Queensland Transport and the Department of Main Roads recognise the importance of celebrating the achievements of Australian engineers. Their innovation, skill and ingenuity allow Queensland to undertake world class projects and enrich the lives of communities across the state.

Queensland is one of the fastest growing states in Australia and our population is set to increase by 1.5 million people over the next 20 years. This growth brings many benefits to Queensland and presents substantial challenges in delivering the infrastructure to serve a rapidly growing population.

By supporting engineering excellence, Queensland Transport and Main Roads can help reward world class expertise and innovation in engineering. These talented individuals help us find the solutions that will deliver roads and transport infrastructure for the future.

If you are a talented individual that likes to work on projects that look good on paper, better in practice and brilliant on a résumé, then it’s time to start building yourself a career with Queensland Transport and Main Roads.

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President’s Message

Engineering Excellence is the foundation of the success of Australian enterprise. Engineers have answered the challenges of the Australian environment to position Australia in the 21st Century. The Queensland Division of Engineers Australia is proud to announce the 2007 Engineering Excellence Awards.

In the 2007 Awards, the projects, which have contributed in the last twelve months to Engineering Excellence in Queensland, have been rewarded for their service to our communities. There are projects, large and small, challenging and innovative, which have highlighted the strength of engineering expertise in Queensland.

We especially recognise the engineering teams involved in these projects and value highly their contribution to the prosperity and development of Queensland. These teams have set an example by their dedication to innovation, sustainability, teamwork and professionalism for others to follow.

The 2007 R.W. Hawken Award winner is the Millennium Arts Project, at a cost of $291.3 million. The Millennium Arts Project is the largest investment in Arts infrastructure in the state with three distinct components: the new Queensland Gallery of Modern Art, the redevelopment of the State Library of Queensland and extensive associated site infrastructure works.

Specific requirements of the project included providing and delivering equitable access to diverse cultural activities for all Queenslanders through the development of internationally competitive, high quality cultural products and services. Bovis Lend Lease utilised its global construction experience to look beyond the required building and structural elements to propel Queensland’s cultural facilities into the new millennium, prioritising social and environmental sustainability for the journey.

I wish to acknowledge the invaluable contribution from our sponsors who ensure this event demonstrates the same standard of excellence as the projects. Our Platinum Sponsors: Department of Main Roads/Queensland Transport, Leighton Contractors and Thiess, our Gold Sponsors: Anchor Wall Systems, Defence Force Recruiting and Maunsell and our Silver Sponsors: American Express, Brisbane City Council, Davies Collison Cave, Hays Engineering, KarelCAD, Monadelphous, Powerlink, Project Services, Queensland Rail, Robert Walters, SKM, Tarong Energy & Three Plus.

The infrastructure and mining boom in Queensland is very real, as suppliers of engineering services compete for engineers and engineering resources. This is an exciting time for engineering in Queensland with numerous significant projects and long-term demanding programs of activity.

In this time of demand for engineering services, the Queensland Division of Engineers Australia is determined to provide positive action to support the engineering profession. There are now over 16,000 Queensland members of Engineers Australia who are part of the engineering teams delivering the engineering solutions.

I recommend to you this presentation about the 2007 Engineering Excellence Awards. I am happy to share with you the excitement of Engineering in Queensland and this celebration of its Excellence.

Geoff Haigh
President
Queensland Division

Deputy Premier’s Welcome

Congratulations to all the entrants and winners of the Queensland Division of the 2007 Engineering Excellence Awards.

With an infrastructure investment of more than $82 billion and 450 projects planned over the next 20 years for South East Queensland alone, it is no wonder that the Smart State has become Australia’s focal point for so many diverse and revolutionary engineering projects.

The standard of Queensland engineering has never been higher and these awards continue to help raise the bar each year.

Engineers will play a vital and visionary role in building the kind of Queensland that our Smart State strategy demands

The current challenge is to encourage more high school students to pursue maths and science subjects which will see them bolster the numbers of students entering the engineering faculties in our universities.

I commend Engineers Australia, for doing its part to promote the profession through events such as the Engineering Excellence Awards.

Anna Bligh
Deputy Premier
Treasurer and
Minister for Infrastructure
Judging Criteria

Dedication to Excellence
Since its inception in 1919, Engineers Australia has always been dedicated to excellence in engineering. The awards are about recognising the achievements which engineers have made to the development of Queensland and the community.

The awards highlight to the public the work performed by engineers and provide recognition of their level of professionalism and contribution to the community.

Judges and Judging Criteria
In 2007 the judges were:
Stuart Lister, Cliff Button, Doug Hargreaves, Iva Dinolova, Michael Waldby, Brian Becconsall, Joe Abercrombie, Grahame Baker, Mark Blundell, John Miles, David Thorpe, John Quinn and Tom Baxter. Engineers Australia, Queensland Division would like to express its sincere thanks to the 2007 judging panel. Without the commitment of the judges the awards would not be possible.

