A spotlight on Queensland roads

Queensland’s population continues to grow. In 2008 the growth rate of 2.3% was just behind Western Australia at 2.7% and much higher than Australia’s overall rate of 1.7%. Queensland’s population totals 20% of the nation’s population.

Population growth means more demand for infrastructure. One example is the estimated additional 735,500 new dwellings that will be needed in south east Queensland alone and the supporting infrastructure and services such as roads. On our roads, the number of freight vehicles has grown by 23% over the last four years.

Irrespective of where people live and economic activity is located in Queensland, there is the need to provide and maintain safe and efficient roads to connect people, goods and services.

The Queensland Department of Main Roads is custodian of the largest physical community asset – the 33,500km state-controlled road network.

Managing this important asset presents many challenges and opportunities, including:

- optimising efficiency of the road network through the use of innovation and technology
- undertaking business in a sustainable manner
- taking a unified approach to ease congestion and support Queensland’s development through regional programs, such as the South East
- Drainage culverts & stormwater systems
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Queensland Infrastructure Plan and Program.

Providing connectivity during climatic events, such as the 2008 and 2009 Queensland floods, is a big challenge in a state as vast as Queensland. Wet weather resulted in over 60% of the state flooded, including many vital road connections for industry and communities. The department has a significant maintenance task to undertake to protect the road asset. In restoring the road network, Main Roads balances the safety of road users with preserving the road asset.

The Roads Implementation Program (RIP) outlines what the department is working on across the state to deliver the infrastructure needed to support economic development and community quality of life. The state’s road construction program has tripled in the last few years to meet the transport demands resulting from growth. To keep Queensland connected and meet the demands on roads, Main Roads is tasked with delivering more than $16 billion of road infrastructure over the next five years. The road infrastructure program is part of a balanced approach to Queensland’s transport solutions.

The multi-billion dollar South East Queensland Infrastructure Plan and Program outlines major road, rail and public transport projects in the state’s fastest growing region. The program will ensure that infrastructure meets the demands of population growth and economic development.

Connecting south east Queensland
Main Roads is delivering many projects in the south east corner to connect people, industry and business.

- Duplication of the Gateway Bridge – includes a second bridge, enhancements to 20km of motorway, additional lanes and a pedestrian and cycle path over the Brisbane River.
- Houghton Highway – duplication of the bridge to improve connections to and from the Redcliffe Peninsula.
- The Brisbane Airport Link - Australia’s biggest road project includes a 6.7km toll road to connect people and business to Brisbane’s growing airport precinct and reduce travel times.
- Ipswich Motorway – upgrade of an important stretch of the AusLink network to provide a vital traffic and freight corridor between Ipswich and Brisbane.
- Unified traffic signals – working with Brisbane City Council to bring together 1,400 signals under the Main Roads/Transmax STREAMS system to deliver improved travel times.
- Traffic response units – 11 currently in operation in south east Queensland to provide traffic control and coordinate emergency services and traffic management centre responses.

Connecting regional Queensland
In regional Queensland, the RIP outlines key infrastructure projects that contribute to rural and regional economic development initiatives and ensure regional and remote communities and industry stay connected. Key regional initiatives include:

- Bowen Basin – road improvements to further support Central Queensland’s coal mining industry.
- Townsville Ring Road – a project to address increasing demands on the Bruce Highway and the northern suburbs of Townsville and Thuringowa. The road will provide a more efficient route for freight and passenger traffic.
- Forgan Bridge, Mackay – bridge replacement and upgrade to ease congestion and improve traffic flow in the city by increasing the cross river capacity.
- Southern Queensland Accelerated Road Rehabilitation Program – replacement of 31 timber bridges with new concrete bridges from Stanthorpe to Bundaberg, providing better road alignments and improved flood immunity.

