2007. The jury commented: "A strong vision that unifies the central waterfront while respecting the episodic experience of the place, this scheme demonstrates the transformational power of a tree-lined alley." The **Port Lands Estuary** also won in this category. The jury noted: "A long dream of local activists, this vision had until now existed only as a theoretical idea or environmental assessment scenario. The Estuary scheme brings it tantalisingly close to reality, handling a beautifully naturalised new landscape with scrupulous urbanity." We are providing transport planning and civil engineering.



Together with our JV partner Worley Parsons, we are undertaking the engineering, procurement and construction management phase of Transnet's **New Multi Product Pipeline** project in South Africa. The overall project has many components, including de-bottlenecking the existing pipeline network in and around Gauteng by constructing three pipelines, increasing the supply of refined fuels into the inland network through a trunkline from Durban to Jameson Park, and building a coastal terminal in Durban and an inland terminal at Jameson Park.

Arup has been commissioned to provide multidisciplinary design for the new **East Asia Hospital** in Ho Chi Minh City, Vietnam. The hospital is envisaged to be a state-of-the-art building and will provide highly professional and sophisticated facilities both in terms of its hardware and software installations. Operated on a membership basis, the hospital aims to provide its members with a blend of high-class medical and international lifestyle services. It will be a one-stop shop for people of all ages wishing to enjoy a healthy lifestyle and will provide an oasis from the fast developing city.

On 2 November 2007 **The Kensington Oval** in Barbados won the *Building Design* award for Leisure/Sport Architect of the Year. The judges said that it has become a "modern icon", retaining the legacy of the ground, while regenerating the area of Bridgetown. On 29 November 2007, the project also won *Structural Design of the Year* at the LEAF Awards which recognise all companies, technologies and individuals that have made an outstanding contribution to the world of architecture, and who continue to set the benchmark for the buildings of tomorrow.



Christophe Fredrick Jones

MacIntosh Island Pedestrian Bridge in Surfers Paradise, Gold Coast, Australia, provides a valuable connection from the island's parkland to Main Beach and a critical link to the pit lane area during the annual Indy 300 motor race. Construction of the 110m-long bridge was completed within a tight five-month timeframe. Arup guided the design and build team to make significant changes to the project criteria to simplify the design and construction effort. We then completed the detailed design in just five weeks including ordering key components within two weeks. The project exceeded client expectations and successfully serviced the 2007 Indy crowds.

Making an impact (continued)



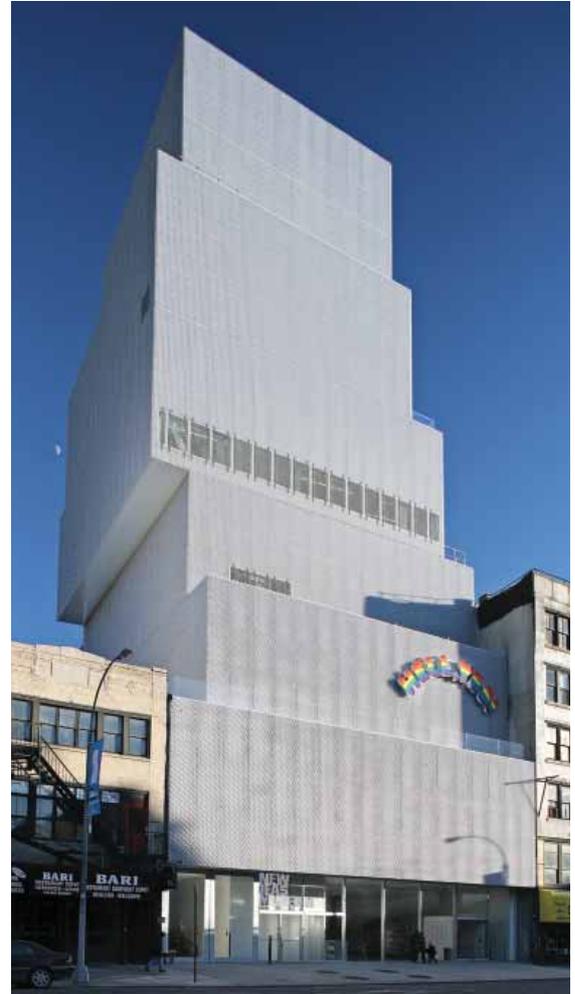
© Cox Architects and Planners

Working with Cox Architects, we have been instrumental in the design of one of Australia's iconic future sporting venues, the **Rectangular Pitch Stadium** in Melbourne, which will provide a 30,000-seat world-class stadium for soccer, rugby and concert events. The bio-frame roof provides an innovative structural solution, acting similar to a shell, therefore reducing the total tonnage of steel required compared to traditional stadium roofs. As arena consultant, Arup is making sure that the natural grass playing surface is an excellent field of play, while our façades specialists have conceived a loose fit flexible skin that adapts to the shell geometry, enhancing cost effectiveness through increased modularity.

The **Umhlanga Node Study** won first prize in the *Professional Project* category at the South African Planning Institute (KwaZulu Natal Branch) Awards Ceremony held on 8 November 2007. The award went to the eThekweni Municipality. Our transportation planning team was an integral part of the overall project team, which undertook this study to focus on the need to increase development in the area and to identify the infrastructure requirements to allow for additional growth.



© Cooper Architects/Seedat & Seedat



Working with architects SANAA and Gensler, Arup provided mechanical and electrical, public health and fire protection engineering and information technology and audiovisual design services for the **New Museum of Contemporary Art**, a 5,110m², eight-storey, structure located on the Bowery, at the origin of Prince Street in New York City. The New Museum opened to the public on 1 December 2007, coinciding with the institution's 30th anniversary.

We have been appointed by the Hong Kong Government to undertake Stage 2A of the **Harbour Area Treatment Scheme (HATS)** – a major programme started in the late 1980s and implemented in stages to improve sewage collection and treatment for areas on both sides of Victoria Harbour. Our responsibilities will include upgrading the existing chemically-enhanced primary treatment capacity of Stonecutters Island Sewage Treatment Works (SCISTW) from 1.7Mm³ to 2.5Mm³ per day, constructing a new influent pumping station and its connections, upgrading eight existing preliminary treatment works on Hong Kong Island, expanding the effluent conveyance system at SCISTW, and providing disinfection to all HATS effluent before discharge into the harbour.





© Kozo Takayama

TBWA and Hakuodo, advertising agencies in the USA and Japan, established a new jointly-owned agency in Japan called **TBWA\HAKUHODO**. New offices for the agency were subsequently commissioned; Klein Dytham architecture and Arup were appointed for the design. We were the design manager and multidisciplinary engineer for these new offices set on two floors of an existing building in space that originally housed a bowling alley. The existing bowling lanes were converted to a double-height, open-plan office space. Set at the centre of the open-plan office space is a 'disruption zone' that contains a café, planting and informal seating, creating a breakout space and informal meeting area for staff. This was considered a key element to help to bring together the staff of the two constituent companies.



© Rockwell Group

Imagination Playground was conceived by Arup and the Rockwell Group in response to the New York City Mayor's sustainability vision in PlaNYC, in which one of the goals is to have a play space no more than a 10-minute walk for any child within the city. This requires an estimated 130 parks and open spaces to be constructed and renovated over the next few years. The site for this prototype playground is in the heart of lower Manhattan in New York – where space is at a premium. The playground is designed to resemble the masted ships moored at the adjacent waterfront and uses reclaimed timbers for the decking. The design also incorporates an infiltration drainage system through porous concrete below the play areas. This is the first time the New York City Department of Parks has permitted this technique to be used in new construction.

The **World Wildlife Fund Building** in Driebergen in the Netherlands was awarded the *NET-Trofee* by the Dutch Minister of Spatial Planning & Environment. The trophy is awarded annually for buildings that set a very high standard on the field of sustainability, and are regarded as examples for the building industry. Together with RAU Architects, we have designed a building with thermally activated, loam plastered ceilings, hybrid ventilation, PV-panels and a solar boiler, long-term energy storage with heat pumps, and a combined heat/power-generator running on pure plant oil.