The judges recognise that excellence and exceptional engineering may take many forms – large or small, traditional or cutting edge, technically complex or straightforward and simple. The dynamics of each of these characteristics are important, depending on the specific project.

Projects located anywhere in the world are eligible for entry. However a significant part of the engineering component needs to have been completed in Queensland.

The primary judging criterion for all project categories is the engineering aspects of the project. In addition the judges consider the following:

- Budget and program adherence
- Contribution to the economy
- World’s best practice
- Benefits to the community and
- Innovation

Additional judging criteria for the overall Sustainability Award were:

- Efficient energy use
- Potential for universal application
- Economic and environmental performance
- Appeal to community awareness

Additional judging criteria for the overall Innovation Award were:

- Export potential
- Impact on the quality of life
- Extent to which the project demonstrates world’s best practice
- Commitment to research and development

2007 Excellence Award Categories
Buildings and Structures
Environment
Products and Manufacturing Facilities
Project Infrastructure
Project Management
Reports, Procedures and Systems (Section One & Section Two)
Research, Development & Innovation (Section One & Section Two)
Small Business Ventures/Projects
Millennium Arts Project
Entered by Bovis Lend Lease

• Project objectives were to provide public facilities with inherently flexible spatial standards and the embodiment of current best practice in art museum and library design.
• Extensive site remedial works were necessary.
• Over 10,000m² of open gallery space and a total floor area of 24,000m².
• Structure is reinforced/prestressed concrete frame supported on 10km of precast piles.
• Concrete frame has span up to 24m and roof has span of 24m and cantilevers up to 15m.
• The large roof cantilever required careful consideration of roof vibration due to wind.
• Protection of Art Works necessitated special security provisions as well as internal climate control to minimise indoor pollutants and contaminants.
• Low maintenance design.
• Sustainability considerations including lighting controls, storm water storage and river water cooling for air conditioning.
• Judges were impressed with the application of significant technical expertise in all disciplines associated with this project throughout from planning to implementation.
Sustainability Award

The purpose of this award is to highlight and recognise a project which demonstrates a commitment to, and understanding of, the fundamental knowledge of sustainable practices.

Ten (10) entrants elected to enter this award.

Fuel Saver Hydraulic Pump
Entered by Mathers Hydraulics Pty Ltd

- This vane pump does normal hydraulic pumping duties but when oil flow is not required, the pump continues to rotate but the oil flow ceases.
- It can deliver fuel savings of between 0.5 and 2.5 litres per hour.
- The vane pump has reduced noise, downtime and repair costs. It is less costly, has lower mass and greater availability and longer life compared with piston pumps.
- The vane pump has very strong potential for export.
- Judges were impressed by the potential for substantial fuel saving and commensurate greenhouse gas reductions through application on motor trucks and heavy mobile equipment.
2007 KarelCAD Innovation Award

The purpose of this award is to highlight and recognise a project which demonstrates a commitment to, and understanding of, the fundamental knowledge of innovative practices.

Eighteen (18) entrants elected to enter this award.

Helping Orthopods Fit New Knee Bearings

Entered by Aimtek Pty Ltd

- This surgical device was developed to provide positive support and guidance for the routing procedure of the tibia to take an implant.
- It enables the surgeon to provide a much flatter recess to take the tibia implant than was previously possible in a short time.
- Using the Orthopaedic Routing Guide (ORG), the surgery is less invasive, it eliminates the need for screws and clips thus reducing the likelihood of infection and provides a better outcome for the patient.
- Lesser skilled surgeons can perform this type procedure so making it more available.
- Allows for more uniform distribution of force via the implant to the bone which promotes healthier bone and can lead to a longer life of the joint.
- The project has strong potential for export.
- **Judges were impressed** with the innovation application of engineering knowledge and skills to surgery.
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Queensland Maritime Museum Dry Dock
Entered by Sinclair Knight Merz (SKM)

- A massive 100 year old iron caisson was removed from the historic dry dock on the Brisbane River and replaced with a concrete wall.
- This ensured long-term preservation of the ex-RAN frigate Diamantina, which had been trapped and floating in the flooded dry dock.
- The 200 tonne caisson of badly corroded iron & steel was mired in two metres of silt.
- Temporary coffer dam gates allowed a staged approach and enabled the ship to be moved out of and into the dock in a controlled manner.
- Judges were impressed with the innovative engineering approach to an extremely difficult task.
Portside Wharf Development
Entered by Sinclair Knight Merz (SKM)

- SKM carried out all the engineering services for Multiplex on Brisbane’s new International Cruise Terminal (Portside Wharf) development.
- This included structural, marine, civil and building engineering services.
- The project comprised refurbishment and reconstruction of an existing wharf, design of the cruise ship terminal, adjacent residential and commercial structures and underground parking.
- Site constraints and existing 230m wharf structures of varying construction styles and deterioration required flexible and innovative application of skills.
- Two eight storey residential buildings, cinema, commercial areas, large underground carpark, bus terminal and external plaza were included.