Connecting through partnerships, relationships and alliances
Main Roads has a proactive approach to partnerships and alliances with industry and business to work collaboratively on infrastructure planning and delivery. We are looking at new methods of contracting, including Early Contractor Involvement, and packaging projects for improved delivery. Key initiatives include:

- SAFElink Alliance, Ipswich Motorway Upgrade – an alliance with Leighton Contractors, BMD Major Projects, Maunsell AECOM and Arup to undertake the project development phase of the upgrade of the Wacol to Darra section of the Ipswich Motorway.
- Inner Northern Busway, Brisbane - delivered by its alliance partners six months ahead of schedule.
- Maroochy River bridgework – delivered a cumulative 16 months ahead of schedule.
- PacificLink Alliance, Tugun Bypass – a partnership between the federal government, Main Roads and the PacificLink Alliance, delivered six months ahead of schedule.
- International linkages – partnership between Austroads and the American Association of State Highway and Transportation Officials, which represents highway and transport departments in 50 states across America to improve knowledge and information sharing between the two organisations.
- National linkages - working with other road agencies through the Australian Transport Council to deliver the federal government’s road reform agenda.
- ARRB – a collaboration providing research
The Horizon Alliance combines the expertise, resources and experience of established industry leaders in integrated infrastructure design and delivery.

Horizon’s dynamic and flexible project delivery model provides a full realm of design and construction services, with the primary goal of delivering world class integrated infrastructure to the booming South East Queensland community.

The alliance model allows complex projects to be delivered on time and to budget, while building strong relationships across industry sectors.

Horizon is committed to establishing a long term alliance program by creating a flexible team dynamic which ensures a diverse range of infrastructure delivery experience across all disciplines.

Horizon will go beyond business as usual. As a dynamic, focused team, challenges will be met and expectations surpassed.

The first project for The Horizon Alliance is the $800 million Darra to Springfield Transport Corridor Project - Stage 1.

Stage 1 includes constructing a new passenger railway line from Darra to a station at Richlands and duplicating the Centenary Highway from two to four lanes from Richlands to meet with the existing Logan Motorway interchange at Carole Park.

This is the first major integrated road and rail project for South East Queensland.

The Horizon Alliance
Phone: 1800 887 464 (freecall)
Email: info@horizon.incite.com.au

THE HORIZON ALLIANCE
Building Our Future Now

The Horizon Alliance is a collaboration between QR (Queensland Rail), the Department of Main Roads, John Holland Pty Ltd, GHD Pty Ltd and Kellogg Brown & Root Pty Ltd (KBR).
**Waterway Solutions** is a Professional Engineering Consultancy specialising in the analysis, design and management of stormwater drainage systems, waterways and floodplains.

Waterway Solutions designed each of the 5 major and numerous minor culvert crossings included within the 7km of The Tugun Bypass Project; provided concept design and sizing for a system of flood walls, drainage systems, and tunnel detention sumps and pumps; and worked closely with specialist Ecological Consultants to ensure adequate provision was made for environmental considerations including discharge water quality, fish passage, frog culverts and other fauna movement structures.

Established in 2004 by the Director, Peter Comino, the consultancy is based in the City of the Gold Coast, South-East Queensland. The company provides consulting services to a range of organisations within the Land Development Industry and Government bodies.

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This large scale infrastructure and construction project was managed by Watpac, who called upon Qasco to deliver the projects survey and spatial data management requirements. Qasco and Watpac have combined on numerous major projects including the Suncorp Stadium and Brisbane Cricket Ground (GABBA) redevelopments and over this time have developed an excellent working relationship. Qasco's involvement in the Skilled Stadium and Transport Hub project represents one of the largest multi faceted projects in the firm's 45 year history. Highlights of the services and expertise provided to the project include:

- The use and integration of a range of diverse spatial technologies including aerial photography, photogrammetric mapping, ground survey, GIS and 3D fly-through modeling.
- Project management of the big picture requirements of the contracting manager (Watpac), plus the supply and management of the surveying and spatial data needs of 15 site subcontractors throughout the two year duration of the project.
- Spatial/Project management by an experienced construction and cadastral surveyor. Our teams of surveyors and assistants have worked internationally on high rise buildings and locally on a host of major projects.
- Provision of a project GIS, updated daily and available to all authorized personnel.
- Provision of reliable, 24 hour access to survey crews.
- Client access to the full range of spatial skills required for the project through a single service provider. In addition to the technologies identified above, the diverse surveying requirements for the project included ground control by GPS for mapping, dilapidation surveys requiring the systematic recording of detail, RTK GPS surveys for bulk earthworks and drainage design, construction control to millimetre accuracy using first order instruments and checking procedures that included both closures and redundant observations, plus cadastral surveys for titling, easements and volumetric road closures.
- The experience of Qasco in providing spatial services to South East Queensland's major stadiums. Qasco has been the project surveyor for both the Suncorp Stadium and the Gabba Stadium complexes.

The range of services provided by the Qasco team included;

Complex Data Management
Data from numerous sources needed to be effectively managed and integrated, including existing services and site information, design data (often with different datums), information generated by aerial and ground survey resources, progressive set out and As-Built plans, design revisions, and the final gathering and integration of As-Built data collated over the two year project period.
Legal advisers to Queensland’s major projects

For more than 20 years, we have been proud of our track record on Queensland infrastructure projects. In 2008, these included:

- Wiggins Island Coal Export Terminal
- Surat Basin Rail Project
- Gladstone LNG Project
- Alpha Project

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Maintenance of Survey Control
Having construction on what was originally a flood plain, ground movement was identified as an issue that required constant monitoring. Project control, consisting of twelve (12) deep driven concrete encased steel rods, were strategically placed around the construction area. Being located within the flood plain, these control points were initially monitored twice weekly, then on a weekly and fortnightly basis as the knowledge of ground movement increased. A further four (4) monitoring control points, external to the flood plain, were used to confirm absolute values.

Integrating Existing Infrastructure and Site Features
The existing Robina Rail Station required extensive As Constructed surveys prior to the construction of a new level over the existing car park. Furthermore, surveys to existing overhead high voltage power lines and existing rail infrastructure in close vicinity of the site required accurate remote surveys using reflectorless survey technology. The use of reflectorless surveying not only provided a high standard of workplace health and safety, but, impressively, allowed the survey to be undertaken without the necessity to shut down rail infrastructure.

Integrating Ground and Aerial Surveys
The site was originally surveyed using low level aerial mapping techniques, providing a time specific, cost effective and reliable source of original data for our client. As the project progressed, the use of aerial mapping decreased and was replaced by ground surveys for the capture of precise structural elements.

Collating Real Property Data
Qasco was required to collate all current Real Property Data including titles and plans. These property interests were managed for our client Project Services, and included cadastral surveys for easements and survey plans for road closure applications. Expertise in land tenure issues was provided throughout the project and ensured no timing delays with final ownership.

Dilapidation Surveys
Dilapidation surveys have become an important risk management tool for the constructors and owners of major infrastructure projects. Qasco has a template model for dilapidation surveys with features classified in a matrix according to likelihood for damage, cost of rehabilitation, and extent of information to be surveyed. Prior to construction, dilapidation surveys were required on all adjoining properties. This involved inspecting every adjoining house and roadway, including all railway station assets. The collection of over 1,000 photographs of visible defects and reports of over 800 pages in four (4) volumes took six weeks to complete prior to construction.
Set Out of Major Structural Steel Items
A key to the architectural design of the Skilled Stadium was the eye catching rafter tips and hip tips that form the backbone of the design for the building. These design elements, weighing up to 32 tons, were positioned with complex hold down bolt configurations for each element. The structural steel elements provided the framework for the state of the art fabric to the roof. Survey control to an accuracy of 2mm-4mm was required for these structural items. Set out techniques included the constant checking of control, observations at right angles, regular monitoring of all construction elements, and the use of high precision equipment.

Set out of 650 foundation piles
The tight completion timeframe for the project required the piling sub-contractor to have multiple pile rigs working on the project site simultaneously. This meant that at any one time there could be up to three piles being drilled, driven or cut off. This busy construction period was challenging to all those working on site, including Qasco surveyors. To achieve the necessary project progress our responsibilities included the provision of up to three on-site survey teams to carry out the set out and As-Constructed piling requirements and other instructions.