© Arup/Michael van Oosten

Making an impact (continued)



The Ørestad Development Corporation has appointed Arup, in a consortium with Cowi and Systra, to act as consulting engineers for the **Metro City Ring Line** (or **Cityringen**) in Copenhagen, Denmark. The new 16km metro will be a driverless system with 17 underground stations and depot, forming a circle line around the centre of Copenhagen. When completed, 85% of all homes, workplaces and institutions of higher education in the densely populated areas of the capital will be located within just 600m of a Metro station or an S-train station. This will, in most cases, mean a walk of less than 10 minutes to the nearest station, dramatically improving the city's connection to public transport.

Developed by renowned artist Peter Coates and Arup, **Textus** is an animated piece based on original script text from the signing of both the Leeds and Liverpool charters in the United Kingdom 800 years ago. The artwork is an indecipherable rhythmic pattern, suggestive of community, communication, language and activity in many layers. Launched on 12 October 2007, it heralded the launch of the Wellington Place site in Leeds as a major temporary cultural event space in Yorkshire. Arup is also providing multidisciplinary engineering services to developer MEPC for the site.



Arup, with the OMA, was selected to design **Shenzhen Stock Exchange's** new headquarters and financial exchange. We are responsible for the multidisciplinary engineering design for the new landmark building, located in Shenzhen's new Financial District adjacent to the administrative and cultural centre of the city. The building features a floating podium raised up the tower to become a platform to support and launch the area which it liberates on the ground. The space between the raised platform and the ground is used as a covered urban plaza, large enough to accommodate public festivals and financial information streams down digital banners hanging from the elevated podium.

Arup was commissioned by Nakheel LLC as the engineering consultant for all site infrastructure design for the new 733 hectare **International City** in Dubai. The City, forecast to have a population of 150,000, will include commercial, residential, community services, retail facilities, schools, religious centres and public open spaces. Now in construction, the City's design incorporated site-wide water balance to maximise the reuse of water from the site, an emphasis on pedestrian mobility and public transport, and flexibility for utility connection to third-party plot developers.





© Richard Manselhorn/Bruner/Cott Architects & Planners

One of three in the State of Massachusetts, the Blackstone Campus was awarded a LEED® Platinum rating earning 54 points, making it the highest ranking in the State to date. Working with Bruner Cott Architects, we were able to achieve energy savings of 45% over a code minimum building through sustainable design of the mechanical, electrical, and plumbing systems for the facility which houses **Harvard University's Operations Services Department** in Cambridge, Massachusetts.



© Anup/Inbiano.pl

Completed in February 2007, the **Złote Tarasy** complex is a 207,000m² mixed-use development in the centre of Warsaw. Designed as a lively, multi-levelled canyon, it combines office, retail and entertainment facilities in a natural environment. The centre of the complex is protected by a 10,500m² free-form glass roof which creates an 'outdoor' ambience, while the addition of heating and cooling allows it to remain comfortable throughout the harshest of Polish winters. Working with architect Jerde Partnership Inc, we provided structural, acoustic, geotechnical, civil and traffic engineering design, pedestrian modelling, sustainability and building physics services for this state-of-the-art development.

As one of the UK's largest motorway construction programmes, effective budgeting and cost management is a critical part of developing the widening of the **M1 Motorway** between junctions 21 to 30. As lead designer to the Highways Agency for the scheme, our team defined and introduced a robust estimating process to help improve cost certainty for the Agency. A target cost was agreed with the contractor, MVM, appointed to build the scheme which fell below the original scheme budget.

At the Builder and Engineer Awards 2007, held on 10 December in Manchester, UK, we were awarded *Project Manager of the Year* for our role on the **Barnsley Transport Interchange** pictured right, as well as the *Consulting Engineer of the Year* award for our design of **Doncaster Education City**.



© Anup/Simon Miles

The big picture

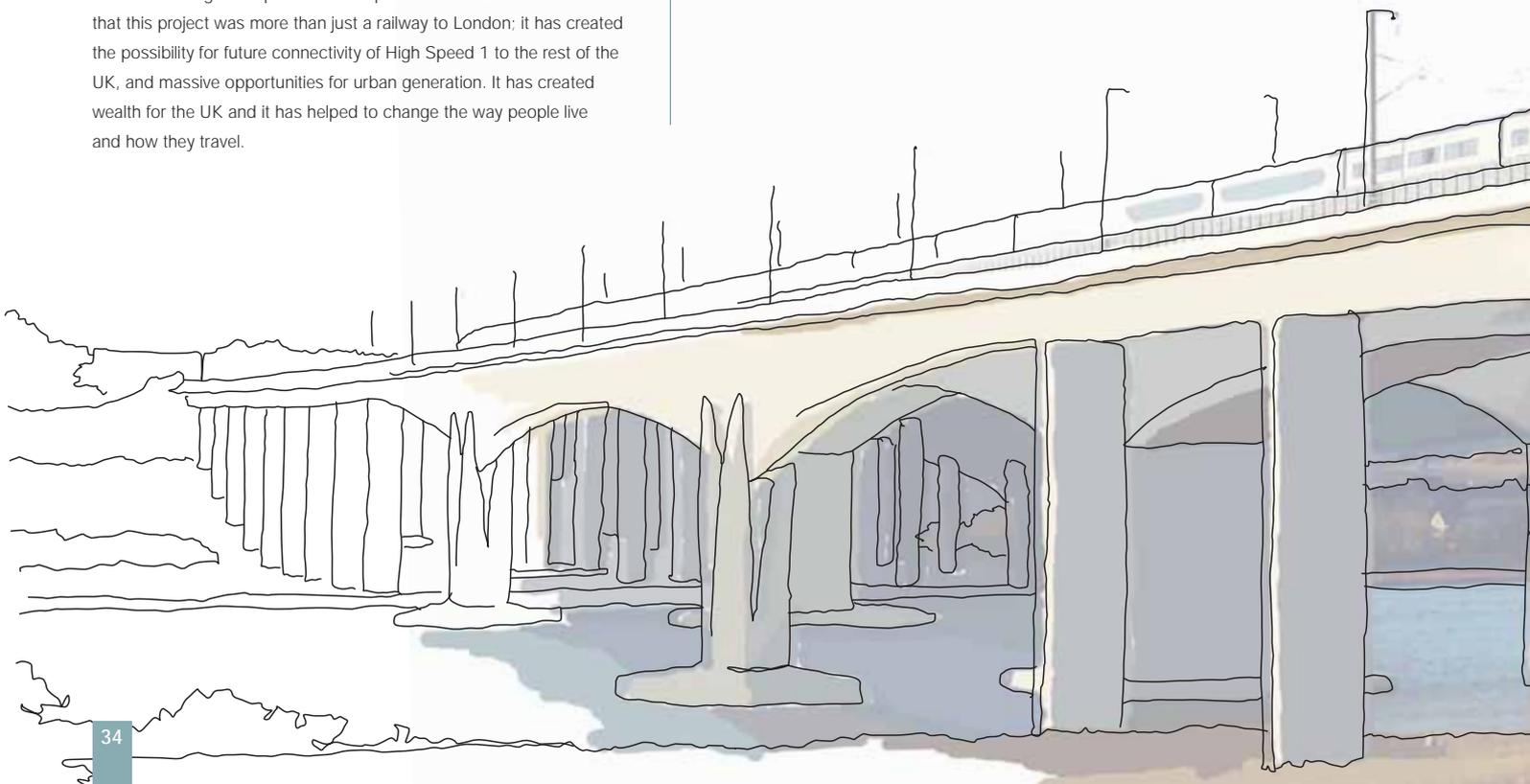
Enhancing projects across their life cycle

One of our strengths as a firm lies in our ability to influence each aspect of a project from start to finish. Our range of technical, design, creative and management skills provides an unparalleled opportunity to take all the pieces of a project puzzle and fit them together to create the big picture. Together with our knowledge of geographies and cultures we deliver valuable, integrated solutions around the world. We are able to look at buildings, the spaces between the buildings, how they connect, and how they enhance the fabric and infrastructure of the communities in which they exist.



The first new railway to be built in the UK in over 100 years, the recently completed **High Speed 1**, formerly known as the Channel Tunnel Rail Link, (shown below) enhances the UK's engineering image around the world. Mega-projects like this take a long time to come to fruition and thousands of our staff across the world worked on every aspect of this project as part of the Rail Link Engineering team. We helped to engineer, design and manage the railway – on time and under budget. Arup created and planned the route with the vision that this project was more than just a railway to London; it has created the possibility for future connectivity of High Speed 1 to the rest of the UK, and massive opportunities for urban generation. It has created wealth for the UK and it has helped to change the way people live and how they travel.