The Aurora
Entered by Bovis Lend Lease and Arup

- This 217 metres tower of 69 storeys is the tallest tower in Brisbane Central Business District.
- Constructed by Bovis Lend Lease and engineered by Arup.
- Utilised a new concept in “jumpform” technology improving safety and efficiency resulting in rapid construction.
- Included extensive restoration of a 117 year old Heritage listed façade.
- Post-tensioned vertical ground anchors minimised excavation and prevent lift-off of tower foundations under ultimate wind load conditions.
- Wind tunnel testing to optimise design of lateral load resisting system and to ensure satisfactory low lateral accelerations due to wind loading.
- Typical floor slab to wall connections incorporating a tailored combination of bend-out bars, proprietary hooked reinforcement connectors and purpose-designed block outs.
- Splayed tower walls combined with structural connectors
- Core link slabs and coupling walls designed using elasto-plastic non-linear design techniques.

“The Wave”
Entered by Multiplex Constructions Pty Ltd

- The Wave residential 34-level tower in Broadbeach, Gold Coast.
- The design features balconies flowing around the building like waves.
- The wave design features a series of unique curved floor plates repeating their shape every fourth floor.
- Innovative formwork and screen system designed to cope with difficulties of wave design.
- Extensive pre-construction planning required for difficult site in middle of busy alfresco dining precinct.
- Staged construction to accommodate existing on-site tenant.
- Hydraulic engineered water recycling initiatives with water harvested and stored in basement tanks.
Natural Disaster Mitigation for Floodplains and their Communities in Vietnam
Entered by Kellogg Brown & Root Pty Ltd (KBR)

- This project emanated from disastrous floods and typhoons in 1999.
- Now is a demonstration project for similar circumstances across Asia.
- Work was undertaken for AusAID with personnel who are mostly full-time employees of KBR, mostly from the Brisbane office.
- The design encompassed Community-Based Disaster Risk Management services, high-technology flood plain simulations, community awareness of a provincial floodplain management plan, and construction of three different demonstration mitigation infrastructure techniques (riverbank protection, estuary anti-surge levees and a safe harbour for fishing vessels).
- Significant contribution to the local economy.
- Demonstrated an understanding of requirements of local communities and the various layers of government.
- Training resulting in aiding long-term decision making to ensure sustainability for the community as a whole.
- Judges were impressed with this exceptional project in helping to make long-term lasting improvements to benefit a community following a major and potentially recurring disaster.

Oxley Creek Water Reclamation Plant
Entered by Brisbane Water Enviro Alliance (BWEA): John Holland Pty Ltd, Brisbane City Council, Aquatec Maxcon Pty Ltd, John Wilson & Partners Pty Ltd, Brisbane Water and MWH Australia Pty Ltd.

- BWEA, formed in 2002, is comprised of Brisbane Water (part of BCC), John Holland Group, wastewater specialists Aquatec Maxcon and consulting engineers MWH and JWP.
- This project included design, construct and commission a complete upgrade and capacity increase of this water reclamation plant.
- The objective was to reduce wastage and promote reuse.
- Improved treatment quality and processes for all wastewater by-products, including liquid, solid and gas. Some 90% of waste materials are recycled.
- Reclaimed water immediately reusable with future connection to Western Corridor Recycled Water Scheme for South-East Queensland.
- Biosolid volume reduced through Australian-first Thermal Hydrolysis, allowing immediate reuse as fertiliser.
- Gases produced during treatment used for cogeneration of the plant.
- Alliance system ensured outcomes were set and met.
- Judges were impressed with thorough engineering planning for both a difficult site and social environment.
Pimpama Coomera Waterfuture Master Plan
Entered by Sinclair Knight Merz and GHD Pty Ltd

- Gold Coast Water developed a fully integrated urban water cycle management plan for the Pimpama Coomera Greenfield development area – the largest of its type in Australia.
- This Water Sensitive Urban Design (WSUD) has set a benchmark for subsequent developments.
- This design provides for the conservation of drinking water and the beneficial use in the community of other water sources.
- Judges were extremely impressed with this project. However, as a comprehensive report on the overall master plan for this area won the 2006 Engineering Excellence Award in the Environment Category, other entries were considered more worthy of a 2007 award.