The ability of Qasco to provide a ‘one-stop-shop’ for all the spatial needs of the project throughout its lifecycle was a significant contributor to the projects success and provided piece of mind for the Project Managers from Watpac. Qasco’s commitment to its client’s and the provision of a single point of contact for all a projects spatial needs minimizes the risks associated with the complex survey requirements on projects of this magnitude.

Qasco’s performance on the project was recognised with the award of the 2008 Queensland Spatial Excellence Award for Infrastructure and Construction. It is the second year in succession that Qasco has won the award after being recognized in 2007 for their work on the Millennium Arts Precinct in Brisbane.
Abigroup brings leading-edge construction techniques and a strong collaborative spirit to a diverse range of major infrastructure projects.

Our role in the award-winning Tugun Bypass project helped the PacificLink Alliance meet the highest expectations of timing, quality, innovation, environmental care and safety.

Outstanding achievements included:

• Project completed six months ahead of schedule
• Complex construction with six bridges
• A 334 metre tunnel under the Gold Coast Airport
• Approvals from 20 regulatory bodies
• Environmental care of wetlands and endangered species habitat
• Connection to live traffic interchanges carrying 40,000 vehicles a day.

Abigroup is proud to be a partner in bringing advanced capabilities to Queensland’s vital infrastructure projects. We share your vision for the future.
Setting the pace and creating the future in Queensland

Leighton Contractors is committed to creating a sustainable future.

The company’s latest completed projects are good examples of this commitment. The Green Square Corporate Office Park and the Inner Northern Busway – Queen Street to Upper Roma Street are cleverly engineered solutions to meet client needs while also meeting high-level sustainability targets.
The award-winning Green Square Corporate Office Park, designed and built by Leighton Contractors, made waves in the commercial property environment, setting new benchmarks for sustainable construction in Queensland.

The Inner Northern Busway built by the Leighton Contractors-lead INB HUB Alliance achieved a goal of approximately 95 per cent in its environmental targets, as well as coming in under budget and ahead of schedule.

General Manager of Leighton Contractors Northern Region Darren Weir said because of the company’s industry leadership, they recognised the clear responsibility to drive sustainable issues forward within the company, in projects and within the industries in which they operate.

“Sustainability challenges are everywhere - from creating strong communities, ensuring the products we use are environmentally sustainable, recycling and reducing waste, to offering a work/life balance and training and career paths for our staff,” Mr Weir said.

“The challenges as well as the opportunities to make a difference are considerable.”

Today, Leighton Contractors continues to grow, based on the quality of its people, its commitment to excellence and its record of successfully integrating sustainability into its operations.

The Green Square Corporate Office Park is the largest mixed-use development in Brisbane for the last 15 years, comprising two office towers, North and South, around a central plaza. It leads the way in responsible commercial building design across Australia with the achievement of 5 Star and 6 Star Green Star ratings from the Green Building Council of Australia and a host of industry awards.
More than a project...

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Dedicated to providing infrastructure investment, our team is ensuring Queensland’s future continues to thrive. Across a range of industries, we are committed to developing long-term partnerships and taking a whole of life approach to all projects.

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Leighton Contractors. More than you’d imagine.
Featuring bright colours, open plan working spaces and ergonomically designed desks and chairs, the new buildings are also environmentally friendly with many water and power saving initiatives.

The South Tower is the first Queensland building to achieve 5 Stars for Office Design and Office-As-Built in the Green Building Council's Green Star ratings scheme.

The eye catching exterior of the South Tower provides improved energy performance through the use of high performance glass, shading and insulation. The use of low volatile organic compounds in the interior fixtures and fittings has ensured a cleaner air space, making it a more comfortable working environment.

North Tower at Green Square is the first completed 6 Star Green Star rated building in Queensland. It provides approximately 23,000sqm of A Grade office space over 12 office levels and 160 car spaces in two basements. A public plaza level links the ground levels of both North and South towers, providing retail space and pedestrian access to Green Square Close and St Paul’s Terrace.