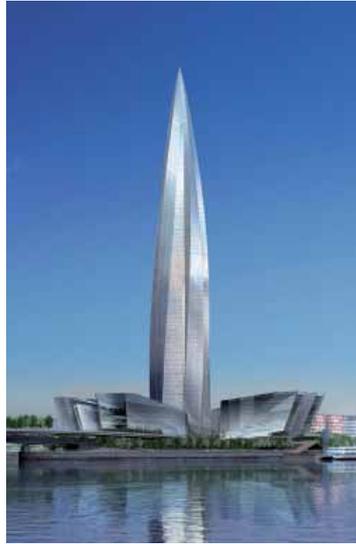
Arup is providing an integrated, multidisciplinary design service that combines in-house capabilities with skills in design and management for Poland's first private general hospital. The coordination of our global and cross-sector resources is rapidly defining the **Medicover Hospital** as a model project. It is being built on a greenfield site in the upmarket district of Wilanow, south of Warsaw. Overcoming environmental constraints on the suburban site, and implementing a novel partnering procedure with the contractor, have already helped to mitigate increases to construction costs.





© Arup/Martin Saunders

Beijing Capital International Airport's Terminal 3 is one of the world's more environmentally sustainable airport terminal buildings and has been designed to respond to Beijing's cold winters, hot summers and short autumn and spring seasons. The roof incorporates several energy-saving features such as south-east orientated skylights which enable the sun to warm the building on winter mornings and make the most of available daylight during normal operational times.



© RMJM Ltd

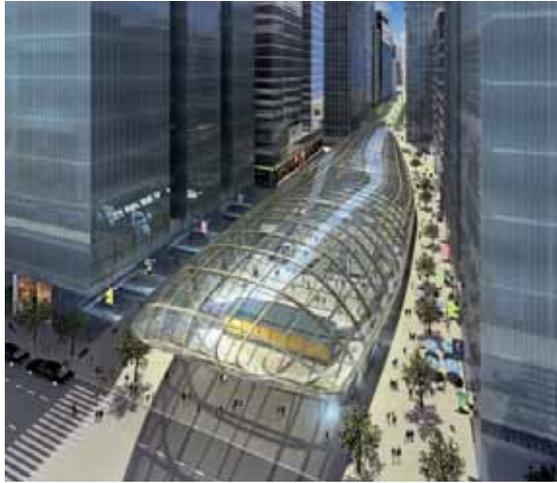
Our client, Gazprom Neft Invest, one of the largest energy companies in the world, wants to construct an iconic building that will raise its profile and its their new company headquarters in St. Petersburg, the Northern Russian capital. We have been involved in this project from the very beginning as the independent technical adviser. We organised the international architectural competition; supported competing architects and commented on their proposed designs; advised them on all aspects of infrastructure, transportation, environmental and building engineering design for this project, and finally prepared engineering technical briefs for the design of the **Okhta Tower** with surrounding buildings and for the multifunctional theatre and concert hall, and modern art museum.



The big picture (continued)



Building and operating high-performance roads is expensive, and many governments are turning to **Public Private Partnerships (PPP)** as a way to supplement the constrained resources of the public sector. Arup has established itself at the forefront of providing consultancy advice on toll roads and PFI/PPP transport projects. We deliver independent advice, pragmatic solutions, innovation, value-for-money options, optimum risk allocation, application and integration of appropriate technology, and commercial confidentiality. **Efie Drivyla** and **Ignacio Barandiaran** (pictured left to right) are leaders in our sponsor and lender advisory practice in the Americas, working on a number of major road privatisation projects for banks, developers and other consortia.



We are providing a range of services – including interchange planning and design, architecture, transport planning, highways consultancy, underground ventilation specialist advice, financial partnering and transaction advice, and sustainability strategy development – to create the multimodal **Zuidas Connector** interchange. We are integrating a new international centre within an evolving urban context to create a hub which can operate and offer an iconic image at the heart of a new city quarter in Amsterdam. We have developed design concepts for the interim station and final interchange station which respond to the future challenges of Zuidas as an international destination.

Al Dana Precinct is the civic heart of the 10.5km-long, 5.7Mm² **Al Raha Beach development** in Abu Dhabi. It contains a number of iconic buildings providing a mix of high-end residential, commercial, retail and hotel properties. The geographic spread of Arup's operations has helped to integrate and minimise interfacing issues by providing a common thread through a development being designed by architects from all over the world. Our Los Angeles office is working with Hollywood-based 5+Design architects on a complex mix of high- and low-rise buildings; our New York office is working with Asymptote architects on an iconic spiralled tower; in London we are working with Foster + Partners to deliver a unique, geometrically challenging World Trade Centre; and our offices in Abu Dhabi and Sydney are working with Qatar-based architects MZ & Partners designing an unusual 23-storey circular office tower which will become the new headquarters for the Al Raha Developer, ALDAR Properties PJSC. Arup's services began at the concept phase and will continue through to commissioning.



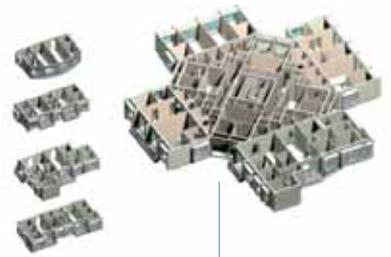


© Olympic Delivery Authority

Arup is working to assist in the successful delivery of the **London 2012 Olympic and Paralympic Games**. The Games will be centred on a new 250 hectare park in East London, regenerating a large area of derelict land in a socially deprived area of the city. We are one of only three 'Tier 1' designers charged with preparing the Games masterplan, obtaining planning permission, and designing the complex new infrastructure for the Park both during the Games and for legacy.



Responsiveness to the Market (RTM) is a new concept of industrialised building components that provide renewable, efficient, adaptive and liveable housing to consumers. Rapid urbanisation in China means that more than 15,000m² of housing will need to be constructed to accommodate the new urban dwellers. Shui on Land, a developer, has commissioned Arup, the Advanced Manufacturing Institute (AMI) of the Hong Kong University of Science and Technology, and Tecton Ltd, to develop a holistic approach to the whole supply chain of residential building development.



Our planning team in Brisbane, Australia was recently awarded a contract by the Queensland Government Department of Infrastructure and Planning (DoIP) to provide specialist programme management resources, knowledge, experience, capabilities, skills, systems and services to assist in the timely, planned and coordinated delivery of a **range of urban planning projects across the State of Queensland**. The contract reflects the first time that DoIP have entered into a specialist resourcing arrangement with a consultant to provide broad planning assistance. Considerable praise has been expressed towards the innovative work and collaborative approach of our planning team, with comments such as: "We like how we can bounce ideas with you...unlike other consultants".



© Gray Palsand

For the second time, Arup has won the contract to programme manage the **Victorian Department of Education and Early Childhood Development's Capital Works Program** through to 2012. This new commission follows on from an identical commission Arup won in 2001. One of the largest public capital works budgets in Victoria, Australia, the Education Capital Works Program encompasses the programme management of projects from modernisations of existing schools to the construction of new schools around Victoria. Under the new contract, we will now be the programme manager for all of the State's primary and secondary school capital works, managing an allocation of 80-100 projects per year for the next three years, and seeing those projects through to completion.