Upgrading the Kuranda Range Road: Engineering Solutions for Infrastructure in a World Heritage Area
Entered by Department of Main Roads & Environment North

- The Kuranda Range Road section of the Kennedy Highway forms a critical 13 km long link in the Far North Queensland transport network.
- This road is through tropical rain forest subject to unstable earth conditions.
- About 44% of the length of the proposed upgrade is on bridge structure.
- Some bridges are “half” bridges (two lanes on the cut against the hill and two on bridge to avoid embankments).
- Others are large four lane bridges selected mainly to allow fauna to move safely beneath the traffic but also permitting construction off-line and stability.

Horseshoe Bay Wastewater Treatment Facility
Entered by Water Matters Alliance

- The Alliance comprises Citiwater, AbiGroup Contractors, wastewater specialist Aquatec, Maxon, GHD and United Infrastructure Group.
- This highly innovative wastewater recycling scheme is on Magnetic Island in the Great Barrier Reef Marine Park.
- Zero ocean outfall providing 200,000 litres of treated effluent daily to a purpose built 2.5 hectare Dry Tropics Rainforest Park, a sports field and local fire brigade.
- 100% reuse during dry weather.
- Dramatic savings in potable water usage.
- High quality recycled water (above EPA standards).
Giant Grinding Mill Relining Machines
Entered by Russell Mineral Equipment Pty Ltd

- In 2006, Russell Mineral Equipment (RME) of Toowoomba, supplied two very large capacity Mill Relining Machines, a 6,000kg capacity unit to Newcrest, Cadia, NSW and a 7,250kg capacity unit to PT. Freeport, Indonesia.
- These machines eclipsed the world’s previous three largest capacity machines each of 4,500kg capacity.
- These huge multi-axis manipulators precisely position 5 tonne wear plates inside the world’s largest hard rock grinding machines.
- Used in conjunction with other RME Mill Relining System Technologies, downtime is halved and injury risk from hard physical work is eliminated.
- Innovative designs have enabled RME to remain competitive internationally in this specialised field.
- Judges were impressed with the innovative approach in automating the relining of large grinding mills, significantly reducing mill downtime and providing improved work environment and safety benefits.

Isis Central Sugar Mill – Modernisation, Electrification & Co-Generation of Renewable Energy
Entered by i.Power Solutions Pty Ltd, Ergon Energy Corporation Limited, Isis Central Sugar Mill Co Ltd, and AGL Energy Services Pty Ltd

- Modernisation of Isis Central Sugar Mill’s milling train enabled the construction of a Co-Generation Power Station, replacing steam with electrical drives and providing central control of operations.
- The project was completed to a tight timetable to minimise impact on milling operations.
- i.Power Solutions was responsible for the entire design, construction and commissioning phases.
- Retrofitting electric drives to existing mill gearing demanded innovation.
- The project provides improved reliability of electricity supply to the surrounding area.
- Judges were impressed with the fine balance of sugar milling and electricity production operations which was essential to achieve optimum improved performance and increased productivity delivering flow-on community benefits.
World’s Most Advanced Printing Facility for Australian Provincial Newspapers (APN), Yandina, Queensland

Entered by Walker Corporation and Sinclair Knight Merz (SKM)

- The world’s most advanced printing facility was created with a high degree of precision for Australian Provincial Newspapers (APN), Yandina, Q’land.
- World class printing technology installed required innovative engineering solutions and high precision construction methods.
- Design and construction was by Walker Corporation and engineering by SKM.
- Special efforts were made to ensure ecologically sustainable development.

Australia Country Choice – Retail Ready Meat Facility

Entered by Wiley & Co Pty Ltd, Australia Country Choice, Industrial Conveying (Aust) Pty Ltd

- Wiley & Co managed the design, engineering and construction of further expansion to the Australia Country Choice (ACC) operation as a major meat products supplier.
- The new facility located in Brisbane integrates a feedlot, abattoir, boning room and cold storage facility linking together ACC’s supply chain.
- Process control automation and conveyor systems expedite cutting, sizing, trimming, packaging, labelling and dispatch product to supermarket shelves.
- The facility hosts the world’s first large scale installation of dual frequency Radio Frequency Identification Device in a factory environment.
- The facility contains efficient working environment meeting food safety standards, incorporating many ergonomic design applications.