Teams working on the projects invested heavily in sustainability education and relationship management to create a culture where sustainability was at the forefront of the minds of all participants.

A good example of how Leighton Contractors had made a difference within sustainability development is encouraging suppliers to introduce ‘green products’.
Building the Foundations of Queensland’s Infrastructure

Piling Contractors specialise in piling, drilling and foundation solutions, including:

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Piling Contractors has extensive experience with both traditional contractor and alliance style delivery methods. Offering design and construct services with nationwide coverage, we pride ourselves on delivering a quality product on time and to budget.

Pictured below are some of the recent Queensland major projects we are proud to be a part of: Hale St Bridge, Vision Tower, Caboolture Bypass, RG Tanna Coal Terminal and Gateway Upgrade projects.

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In January 2006, Leighton Contractors tendered for a concrete supplier for the South Tower, seeking a supplier who could replace 40 per cent of the cement material with industrial waste product, while maintaining workability, quality and commercial competitiveness. Only one supplier could meet this criteria. One year later in January 2007, Leighton Contractors tendered for a concrete supplier for the North Tower with the same ‘green’ cement requirements. This time, three additional suppliers met the criteria.

Suppliers said their initial inability to meet the requirements for the South Tower concrete tender was a strong driver in their move to develop a workable mix which reduced embodied energy and resource depletion.

This story is one of many that demonstrate Leighton Contractors’ success in paving the way for green building by moving beyond compliance, educating employees and subcontractors and creating demand for environmentally sustainable products.

One of the most innovative measures implemented on the North Tower was the cogeneration plant. Cogeneration generates power on-site using a gas engine-driven generator. Its implementation reduced North Tower’s carbon dioxide emissions rate by 49 per cent.

To further reduce emissions, in an Australian first for commercial office buildings, a Selective Catalytic Reduction system reduced the tower’s nitrogen oxide emissions by 85 per cent and carbon monoxide emissions by 90 per cent.

Overall, Green Square North Tower achieves a reduction in CO2 emissions of 1163 tonnes per year compared to a building that has a good energy rating in Queensland and achieves a 5-Star Australian Green Building Rating of 76kgCO2/m2/annum.

...the requirements for the South Tower concrete tender was a strong driver in their move to develop a workable mix which reduced embodied energy and resource depletion.
Leighton Contractors called to share its sustainable development and construction experiences with industry.

In May 2008, the Inner Northern Busway – Queen Street to Upper Roma Street project hosted a community open day to mark its completion. More than 10,000 community members came together to commemorate the completion of this vital link to the new busway network.

Construction of the busway from Queen Street to Upper Roma Street commenced in June 2006. The new section allows buses travelling north and west to bypass traffic congestion in Brisbane’s CBD by moving through tunnels and saving buses up to 20 minutes in heavy traffic.

Two new busway stations were built on the lower levels of the existing King George Square car park – a major technical challenge - and at Roma Street Rail Station. The project was key to delivering a world-class public transport system that would help take vehicles off the congested inner city streets.

The project alliance team worked collaboratively to achieve the best possible design, construction, environmental, geotechnical, architectural, and community engagement solutions.

In recognition of Brisbane’s need to future proof water supplies, the Inner Northern Busway Project team delivered a legacy for the benefit of future generations. The team designed and constructed a pipeline under the busway road foundations with the capability to provide for the city’s future recycled water main. This community legacy, which extended beyond the original project scope, is an example of an innovative approach to provide positive social and environmental outcomes for future generations. Value-add initiatives taking place on a Leighton Contractors project such as this are rigorously investigated from both a risk and whole of life cost benefit prior to implementation.

A host of other initiatives were implemented on the Inner Northern Busway project including a Water Efficiency Management Plan in response to the water shortages faced during construction. The plan aimed to better manage water use, improve water efficiency and reduce water consumption.