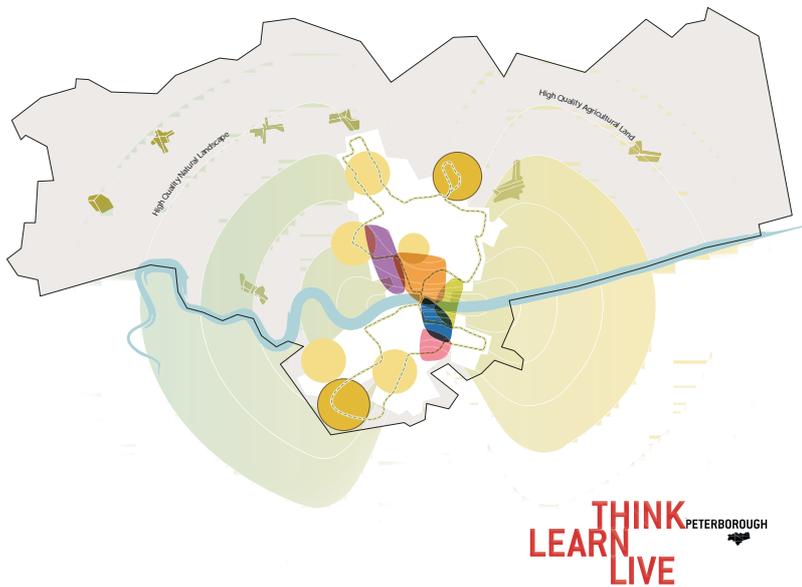
The big picture (continued)

The GreenPix – Zero Energy Media Wall

project involves wrapping an existing building on Xicui Road in West Beijing with what will be the world's largest permanent media wall installation. It is unique in integrating photovoltaic (PV) cells and LED lighting together on such a large scale. The media wall that we are creating with architects Simone Giostra & Partners will become an iconic landmark in this area of the city. We believe this is the first time that glass-laminated PV transparent modules and LED lighting systems have been integrated together in this way. This combination is also a showcase of emerging sustainability technologies. The system is essentially self-sustaining, with the energy output from the PVs exceeding that consumed by the lighting system. The design process was truly international, with team member locations spanning 13 time zones.



© Simone Giostra & Partners/Arup/Zhou Ruogu Architecture



Peterborough city centre, in the UK, is in urgent need of regeneration. A multidisciplinary Arup team was commissioned by Opportunity Peterborough and Peterborough City Council to prepare an **Integrated Growth Study** to produce an overarching framework for regeneration and growth up to 2021. The study shows how plan preparation can be driven by sustainability while being methodologically transparent, robust, detailed, deliverable, and rooted in community consultation. Deliverable strategies for the comprehensive range of topics involved in fostering successful growth include 20,650 homes and 80 hectares of employment land, provision of social and community infrastructure, protected and enhanced environmental features, and phased programmes to deliver £140m in utility investment and £80m in bus network and transport infrastructure. The groundbreaking Sustainability Charter for Peterborough, which we developed, links the proposals into one overarching mechanism, sets out the key drivers for growth, and creates a monitoring system of unprecedented depth to measure and drive change. Our vision is in the process of being adopted as the official vision for the future of Peterborough.



© James Lauritz/Getty Images

The global economy's underlying supply chains can be kinked, distressed, diverted or even ruptured by events that are often unforeseen. These changes can result in a loss of efficiency, supply and business. The Arup solution, according to **Graham Bolton**, a director of our management consulting business, is to "take a step back and take some time to identify the future challenges facing a business. Of course you have to look at the big picture but you must also be able to focus on what is most important." Arup provides smart tools for **rethinking logistics** and analysing all the factors affecting the global supply chain, enabling companies to measure their progress and plan ahead.



The **Venetian Macao**, an entertainment complex comprising a 3000-room, five-star hotel, a 56,000m² casino, a 140,000m² Expo Centre, a 93,000m² retail space with three internal canals – each 150m long, a 15,000-seat Event Centre (multi-purpose stadium) and a 2000-seat theatre was opened on 28 August 2007. The complex, for which we provided civil, structural, geotechnical and traffic engineering and site supervision, is the anchor development of seven parcels of development along the Cotai Strip between Coloane and Taipa in Macau. The plan is to reshape Macau into a city similar to Las Vegas with future business focused on expo shows, conventions, tourism and gaming to help Macau broaden its economy.

Our constantly evolving skills base reflects the diversity of both our clients and our staff. Our specialist **naval architecture** capability has been growing in Australia over the last 12 months. By working in close collaboration with colleagues from the energy, maritime and geotechnics groups, our naval architecture group can offer numerical fluid analysis, stability analysis, tank testing, structural design and analysis, underwater appendage design, marine operations, fire and safety, repairs, refits and surveying services.

Arup has been assisting the Welsh Assembly Government for many years to develop scheme proposals in support of the statutory process for the new **M4 Motorway**. A key component in maintaining safety, informing travellers and minimising impact on the environment, will be the application of leading-edge technology on the road. This technology will make best-use of the available road space by providing the network operators with the tools to monitor traffic, detect incidents and advise motorists of conditions ahead. The new M4 will contain the core systems to support the next generation of traffic management and control. In developing these evolutionary systems Arup will be working with industry and academia to ensure their client remains at the forefront of Intelligent Transport Systems (ITS). In 2007, **Tim Gammons** (*pictured right*) joined Arup to drive consultancy services in ITS. This major project is just one area where his skills are being deployed to add value to project delivery. Tim, who currently leads our ITS business in Europe, takes a holistic view of a user's travel needs. We are able to draw on the expertise of our colleagues in vehicle design, scrutinise the whole journey life cycle carbon footprint, and develop dynamic air quality management strategies.



We were recently selected, in consortium with Terry Farrell & Partners and SMEC, to redevelop the **New Delhi Railway Station** in India as an urban icon for a modern, vibrant city. It is the first station within the Ministry of Railways Worldclass Station Programme. We are preparing the masterplan and concept layout plan for the redevelopment of the station and its adjacent 86 hectares. It will offer superior services for passengers, train operations and maintenance, provide new community space and better transport arrangements for the public, and provide modern office space, high-quality accommodation and facilities for the railway staff. Upon completion, the station will include 18 platforms and handle in excess of 500,000 passengers per day. Implementation of the project will be phased so that existing operations are maintained. The project will be procured under a public private partnership model to provide commercial development opportunities and facilitate an optimal revenue model for developers.



© Bob Oram

Improving people's lives

A holistic approach to progress

We aim to deliver projects and services that improve people's lives. Our goal is to improve our clients' businesses; and enhance the communities in which we work. We want to provide end-users with improved tools, options, means and methods to help them responsibly change the way they work, play, travel, think and adapt to the future, today.

Faith & Form magazine recently awarded 'The Rising' Westchester 9/11 Memorial (pictured left) its 2007 Honor Award for Sacred Landscape. Working with Schwartz Architects, we provided structural engineering services for the 24m-tall, intertwining stainless steel structure in which 109 steel strands, representing the 109 lives lost on 11 September 2001 from the Westchester community, rise to form one single rod. The structure rises from an 18m-diameter circle of 109 granite stones, each engraved with the name, date of birth, and inscription provided by the family.

By connecting people to the information they need, modern technology can improve a city's environment and economy, making it a more desirable place to live and work. At Arup, we describe our approach to delivering information in cities as **Urban Information Architecture**. A team of Arup experts recently helped Land Securities to plan information technology (IT) across a new development in Ebbsfleet Valley, Kent. We carried out workshops to look at which IT services would be needed across the entire development. These services would build on Land Securities' existing investment in state-of-the-art infrastructure, including fibre optic cables running right up to houses and allowing fast internet access for years to come, without having to upgrade.



Arup is supporting Interactive Africa with its **Design Indaba 10x10 Housing Project** in Cape Town, South Africa. The aim of the project is to develop innovative designs suitable for low-cost housing. We are providing technical advice on materials and construction, and we will assist in capturing the design principles of the project in a manual to be presented to South Africa's Minister of Housing. The information will become architectural design open source, such as this design by MMA Architects of Cape Town.



© MMA Architects



Following its selection by *Environmental Design + Construction* magazine as winner in the *Institutional, Non-Profit Organization, Educational or Healthcare* category in its 2007 Excellence in Design Awards, the **Kirsch Building for Environmental Studies** at De Anza College in California has also won the inaugural Center for the Built Environment (CBE) *Livable Buildings Award*. CBE selected 10 finalists from a pool of over 300 buildings to participate in the 2007 Livable Buildings Awards. For every award category that Arup had responsibility for (acoustics, lighting, thermal comfort and air quality), the building scored in the 100th percentile.

Early in 2007, the Government of the Emirate of Abu Dhabi initiated a series of charrettes to inform the development of an **Urban Structure Framework Plan (USFP)** that will ultimately be used to assess and control development in Abu Dhabi over the next 25 years. Arup was invited to be a member of the 'expert team' brought together for these charrettes and to contribute on issues of infrastructure and sustainability. The charrettes led to the publishing of the USFP in September 2007 and the setting up of an Urban Planning Council to take on the role of development control in Abu Dhabi.