UTS2-Sentinel

Entered by Cochlear Limited

- Cochlear Brisbane Operations (CBO) is a key strategic location for manufacture of Cochlear products and has the vision to become a “Centre of Excellence” providing a streamlined manufacturing environment, facilitating growth and providing high quality medical products.
- The Universal Test System (UTS2–Sentinel) is used to efficiently verify the manufacture of a range of Cochlear products and to view and analyse test results to enhance product quality, the manufacturing process and the design.
- UTS2-Sentinel system ensures that the product manufactured meets the stringent functional requirements for optimal performance to the implantee.
- Improved quality and productivity of Cochlear manufactured products means a positive impact on the quality of life for the hearing impaired community worldwide.
Green Bridge Project
Entered by John Holland and GHD Pty Ltd

- Brisbane’s Green Bridge, now named Eleanor Schonell Bridge, opened on December 2006, providing a bus, pedestrian and cycle link across Brisbane River between Dutton Park and the University of Queensland, St Lucia.
- This cable stay suspended bridge was designed and constructed for Brisbane City Council by GHD and John Holland Group.
- Australia’s third largest cable stay bridge.
- Cable stays in “harp” design for aesthetic purposes.
- 520 m long crossing of Brisbane River with 185m main navigation span.
- Four 70 m high towers.
- Bridge approaches through sensitive community areas.
- The slender look necessitated main structural elements of the bridge being heavily reinforced with resultant complex connection details at interfaces.
- Special construction techniques were necessary at the interface between towers and perimeter deck level, on piling and tower construction.
- Judges commended the entrants on the impressive aesthetics and the unique functionality that was achieved. Judges also paid tribute to innovative inclusion of provision for light rail and the valuable adoption of the energy neutral theme – where solar panels are extensively used. Stormwater capture into the University’s recycling system was also seen as very innovative.

Eenie Creek Road Stage 2
Entered by GHD Pty Ltd, John Holland and Brisbane City Council

- Eenie Creek Road is an important link within the arterial road network in Noosa Shire.
- Cardno was responsible for planning, public consultation, liaison, with statutory authorities, detailed design and contract administration for all stages of the project.
- Stage 2 includes 1.9km of arterial roadworks, a 515m bridge across Weyba Creek, a 30m bridge over Noosa Springs Drive and two large roundabouts.
- This was an extremely environmentally sensitive area and special design features were incorporated to minimise adverse consequences.
- Bridge length was increased from 220m to 515m to safely allow animal movements and to better protect the natural environment.
- Areas of high nature conservation value were preserved and the road routed via degraded areas to preserve integrity of faunal habitats.
- A “Super T” girder system and bored piles without pile-caps were adopted to ensure least impact on mangroves and sensitive marine environment.
- Judges were impressed with the extensive range of route/bridge alignments, which were investigated to best accommodate this project in this very environmentally sensitive area.
Thiess is one of Australasia’s largest construction, mining and services companies with projects extending across mining, water, road and rail, energy, health, education and defence. With over 6000 employees in Queensland dedicated to upholding a culture of teamwork, innovation, integrity and performance, Thiess is proud to be making a difference.

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**Project Management**

**EXCELLENCE AWARD**

**The Split Rock Inca Alliance**
Entered by Department of Main Roads, Myuma Pty Ltd and Seymour Whyte Constructions Pty Ltd.

- The Split Rock Inca Alliance (SRIA) Project was the final stage in a program of National Highway projects to upgrade the Barkly Highway between Mount Isa and Camooweal in far north-west Queensland.
- This included 35km of new highway, three bridges totalling 28 spans and 62 culvert crossings.
- SRIA was an innovative contracting arrangement involving Dept of Main Roads, Myuma, a young company owned and managed by Indjlandji-Dhidhanu people, the Aboriginal traditional owners and Seymour Whyte Constructions.
- Successfully provided training, employment and business development opportunities for local indigenous communities, providing a benchmark for future projects.
- Several construction innovations were adopted to ensure cost-effectiveness in this remote area, including a high degree of automation and off-site work plus technology on site to meet tight schedules.
- Judges were impressed with the success of this Alliance Project providing indigenous employment and excellent training. It was not just the engineering aspects but also the whole range of impressive project management with long-term benefits for the community.

**HIGH COMMENDATION**

**Toomelah/Boggabilla Aboriginal Community Development Program**
Entered by Maunsell Australia Pty Ltd

- Toomelah and Boggabilla Aboriginal Communities are on the NSW/QLD border near Goondiwindi.
- All engineering services were resourced from Maunsell’s Brisbane office.
- The NSW Government granted funds towards improvement of health and living standards for these two communities.
- The work included 20 new houses, 17 house refurbishments, subdivisions, waste water transfer station, storm water drainage and other infrastructure.
- Combined engineering and project management expertise was applied involving the local communities and in developing training and employment strategies.
- Judges were impressed with the success of this project with the assistance of an established Northern Territory indigenous contractor together with the adoption of special education and on-site training systems. This project demonstrated strategies for benefiting indigenous communities through employment, training and assessment.
Central Vehicle Washpoint Facility
Entered by GHD Pty Ltd, Department of Defence, Thomas & Coffey and Clearmake Pty Ltd

- Established at Gallipoli Barracks, Enoggera to replace 18 vehicle wash-down points that used potable water with no capacity to recycle and expelling dirty water into the sewerage system.
- This project provides a single site where up to 16 vehicles can simultaneously be cleaned using water from the on-site dam or from the on-site water purification system.
- On-site water treatment plant using recycled water with make-up from on-site dam eliminating need for potable water supply.
- Management of multiple stakeholders.