The procedures implemented in response to this plan were successful in minimising water use throughout the project. In addition to measures such as ongoing maintenance, and monitoring and installing efficient water fixtures on-site and in offices, the project worked on behavioural change programs to create a different mindset in workers, and implemented recycling strategies such as using mobile water treatment plants to reuse storm water captured on-site.

The project’s commitment to water efficiency was implemented prior to the introduction of Levels 3, 4 and 5 water restrictions and meant recycled water was used for all site construction activities.

Each year, Leighton Contractors publishes Sustain, a sustainability report that documents the safety, health, environment, community and financial performance of Leighton Contractors within the financial year. For more information on Leighton Contractors’ approach to sustainability, download this report from the sustainability page on our website at www.leightoncontractors.com.au.
Inside the larger of the two Adelaide entry structures to the new King George Square Busway Station

The new integrated Roma Street Busway Station during the INB public open day. The inbound busway shares a passenger platform with rail services – a first of its kind in Australia.

The connection of the new busway to the existing INB at Countess Street. The colonnade forms a physical and attractive visual barrier to the adjacent Roma Street.
W-Beam X-350 TERMINAL

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The X-350 is a tangent terminal and provides the opportunity to minimise civil fill works behind the barrier as for more conventional terminals.

The X-350 is simply a better-performing terminal end. Please call Australian Construction Products for more information on 1800 724 172 or email sales@acprod.com.au
Water for the people

Leighton Contractors is committed to creating a sustainable future.

For Aurecon’s Sean Gray, applying expertise to projects that benefit people is one of the main rewards of working in the water and environment field. He cites his involvement in the Luggage Point Advanced Water Treatment Plant as a good example of being a part of major infrastructure works that really are of benefit to the community.

The 1990s saw formal Government acknowledgement that drought is part of the natural variability of the Australian climate – part and parcel of Australian life. But now, with the opening of the Luggage Point Advanced Water Treatment Plant (AWTP), Queenslanders can look forward to seeing a substantial flow of purified water to South East Queensland, one that will help to relieve Queensland’s water shortage now and into the future.

The $290 million Luggage Point AWTP is expected upon full operation to provide up to 66 Megalitres of purified recycled water per day to the Western Corridor Recycled Water (WCRW) Project. This is enough for more than 380 000 people at “Target 170” (170 litres per person per day) usage.

Sustaining our future

The Luggage Point AWTP forms just one part of the WCRW Project, which has been delivered through a multi-alliancing framework with five alliances delivering different parts of the project.

“We are proud to be one of the four organisations that make up the Alliance Team working on part of the largest recycled water project in the southern hemisphere,” says Gray, who led Aurecon’s team as sub-alliance partners to the Luggage Point Alliance.

In an effort to provide a sustainable water supply network to South East Queensland, the WCRW Project involved the design and construction of more than 200 km of new pipelines from six wastewater treatment plants located throughout Brisbane and Ipswich, three advanced water treatment plants (AWTPs), eight storage tanks and nine pumping stations. The new pipelines transfer treated effluent from the wastewater plants at Oxley, Goodna, Bundamba, Wacol, Luggage Point and Gibson Island to the three new AWTPs at Luggage Point, Bundamba and Gibson Island for advanced treatment. After treatment, the purified recycled water is transferred to industry, agriculture and power stations, or to Queensland’s water supply reservoirs as an emergency response (when combined South East Queensland dam levels drop to 40 percent).

In total, the supply network will have the capacity to deliver up to 232 megalitres a day of purified recycled water, providing South East Queensland with a future-proofed, climate-independent purified recycled water supply.

Leading the way

The WCRW Project has warranted Queensland’s position at the forefront of recycled water technology. Highlighting this, the scheme has so far received international recognition, being the recipient of five major industry awards including the Global Water Project of the Year Award from Global Water Intelligence. In addition Bundamba AWTP was named “2008 International Project of the Year” by the Construction Management Association of America (CMAA).

“What has attracted such global attention,” says Gray, “is the sheer geographic size of the project, and the engineering complexity, seen particularly in the innovative technology utilised for the advanced water treatment process.”