Improving people's lives (continued)



© Joseph Cory & Eyal Malka

Supported by WaterAid, Arup created an international competition – the **drawing water challenge** – to find new ideas and concepts to help deliver clean water and sanitation. It attracted 91 entries from 19 different countries. Israeli architects Joseph Cory and Eyal Malka were the winners for their design called *WatAir* – an inverted pyramid that collects dew from the air, providing 48 litres of fresh water each day in almost any climate.



Working for the Land Transport Authority, our performance-based fire engineering solutions provided user-friendly changes to the design of three existing **Mass Rapid Transit stations in Singapore** – Dhoby Ghaut, Clarke Quay and Tanjong Pagar – by allowing the integration of commercial spaces. This was a first in terms of increasing the potential for commercial space beyond the prescriptive requirements for MRT Stations, which has added a whole new lifestyle aspect to Singapore's public transport system.



Jeddah, located on the Red Sea on the western coastline of the Arabian Peninsula, has established itself as the commercial capital of the Kingdom of Saudi Arabia and the genuine gateway to the holy cities of Mecca and Medina. We have been commissioned by the Urban Development Company to develop a masterplan for a 5km² central district. The sustainable development strategy aims to reunite the city centre with the sea, and to strengthen its economic vitality and the role of Jeddah as gateway to the Arab world. The key urban arrangement of the development strategy will create spatial connections between the city and new developments along the waterfront.

We have provided a sustainability strategy, structural, mechanical, electrical and public health engineering, geotechnical engineering, infrastructure and environmental consulting concept design for **One Gallions** in London, which will be the first zero-carbon development in the UK since the **BedZED** project (also an Arup project in London). It will produce all on-site energy from renewable sources. It is envisioned that Gallions Park will act as a benchmark for sustainable development, not only during construction but also for energy use into the future. It will also show how carbon-neutral housing can be financially viable and built by commercial developers.



© Crest Nicholson, Barrow and Cousins, LLP, Felder Claggy Brandy and Studio Toni YL-Suzano



Saltwater shrimp farming, saline intrusion from the sea and arsenic contamination make freshwater scarce in Satkira, Bangladesh. Together with **WaterAid Bangladesh**, an Arup team assessed current supplies, possible options and technical solutions, including rainwater harvesting, solar distillation and desalination technology. We took account of traditional social structures, available skills and limited financial resources, using our insight into the issues in managing community-based schemes in less developed areas. We are currently investigating reverse osmosis as a possible long-term solution and plan to develop case studies via desktop research and a month-long country visit.

We have recently accepted a semi-voluntary commission from the Mongolian Children's Aid Foundation to masterplan and design the **Lotus Children's Centre** – a centre for homeless children in a suburb of Ulaanbataar, the capital of Mongolia. Arup was recommended for the project because of our successful design of the **Druk White Lotus School** in Ladakh, north-west India. The design team for the Lotus Centre will aim to achieve a safe and economic design, minimise maintenance cost, maximise use of local materials and local skills, and set a local example for utilisation of renewable energy and sustainable design in this demanding environment.



Anna Pearson won the 11th *Glossop Award*, the most prestigious early career award that the Engineering Group of the Geological Society can bestow. Her winning presentation, entitled *Reduce, reuse, recycle: engineering geology of a sustainable housing development, Eastern Quarry, Kent*, was presented as part of the Engineering Group Forum on 21 November 2007.

We are providing pro bono, multidisciplinary technical advice and project leadership for a sustainable development plan in **Paposo**, a rural desert community in Chile. Supported by the University of California, Berkeley, and the Universidad del Norte, Chile, our plan aims to improve the town's water supply and wastewater handling systems, encourage local businesses, improve the area's infrastructure and promote environmental stewardship.



On 28 November 2007 the **Dongtan eco-city** was recognised in the inaugural MIPIM Asia Awards, an event focused on real estate in Asia Pacific. The award is designed to honour the most innovative and outstanding buildings in Asia. The international jury selected three finalists for each of the seven competition categories out of 100 entries from 15 different countries. Dongtan won the Futura Projects category.

Improving people's lives (continued)



Our planners in Brisbane picked up a *Certificate of Merit* in the Planning Achievements in Small and Local Communities category for their work on the **Douglas Shire Sustainability Code** at the Queensland Division of the 2007 Planning Institute of Australia (PIA) Awards of Excellence held on 9 November 2007. The Code – the first of its type to be developed and adopted by a small regional Council in Queensland – is helping protect one of the world's most pristine natural environments from overdevelopment. We also won a *Certificate of Merit* in the Transport Planning category for the **Normanby Pedestrian and Cycle Link** project, which was described by the PIA as delivering "a local transport solution that significantly improves access and provides high standard non-road outcomes for the community".



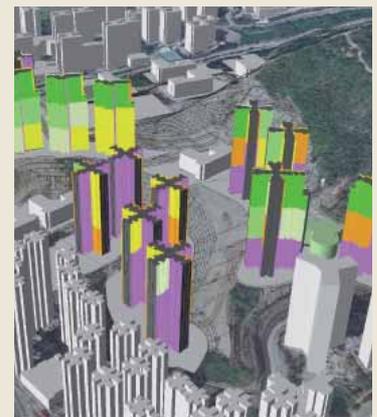
Former UK Prime Minister, Tony Blair invited **Tony Kirby**, a senior site development engineer from our Cardiff, Wales office, along with a number of other young engineers and scientists, to 10 Downing Street as a way of thanking them for their contribution to the economic prosperity and quality of life in the country. Tony volunteers for the Institution of Civil Engineers' *Bridges to Schools* initiative and is also an ambassador for the Construction Industry Training Board. The two initiatives encourage students to take an interest in maths and science, and demonstrate the varied career opportunities that engineering offers.



© Peter Hyatt

K2 Apartments is the first multi-level sustainable social housing project to be undertaken in Victoria, Australia. The 96-unit medium density social housing development for the Department of Human Services is a model of energy conservation and sustainable building design. Key objectives of the design by architect DesignInc and Arup were to minimise greenhouse gas emissions, make use of reusable and recycled construction materials, and minimise habitat degradation through efficient water use and pollution control.

Arup collaborated with the Hong Kong Housing Authority on microclimate studies and sustainable design for public housing developments since 2000. We have handled over 30 public housing projects in different districts of Hong Kong. These microclimate studies have given design teams valuable advice and practical solutions for sustainable planning and design of public housing. Our **Microclimate Planning Research Studies for Sustainable Public Housing Development project** was awarded the *Hong Kong Institute of Planners Award* in 2007.



Arup engineers **Matt Jackson** (pictured second from left), **Mike Capuzzi** (pictured rear centre, wearing white shirt), and **Jonah Allaben** (pictured sixth from right) teamed up with architects from HOK to kick off another session of the **Architecture, Construction, and Engineering (ACE) Mentoring Program**. ACE is a national organisation in the US dedicated to mentoring and encouraging high school students to pursue careers in engineering and architecture through lectures, site visits, and hands-on learning activities. This year, our team will have 15 students coming from high schools all over New York City.



The **Concord Community Reuse Project** involves preparing a reuse plan, led by Arup, for the Concord Naval Weapons Station, a 2,035 hectare former US Navy munitions installation that is located within the incorporated City of Concord, 45km east of San Francisco. We have employed an intensive planning process to engage the community and incorporate its ideas into the plans for the future uses of the site. The effort has, to date, identified seven alternative concepts that all incorporate sustainable, transit-oriented development as the foundation of future site use. The alternative concepts provide for a mix of residential and commercial development that promotes a balance of jobs and housing integrated with community facilities and parks, recreation, and open space that will set a new standard for urban development in Concord and the rest of the San Francisco Bay area.



Working with architect Sheppard Robson, we have designed the prototype **Kingspan 'Lighthouse'**, the first UK house to achieve the Code for Sustainable Homes Level 6, which requires homes to have net zero-carbon emissions over the year. The Lighthouse aims to explore how the house of the future might meet these tough new specifications. It has high standards of energy efficiency, a wood-fuelled boiler for heating and a large array of photovoltaic panels for electricity generation. It also has water-efficient fittings, recycles greywater and collects rain water for irrigation and the washing machine.