South East Queensland Infrastructure Program Management Office
Entered by Department of Infrastructure: Brisbane, Arup; Brisbane and The Peron Group: Brisbane

- The South East Queensland Infrastructure Program represents a huge unprecedented increase in capital investment by the State.
- Satisfactory achievement of objectives necessitates a strong coordinated response, which is the role of the Program Management Office.
- Need to coordinate management of conflicting demands on resources.
- Need to coordinate management of skills shortage.
- Need to coordinate efforts in withstanding overheating industry and increasing costs of investment.
- Ensure sustainable expenditure patterns.

Hail Creek Mine Stage 2
Entered by Sinclair Knight Merz (SKM)

- Rio Tinto Coal Australia decided to expand coking coal output to 8Mtpa at Hail Creek Mine, located 100km west of Mackay.
- SKM was awarded an Engineering, Procurement and Construction Management Contract to manage this Stage 2 mine expansion.
- Scope included a 2nd P&H 9020 dragline, mining equipment, duplication of coal handling and preparation plant and other infrastructure.
- Environmental sustainability was a major driver with particular reference to water usage/management. Special mechanical sealing glands used.
- Alliance contracting strategy used with Thiess Sedgman Joint Venture.
Reports, Procedures and Systems

As there were no entries in two of the ten categories and as there was significant diversity in the nature of entries in this category, we have divided this category into two sections for consideration of Awards.

SECTION 1 EXCELLENCE AWARD

GCD Alliance Site Selection and Project Approvals
Entered by GCD Alliance and SureSmartWater

- GCD Alliance consists of Veolia Water Australia, John Holland Group, Sinclair Knight Merz and Cardno appointed to plan, design & construct the Gold Coast Water Desalination facility and operate it for ten years.
- The two-year period for design & construction necessitated site selection, planning and environmental approvals within 12 months.
- The site is adjacent to Gold Coast Airport with two tunnels extending under the ocean to 1 ½ km off Tugun beach.
- A Multi-Criteria Analysis included environmental, social/community and technical/engineering considerations for site selection.
- Judges commend this report for the competent and wide-ranging extent of its appraisals that were undertaken in a very short time frame. The Judges were especially impressed with the report’s inclusion of recent worldwide advances in technology that were included as a result of reviewing a number of large scale overseas desalination projects.

SECTION 1 HIGH COMMENDATION

The New Parallel Runway Environmental Impact Statement and Major Development Plan
Entered by Brisbane Airport Corporation, Arup, Maunsell Australia and Bayly Willey Holt

- This document was the culmination of 18 months work by over 30 consulting firms brought together by BAC.
- This EIS/MDP addresses “Airport & Surrounds”, “Middle Banks, Moreton Bay” and “Airspace” using numerous innovative approaches.
- The report comprehensively documents the 48 individual reports which cover a wide analysis of the possible development impacts – including on the site, sand reclamation areas, the surrounding noise and environmental impacts.
- A major contribution towards assessments of major projects and a benchmark for best practice approaches.

- Judges were particularly impressed by the comprehensive and wide range of environmental aspects that were thoroughly considered – including wide community consultation, spoil treatment on site and when material was taken from the Middle Banks of Moreton Bay. They were also impressed that the report covered issues such as the accelerated reclamation by vacuum consolidation for the reclaimed areas and the extensive use of noise modelling to ensure minimal impact on the surrounding suburbs.
Perfecting The Procurement Process – Gateway Upgrade Project
Entered Queensland Motorways Limited and Department of Main Roads

- Efficient, innovative and comprehensive procurement process for $1.88 billion contract for major road and bridge infrastructure.
- Development of technical documentation setting benchmark for future large infrastructure projects.
- Rigid set of criteria and requirements for tendering, while incorporating flexibility to encourage innovation in design and construct solutions.
- Highly advanced probity measures to ensure and maintain ethical, fair and confidential practices throughout the entire process.
- The innovative procurement process required development of new methods for pile capacity testing, as well as arrestor islands to ensure the project’s safety – both during construction and operational phases of this multi-billion dollar project.
- Judges were particularly impressed with the very thorough documentation of the procurement process including tender appraisal, its transparency and probity aspects as well as use of a diverse range of specialists in evaluations. The Judges also commended the introduction of a Board to overview both the construction disputes and any long-term operational disputation issues.

Hale Street Link Feasibility Study
Entered by GHD Pty Ltd and Brisbane City Council

- The $200 million Hale Street Link (HSL) Project.
- A feasibility study (including concept reference design) and voluntary Impact Assessment Statement for a cost-effective cross-river connection between Milton and West End/South Brisbane.
- Reference design included a twin concrete box girder, balanced cantilever four lane bridge and associated roadworks, electronic tolling, and pathways for pedestrians and cyclists.
- Judges were impressed with the thoroughness of the report and the wide scale community consultation within the report. Also, Judges commended the unique treatment of walkway areas for the disabled.