Achieved through seven stages of treatment, the purified recycled water produced by the WCRW Project meets some of the world’s strictest safety and quality standards. Following initial treatment at sewage treatment plants, the wastewater is transferred to an AWTP where it undergoes microfiltration, reverse osmosis, advanced oxidation, stabilisation and disinfection before it is sent either directly to power stations or to water supply reservoirs during drought periods.
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“As part of the Luggage Point Alliance, Aurecon is excited to have an instrumental role in the delivery of world-first technology,” says Gray.

**Pride and innovation**

In association with Hatch and CH2M Hill, Aurecon was responsible for managing design elements, as well as providing civil, structural, electrical, instrumentation and controls, building services, durability assessment, outfall plume modelling, environmental and approvals support to the Alliance Team. Aurecon also worked closely with stakeholders, including the Environmental Protection Agency.

“In particular, we focused on sustainable design and objectives,” says Gray. “What would be the point of building this Advanced Water Treatment Plant if it was a burden to the environment? One of the often overlooked benefits of the Advanced Water Treatment Plants is the reduction in nutrients discharged to Moreton Bay. The AWTP pre-treatment process removes a significant amount of nutrients from the treated effluent, particularly phosphorous, that would otherwise be discharged to Moreton Bay from the existing wastewater treatment plants.”

Aurecon’s innovative design of a new sea outfall to release reverse osmosis concentrate into the mouth of the Brisbane River included the development of a purpose-built jetty diffusing system to reduce the potential environmental impact and to avoid the need for dredging.

“The system has the added benefit of being relatively easy to maintain with a low environmental impact during construction,” explains Gray.

As part of their role, Aurecon provided geotechnical services along with specialist water retaining structures design. Aurecon worked closely with construction partners to resolve significant issues associated with predicted site settlement and to come up with designs that facilitated timely construction of structures. The design of the majority of the concrete structures minimised construction joints and omitted expansion and contraction joints to maintain the time frames within the tight construction programme.

With the project fast tracked for completion in just two years, instead of the usual three to five years, the Western Corridor Recycled Water Project’s necessity is clear. At the Luggage Point Advanced Water Treatment Plant’s open day in November 2008, Deputy Premier Paul Lucas toasted the completion of the plant, citing the project as being at the cutting edge of water efficiency and environmental responsibility.

“It’s something all Queenslanders can be proud of,” he said.

Speaking with an inside understanding of the project and the critical worth of water infrastructure, Aurecon’s Sean Gray agrees.
Queensland and Victoria tackle water woes

Drought, expanding populations and outdated infrastructure has led two states to implement new measures: one a modern water grid, the other a state-of-the-art irrigation system. We also examine some of the key features of two of the popular project delivery methods in the water sector.

South East Queensland Water Grid

Management of water resources within South East Queensland (SEQ) remains a highly contentious issue. Prompted by a rapidly growing population, severe drought and the consequences of climate change, the SEQ Water Grid (water grid) is at the centre of the state’s new water system.

The water grid is considered to be cutting-edge water reform and includes new dams, a desalination plant, a recycled water scheme and extra groundwater sources, all connected by two-way pipelines. It is an integrated regional system replacing the previously fragmented SEQ water supply. Once fully operational the water grid will deliver around 350,000 megalitres of water a year through existing and new climate-resilient water sources.

The key principle underpinning the establishment of the water grid is that water is a shared resource. The grid will supply the local governments of Brisbane, Gold Coast, Ipswich, Lockyer Valley, Logan, Moreton Bay, Redland, Scenic Rim, Somerset and the Sunshine Coast, giving SEQ more water and moving water to the areas of highest demand.

To facilitate the operation of the water grid, the Water Supply (Safety and Reliability) Act 2008 (Qld) has amended the Water Act 2000 (Qld) to establish the regulatory framework for an urban water market in SEQ.

In marked contrast to the state’s previous water system, the water market is created for the sale and purchase of water services, such as water storage or water reticulation, declared by the relevant minister to supply water to the water grid.