A team comprising Arup, Barratt Developments, HTA architects, Kingspan, and Sovereign Housing Group has been selected by English Partnerships to create a new community at the former **Hanham Hall Hospital site** near Bristol. This was the first site identified under the Carbon Challenge, being run by English Partnerships as part of the UK Government's commitment to tackle climate change. The Carbon Challenge aims to accelerate the house-building industry's response to climate change by fast-tracking the creation of several zero-carbon housing developments. It is anticipated that the site will support up to 200 homes, of which around 50% will be affordable, as well as retail floor space and employment space. The on-site biomass combined heat and power plant will deliver energy to all homes.



We shape a better world

The ultimate influence

It is both a huge opportunity and a significant responsibility to work on projects that provide our clients, the communities we work in, and the end-users of our projects with the possibility to transform the way they think about the future.

We have invested heavily in research that is helping us to understand what drives progress in the world today. These 'drivers of change' affect all of us and, in turn, we can influence them. The range of in-house technical, design, creative and management skills that we possess can help society understand and deal with the challenges that the future presents.

Collaborating with our clients to help them adapt their businesses, and empowering people to change the way they live, means we can help improve the built environment and the wider environment. As our mission states: we shape a better world. That is the ultimate influence.



Drivers of Change is a concept developed by Arup to indicate key issues that will play a role in our future: ageing population, energy use, connected communities – to name but a few. The drivers affect all of us and alternatively, we can affect them. They are the ongoing themes of workshops, publications, talks and exhibitions. They adapt in response to the feedback received and evolve with the changing built environment. **Alice Clarke** (pictured left) was appointed lead researcher for the Drivers of Change: Poverty project in October 2007. For her research she is considering poverty in its broadest context in order to identify factors driving and being driven by poverty. This research will culminate in the production of a set of informational cards similar to those produced in 2006 and 2007 on other global issues such as water, energy and urbanisation. Alice is also one of the coordinators of Arup's **Poverty Action Network** – a grassroots, umbrella network for staff interested in poverty alleviation, international development and disaster relief work. A further Drivers of Change publication, led by **Duncan Wilson**, will investigate the significance of convergence in contemporary society. In particular it will focus on new collaborations, the merging of sciences and the combination of new business sectors.

The location of Kraków in the upper course of the Vistula river has significant impact on the river basin and a catchment of the Baltic Sea. An objective of the **Plaszów II Sewage Treatment Plant** project is to gradually restore water purity in the Vistula river, and consequently, in the Baltic Sea. The capability of the old plant did not allow for treatment of the presently produced sewage, much less the treatment of increased quantities of sewage generated as a result of the predicted expansion of the city. We were selected to manage the modernisation and extension of the existing mechanical wastewater treatment plant and construction of a new-build plant for biological treatment including sludge processing and utilisation of biogas. The works were completed in October 2007. The new treatment plant fully complies with the recent EU and Polish directives, especially for phosphorus and nitrogen removal.

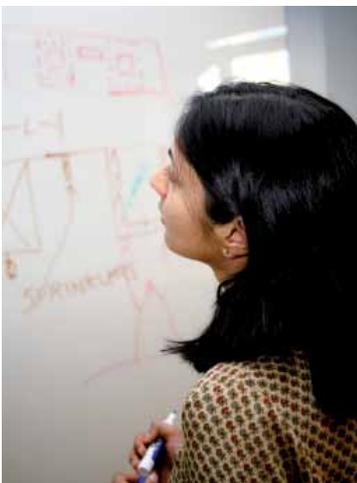


THE CLIMATE GROUP

Arup's sustainability philosophy extends across our business dealings and community relations, and compels us to be leaders in driving sustainable development. For example, we are a member of **The Climate Group** and have been working with it across the world to develop programmes and initiatives that will deliver real solutions to climate change. In the United States, we are a founding member of the **Business Council on Climate Change (BC3)**, a partnership of businesses committed to reducing greenhouse gas (GHG) emissions while creating a model of commercial climate stewardship. BC3 seeks to create a thriving economy, while at the same time contributing to public dialogue and positive action on climate change. The United Nations Global Compact is showcasing the BC3 initiative on a global level.



We have been developing the **Australian FEX Climate Voluntary Protocol**, an interactive web-based tool and recognition programme that corporate subscribers and their teams can work through at their own pace to develop, pilot and implement a voluntary emissions reduction plan. Arup developed the Voluntary Protocol following an extensive review of existing protocols and relevant greenhouse gas reduction literature globally. It is designed to be accessible, affordable and useful for all types and sizes of businesses. *Pictured left to right: Andrew Aitken, Cathy Crawley, Former US Vice-President Al Gore, Peter Bailey and James Selth.*



The Lower 9th Ward is one of the richest cultural communities in the United States and was, until Hurricane Katrina in August 2005, a crossroads of families, music and social interaction in New Orleans. Actor Brad Pitt is the force behind the **Make It Right** project's vision, which is intended as a catalyst for redevelopment of the Lower 9th Ward: building a neighbourhood comprising safe and healthy homes inspired by cradle-to-cradle thinking, with an emphasis on a high quality of design, while preserving the spirit of the community's culture. Working with a local, neighbourhood-led coalition of not-for-profits, and renowned local, national and international architecture firms, we are developing a basis of design for handover to local consultants. **Shruti Narayan** (*pictured left*) is leading the Arup team that has, to date, hosted an internal sustainability charrette, developed water and energy diagrams to maximise resources, and provided input on cost/operations to the design team, peer review going forward, and continued ad hoc consultation on the engineering systems.



Arup has developed a **low-carbon energy strategy for a new world-class city in Dubai**. Construction is already under way on the 'waterfront' city, and implementation of the strategy is integral to the design and construction of the buildings, infrastructure and transport systems. In this arid desert climate, where resource consumption is already the highest in the world, innovative yet practical solutions are essential to deliver a low-carbon city that is commercially attractive and offers an attractive lifestyle to residents, employees and visitors alike. The effective implementation of the strategy illustrates the paradigm shift necessary to achieve real change and influence in the design, development and built-out phases of a low-carbon city.



Australia's Gold Coast City Council (GCCC) engaged Arup to develop a project management plan to refocus and redevelop its **Greenhouse and Energy Management Strategy**. The development of this high-level plan involved liaison with internal stakeholders to collate information and develop an understanding of the issues, opportunities, and risks to developing and implementing the revised strategy. The process integrated previous and current climate change adaptation and mitigation efforts by the Council and identified four key focus areas. We are now working with the GCCC to assist in the implementation.

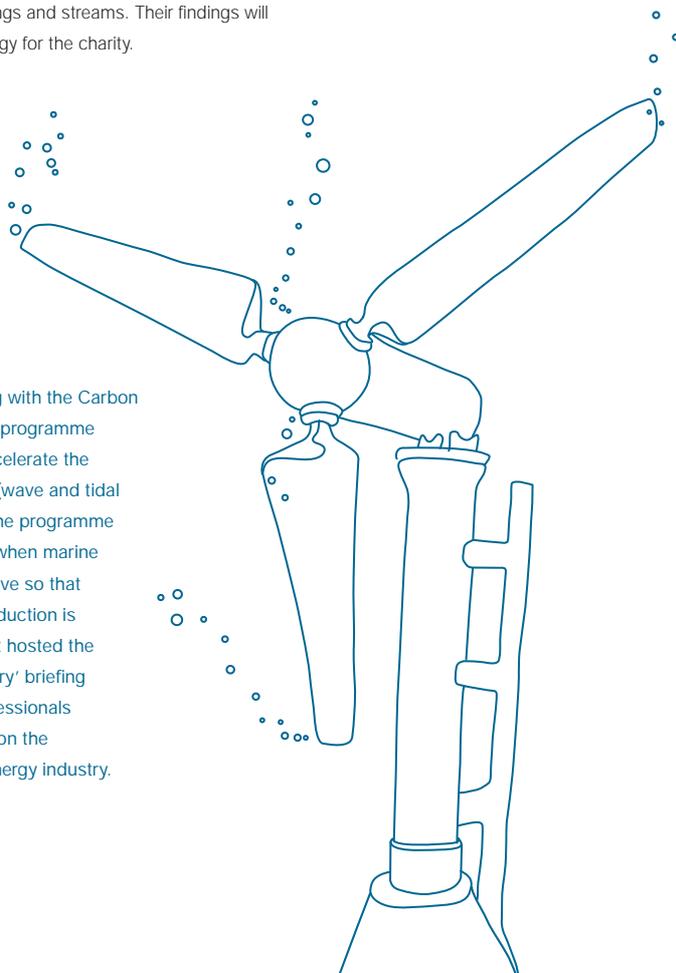
We shape a better world (continued)



Hydrogeologist **Vicky Coy** and geochemist **Catriona Neath** surveyed the water resources of villages in the Ashanti region of Ghana. Working with **Ashanti Development**, a registered charity that promotes health and development around the village of Gyetiase, they completed an initial desk review of available information followed by a site visit to Ghanaian institutes and around 20 visits to view community water sources such as boreholes, springs and streams. Their findings will inform a sustainable water strategy for the charity.