Tugun Bypass EIS
Entered by Parsons Brinckerhoff Australia Pty Ltd (PB)

- The $543 million Tugun Bypass is a new motorway link - Q’land and NSW.
- Work includes 7km of dual two-lane carriageway, interchanges, four bridges and a 350m twin-tube tunnel under the airport runway extensions.
- This bypass crosses Q’land, NSW and Commonwealth airport land creating complex requirements for environmental and planning approvals.
- This submission focuses on challenges in gaining these approvals.
- Judges were impressed by the extensive range of special treatments proposed from the wide-ranging set of environmental studies undertaken.
Australia TradeCoast Strategic Infrastructure Plan
Entered by Connell Wagner

- The Australia TradeCoast is “Queensland’s Export Gateway to the World”, including the Port of Brisbane, Brisbane Airport and surrounds.
- This Plan provides a coordinated vision for land use and infrastructure development of the region sequenced over the next 20 years.
- GIS software was used to integrate the planning schemes, environmental constraints, infrastructure studies and land development proposals into a single spatial database.

Torres Strait Transport Infrastructure Plan
Entered by Maunsell Australia Pty Ltd

- This Infrastructure Plan delivers a range of initiatives for vital transport services (air/sea/land) to many remote communities in Torres Strait.
- Established existing demands and community needs to 2026.
- Long term plan providing an integrated transport strategy for the region.
- Identified technologies and transport infrastructure/service options to deliver plan.

Caloundra-Maroochydore Public Transport Connection Study
Entered by Parsons Brinckerhoff Australia Pty Ltd (PB)

- PB and McCormick Rankin Cagney were engaged by Translink to review existing transport links in the region and propose a range of future possible public transport facilities.
- As a result of this study, by 2016 the public transport link between Caloundra & Maroochydore will be faster, more reliable and user-friendly connecting existing and future communities.
- An integrated approach in identifying land use developments and practical world-class bus corridor applications.

Toowoomba Water Supply Options Study
Entered by Parsons Brinckerhoff Australia Pty Ltd (PB)

- An independent review of the region’s water supply options.
- Vast amount of data on complex and diverse options assessed in short time-frame of five weeks prior to local plebiscite.
- Recommendations supported the strategy of indirect potable re-use of recycled water, involving heavily treating wastewater, returning it to the dam, processing it to a potable level and returning it to customers.

Maroochydore CBD Master Plan Preferred Option
Entered by Parsons Brinckerhoff Australia Pty Ltd (PB)

- Maroochy Shire engaged PB in association with Deicke Richards Architects (DR) as lead consultant to conduct studies and analyses of Maroochydore’s potential as a vibrant CBD.
- The team reviewed planning policies, analysed land uses, road & rail transport networks and community facilities.
- Innovative ideas were applied in producing the preferred plan.
Research, Development and Innovation

As there were no entries in two of the ten categories and as there was significant diversity in the nature of entries in this category, this category has been divided into two sections for consideration of Awards. Section 1 covering projects involving primary research and innovation and Section 2 covering projects involving research, development and demonstration.

SECTION 1 EXCELLENCE AWARD

Helping Orthopods Fit New Knee Bearings
Entered by Aimtek Pty Ltd

- This surgical device was developed to provide positive support and guidance for the routing procedure of the tibia to take an implant.
- It enables the surgeon to provide a much flatter recess to take the tibia implant than was previously possible in a short time.
- Using the Orthopaedic Routing Guide (ORG), the surgery is less invasive, it eliminates the need for screws and clips thus reducing the likelihood of infection and provides a better outcome for the patient.
- Lesser skilled surgeons can perform this type procedure so making it more available.
- Allows for more uniform distribution of force via the implant to the bone which promotes healthier bone and can lead to a longer life of the joint.
- The project has strong potential for export.
- Judges were impressed with the innovation application of engineering knowledge and skills to surgery.

Fuel Saver Hydraulic Pump
Entered by Mathers Hydraulics Pty Ltd

- This vane pump does normal hydraulic pumping duties but when oil flow is not required, the pump continues to rotate but the oil flow ceases.
- It can deliver fuel savings of between 0.5 and 2.5 litres per hour.
- The vane pump has reduced noise, downtime and repair costs. It is less costly, has lower mass and greater availability and longer life compared with piston pumps.
- The project has strong potential for export.
- Judges were impressed by the potential for substantial fuel saving and commensurate greenhouse gas reductions through application on motor trucks and heavy mobile equipment.