On 11 December 2007, more than 540 clients and staff took part in our **One Big Day** to develop an understanding of how government, business, technology and society can work together to deliver a low-carbon UK by 2050. Jon Snow, the award-winning journalist and broadcaster, chaired the event and praised the firm for its vision in moving the climate change debate beyond the 'why' and into the 'how'. Guests received high-quality presentations from HSBC, Arup, the Greater London Assembly, WWF, The Climate Group and *New Scientist* magazine. They also participated in open workshops facilitated by the Cambridge Programme for Industry, and engaged in a lively 'question-time' session. Arup provided a forum where, it is hoped, headway was made in creating relationships that can develop a more united approach to combating climate change.



Matt Cooper has been working with the Carbon Trust for the past 12 months to programme manage a major initiative to accelerate the development of marine energy (wave and tidal stream energy) technologies. The programme aims to bring forward the time when marine energy becomes cost competitive so that significant carbon emissions reduction is achieved. On 4 December, Matt hosted the Carbon Trust's 'meet the industry' briefing session where around 100 professionals attended a workshop focusing on the challenges facing the marine energy industry.

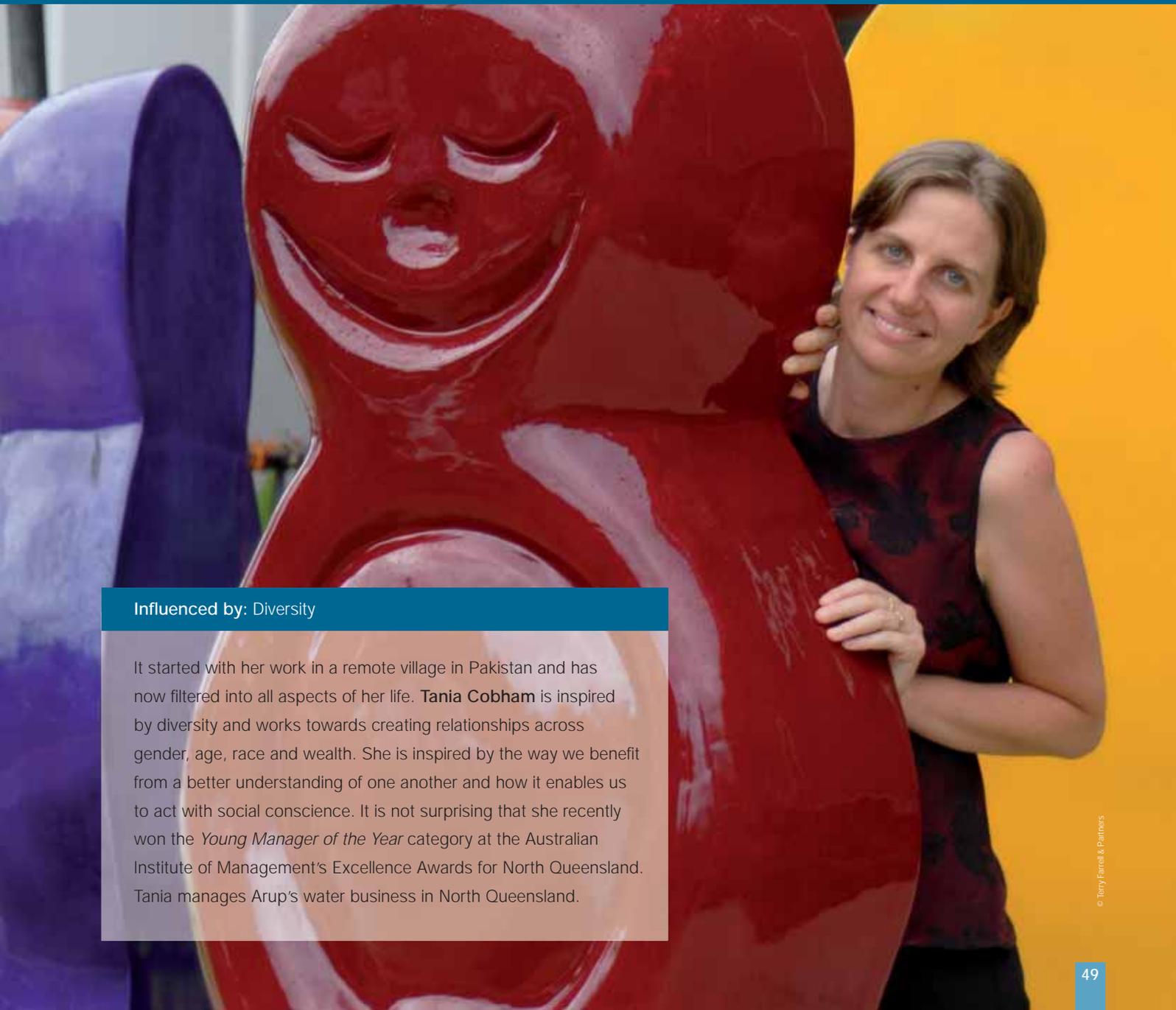


Rachael Williams was awarded a *Carillion Values Award* for her work on sustainability. As part of a sustainability action group, she researched staff travel habits and proposed options to the company for reducing car journeys and the company's carbon footprint, while ensuring that normal business operations would not be compromised. The national awards, which recognise exceptional contributions above and beyond normal job roles, were presented on 15 May 2007 at a ceremony in North Wales.

Our work on **emissions modelling** with Sheffield City Council in the UK has been recognised with a joint Climate Alliance European Award. The Climate Alliance is made up of more than 1,400 European local authorities in 17 countries, representing more than 50 million citizens. The Climate Alliance invited all European cities and municipalities to present their climate change protection activities and apply for the award of *Climate Star 2007*. The laureates were given the award at a ceremony in Vienna, Austria.



In October 2007, **Jo da Silva** and **Zygmunt Lubkowski** were invited to carry out a two-week mission to Aceh, Indonesia in order to review the post-tsunami reconstruction of houses, schools and medical centres that had been built in 2007. One of the key benefits that emerged from this mission was the apparent influence of our previous mission in March 2006 for Muslim Aid, during which we had highlighted the importance of including seismic resilience in housing programmes.



Influenced by: Diversity

It started with her work in a remote village in Pakistan and has now filtered into all aspects of her life. **Tania Cobham** is inspired by diversity and works towards creating relationships across gender, age, race and wealth. She is inspired by the way we benefit from a better understanding of one another and how it enables us to act with social conscience. It is not surprising that she recently won the *Young Manager of the Year* category at the Australian Institute of Management's Excellence Awards for North Queensland. Tania manages Arup's water business in North Queensland.

Coming full circle

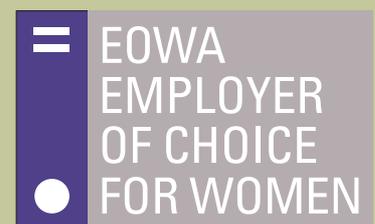
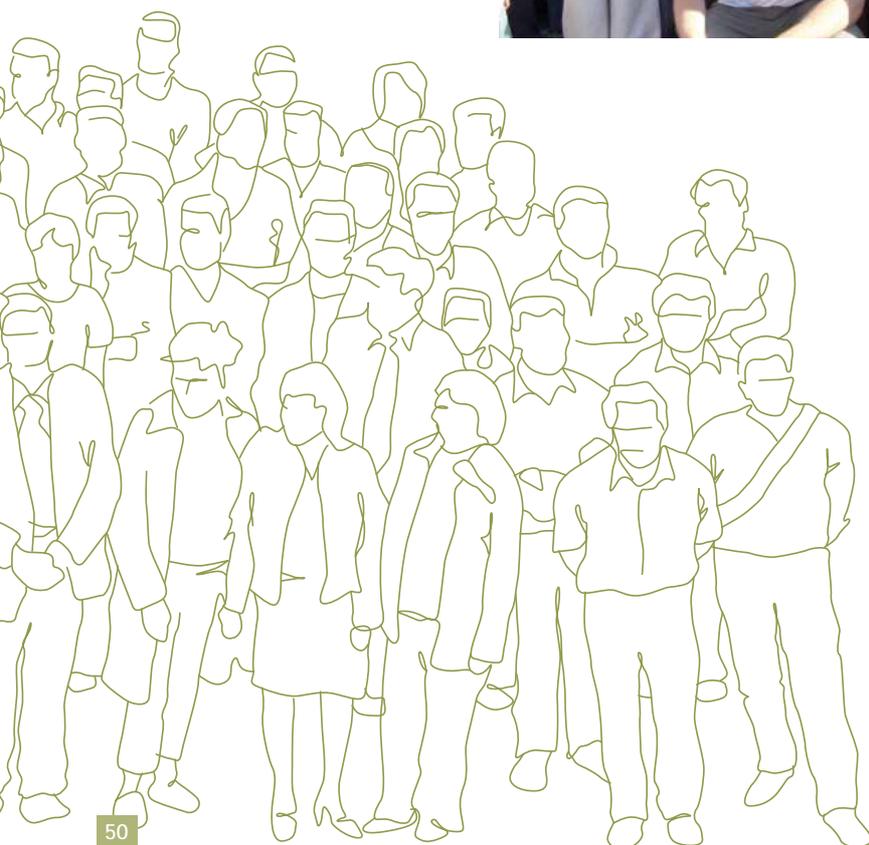
A place where people make progress

Arup is a firm that determines its own direction. Planning for our future is as important as planning for our today. This approach attracts thought leaders who shape policy, industry and projects at all levels. Our work not only changes the way people live, but it can also transform the world in which we operate.

Arup is a firm that enables positive change. It is an environment in which our people can help to shape a better world. It is a place that gives back. We are a business that strives to make a difference. Influentially.



Daniel Lambert received a commendation in the *Future Leaders Award* category of the 2007 Association of Consulting Engineers Australia's Awards for Excellence held on 30 November 2007. He demonstrated a significant contribution to the firm, working on notable projects including the **Melbourne Cricket Ground**, **Burwood Square Development** in Melbourne and **K2 Sustainable Housing** in Windsor, Victoria. He was also commended for his work with the international charity WaterAid. Daniel has organised educational, fundraising and practical engineering programmes to support and promote WaterAid. He was also selected from 10,000 staff to attend the charity's Supporters' Visit to India in 2007, along with fellow Arupian **Claire Moore**.



To celebrate the global nature of the firm, offices across the Arup world participated in **Ovafest 2007** with a variety of events including: a day out at Warwick Castle in the UK (*pictured left*); a party on a boat in Berlin, Germany; a walk around UNESCO Heritage site Portovenere in Italy; a visit to Bahurutse Cultural Village in Botswana (*pictured right*); and volunteer and community service activities at parks and ecological reserves across the Americas (*pictured far right*).



The firm decided to invest in a global initiative, the **Arup Cause**, which began in 2006 as a celebration of our 60th anniversary. As we work together to further humanitarian aims in a way that is central to our shared values and our overall mission, the Arup Cause provides a focus for our activity, encouraging and leveraging the individual abilities and contributions of our staff for maximum impact. We want to provide more structured opportunities to provide technical assistance or fundraising for specific projects, and to improve awareness and understanding of poverty and its alleviation by capturing, sharing and disseminating learning. As part of this initiative, **Jo da Silva**, Project Director for the Arup Cause (*pictured fourth from left*) and **Karen Patey**, Communications Manager (*pictured fourth from right*) ran a workshop for the Freshwater Action Network at their advisory meeting in Nairobi in October 2007.



For the sixth year running, Arup has been recognised as an **Employer of Choice for Women** with the Australian Government's Equal Opportunity for Women in the Workplace Agency (EOWA). Arup was one of 131 Australian employers recognised for practices that support women within their organisations. The EOWA citation is awarded to organisations with more than 100 employees that have demonstrated policies and practices that support women across the organisation, providing a positive outcome for both women and the businesses in which they work.

Coming full circle (continued)



In 2007 Arup was declared one of the **Best Architectural, Engineering and Construction Firms to Work For** in the United States by *Building Design & Construction Magazine* for its "top-notch benefits and multiple training and education programs". The magazine noted that we back up the statements we make about attracting and retaining the best and brightest with programmes that achieve our aims. Pictured second from right: **Elizabeth Mitchell**, Senior Human Resources Manager for the Americas Region, accepts the award on Arup's behalf.



Arup has been named as one of the *Sunday Times* **100 Best Companies to Work For** in 2007, coming 37th overall in the biggest and most comprehensive survey of employee opinion in the UK. We jumped an impressive 37 places, from 74th position in 2006. The survey revealed that 83% of our people believe the company makes a difference to the world we live in; that 86% are proud to work for the firm; and that we have a working culture with strong ethics, consistent values and a holistic approach to work and home life.



Mark Buttle has been elected as a Trustee and member of the management board of RedR UK. Mark has been a RedR member since 1998. He has carried out assignments in Albania and Afghanistan, and a consultancy as an Associate Trainer in Pakistan. As well as fieldwork, Mark spent six months working in the RedR office, has interviewed prospective members and debriefed people returning from assignments. Since joining Arup he has coordinated the support for RedR within Arup, and his election provides a good opportunity to forge closer links with the organisation.



Arup is committed to keeping in contact with its retired staff. The **Old Arupians** organisation is a community of those who retired directly from Arup service and were members of an Arup pension scheme. During 2007, 600 of the 800 pensioners actively participated in some or all of its activities, including annual lunch parties such as the one pictured above, which took place in South Queensferry in Scotland on 27 September 2007. They keep connected through a dedicated, password-protected website. Arup life after retirement continues, albeit in another vein.

The **Ove Arup Foundation**, created to mark Sir Ove Arup's contribution to engineering and architecture, has been exceptionally busy this year. In Australia, the charity provided funds to enable the University of New South Wales to attract top practitioners and academics from different countries to lead multidisciplinary design workshops. Our investment in the Centre for Cities in Africa, based in Cape Town, South Africa, enabled Visiting Fellowships to be created, bringing together engineers and planners to research solutions to particular African city design issues. We also attracted six industrial partners to provide funding for three Visiting Professors in Building Engineering Physics at Bristol, Cambridge and Sheffield Universities in the UK. We have also given support to a variety of other initiatives ranging from providing schoolchildren with an insight into careers in the construction sector, to supporting research into design to help disabled people to contribute more fully to society.



We were recently awarded the Hong Kong Council of Social Service **Caring Company Logo** for the third consecutive year. This was in recognition of our corporate citizenship – in particular, for our contribution to the areas of volunteering, being employee friendly, employing vulnerable groups, caring for the environment, and giving.

Arup people is an internal global knowledge management skills sharing tool on the Arup intranet which enables access to relevant professional information on any employee worldwide. It has been invaluable in making connectivity seamless across the firm. We want all Arup people to be able to connect to other Arup people – we work as one firm to get the job done.



Arup is a global firm of planners, designers, engineers and business consultants. We provide a diverse range of professional services to clients around the world, exerting a significant influence on the built environment. The firm is the creative force behind many of the world's most innovative and sustainable building, transport and civil engineering projects and design technologies.

Established in 1946, Arup has over 10,000 employees based in more than 90 offices across 37 countries, working on up to 10,000 projects at any one time. Its unique structure, with the firm held in trust on behalf of its employees, gives us complete independence. Our multidisciplinary approach means that any given project may involve people from any or all parts of Arup. Our aim is to achieve excellence in all we do by bringing together the best professionals in the world to meet our clients' needs.



Arup offices

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