SECTION 1 HIGH COMMENDATION
Intelligent Train Monitor
Entered by Queensland Rail (QR)

- This project by QR and Centre for Railway Engineering at CQUniversity addresses the challenges of driving long freight trains by balancing reduction of energy usage, damage and journey time and improving safety.
- The Intelligent Train Monitor (ITM) provides the driver with operational data to facilitate more appropriate operating decisions that reduce the longitudinal forces created within the train.
- The ITM synchronises the locomotive control data, GPS position and track geometry to provide a display to the driver together with energy consumption.
- The ITM is unique in that the fuel saving, reduced noise, improved safety and reduced travel time benefits are measurable and predictive.
- The ITM is the only in-cabin device in the world that provides both historical and predictive information.
- Judges were impressed with the thorough integration of control systems software and hardware to achieve increased safety and improved cost-effectiveness in long freight train operations.

Reducing Road Accidents at Intersections
Entered by Queensland Government: Department of Main Roads and Engineering and Technology Division

- Research shows that little has been proven worldwide about how the physical layout of unsignalised intersections affects traffic accidents.
- A "regression analysis" was undertaken on historical data for each major accident type.
- Although complex, this unique and innovative approach produced readily understood results. Models can now be developed to predict accident rates for all forms of roadway and intersection.
- Optimum design of unsignalised intersections is now possible.
- Benefits include improved safety and effectiveness of road funding plus reduced traffic delays, vehicle repair and community costs.
- Judges were impressed with the lateral thinking and the thorough logical engineering approach to analysis and modelling to address improving road safety.

Queensland Tissue Transplant Services Facility
Entered by Project Services

- Australia’s first facility for processing of donor tissue for surgical implant meeting all ISO standards.
- Key associated issues relate to providing an engineering solution in establishing a sterile environment for processing donor bone tissue for transplant.
- Automatic controls maintain a robust facility tolerant to extreme atmospheric conditions which can be practically maintained and serviced.
- Judges were impressed with the achievement of the unidirectional laminar air flow and graduated air pressure gradients between areas of varying sterile requirements to ensure appropriate air purity.
<table>
<thead>
<tr>
<th><strong>Development of the Danley Bow-Tie Coupler</strong></th>
<th><strong>Ergon Zone Substation Standardisation Project</strong></th>
<th><strong>Power Generation Skills Development</strong></th>
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<tr>
<td>Entered by Danley Construction Products Pty Ltd</td>
<td>Entered by Maunsell Australia Pty Ltd</td>
<td>Entered by CS Energy Limited, Tarong Energy Corporation, Stanwell Corporation, Central Queensland University, Queensland University of Technology, University of Queensland and Thermodyne Technologies.</td>
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<td>- The Danley Bow-Tie Coupler is an innovative coupling device that uses a simple block and wedge mechanism rather than a thread or other mechanical device to join reinforcement in concrete floor-to-wall connections. This is a simple mechanism with effective full capacity.</td>
<td>- This project addressed the standardisation of designs for a network resulting from amalgamation of six regional electricity boards each with different plant specifications and voltages between locations.</td>
<td>- This is a unique postgraduate professional development program responding to urgent industry need for specialist education and training in power generation sector of the electricity supply industry.</td>
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<td>- It obviates the need to bend reinforcing bar thereby increasing the structural integrity of the connection.</td>
<td>- The Maunsell Ergon team delivered a suite of six substation designs.</td>
<td>- This program was developed collaboratively by the above-mentioned three Government-owned power generators and the three universities.</td>
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<td>- There are no threaded sections which are vulnerable to fouling &amp; damage.</td>
<td>- This provides significant benefits in meeting time and cost constraints.</td>
<td>- Provision of increased skills and knowledge to power generation professionals is aimed at ensuring on-going cost-effective electricity supply.</td>
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<td>- Site productivity is improved by reducing installation time.</td>
<td>- The outcome is a prospective cost saving of $10 million over five years.</td>
<td>- The program has strong industry support.</td>
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<td>- Quality control is improved.</td>
<td>- Conforms to worldwide standards and codes and has good export potential.</td>
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Creating a “Robot-Ready” Giant

Entered by INETE P/L

- INETE was contracted by BMA to provide complete electrical project management for transfer of a Marion 8200 dragline from USA to Blackwater Mine in Central Queensland.
- This involved a total re-design of the Dragline’s on-board electrical power and control systems, including automation, employing state-of-the-art technology.
- These innovations have produced one of the world’s first “robot-ready” coal mine draglines.
- Judges were impressed with the company’s size – four employees (two Electrical Engineers and two IT Specialists) to successfully complete the daunting specialist refit and upgrade project. Particular note was made in this giant recycling of the US dragline itself, as well as the inclusion for future uses to utilise a range of future adaptations as required by their client.
Without the following sponsors the Engineering Excellence Awards would not be possible.