A grid service provider will supply water services to the water grid manager, a state-owned statutory authority overseeing the operation of grid functions and water flow around the grid. Water will be subsequently sold by the water grid manager to a grid customer initially consisting of each local government in the SEQ region. Local government-owned retailers will then be responsible for the retail sale of water supply by 1 July 2010.

The new water market regime will significantly affect operators of existing water infrastructure as well as users and suppliers of bulk water in SEQ. Retail water customers will also be affected both by the change in retail suppliers and likely price increases.

To date, both the grid and market have been criticised as being too complex and lacking in accountability. Whether these criticisms are founded remains to be seen. Only time will tell if the technologically advanced water grid is the answer to Queensland’s water woes and gives Queensland an equitable and sustainable distribution of water.

Irrigation modernisation in Victoria

Climate change, chronic drought, and ageing infrastructure have had a significant impact on the viability of Australia’s irrigation industry and the surrounding environment, hampering the efficiency of water delivery. Victoria has therefore moved towards modernising, automating and reconfiguring its irrigation infrastructure, with the Northern Victoria Irrigation Renewal Project (NVIRP) in the Goulburn-Murray Basin as the cornerstone.

Irrigation modernisation projects are driven by the recognition that of the approximately 14,000 gigalitres per annum used in irrigation in Australia, between 10–30 per cent of river diversions are lost before the water reaches the farm gate. These projects typically involve a combination of piping or lining channels, channel reconfiguration and rationalisation, channel automation and metering upgrades. These help reduce water losses, more accurately measure and deliver water and provide a better service for irrigators. These projects are being facilitated by a number of government funding programs, including Water for the Future (which allocates $5.8 billion to increase water use efficiency in rural Australia), the Living Murray Initiative and the Victorian Government’s specific funding of projects.

The NVIRP project involves approximately $2 billion of investment, including $1 billion committed as Phase 1 towards achieving 225 gigalitres of water savings, delivering a renewed backbone for the bulk water delivery system, upgrading metering and connecting 25 per cent of customers to the new system. Approximately a further $1 billion commitment is proposed for Phase 2 to complete the connection of remaining customers and achieving further water
savings. The project is intended to yield substantial water savings: 225 gigalitres in Phase 1 and a further 200 gigalitres in Phase 2.

In our experience, the success of these projects often depends on resolving challenging questions, such as:

- How do you structure and select the best procurement methodology to reflect the nature of these projects? (For example, the NVIRP Project has used an alliance to deliver early works, while tenders have been sought for a managing contractor to deliver other aspects of the project.)
- How do you manage the typical risks of any technology project?
- How do you manage the competing pressures of reconfiguration and modernising an irrigation system while it is still being used to deliver water?
- How do you balance the timely achievement of water savings while carrying out appropriate customer consultation and system design?
- How do you maximise the broader economic and community benefits of the projects?
- How do you ensure that the benefits of the projects are properly communicated and explained?
- How do you ensure co-operation across a diverse range of agencies with a role to play?

It is inevitable that the NVIRP Project represents only the beginning of irrigation modernisation in Australia (and the Murray-Darling Basin in particular), as governments, water authorities and irrigators seek to ensure the on-going viability of the irrigation infrastructure while addressing the health of overstressed rivers and the environment.

**PPP options**

Uncertain economic times lead to a re-examination of the key features of project delivery, particularly the management of risk. In two very different contract models, public private partnerships (PPPs) and alliances, the principal seeks to manage risk through the relationship that it forms with its contractor.

In recent and more prosperous economic times, water projects have been delivered using both contract models. The PPP encourages innovation and growth by allowing the contractor a certain freedom to deliver water services using the best available technology with minimal interference from the off-taker. This in turn allows the PPP to encourage a relationship in which the contractor has the freedom to implement its best business model. An advantage is potential freedom to restructure (including taking the financial benefits of debt restructuring) to weather tougher economic conditions. This is provided that the service levels for water delivery are not affected. In addition, PPPs tend to use a special purpose vehicle for the delivery of the project, which may quarantine the project from any failings of the parent company.

As an alternative, alliances employ a ‘no blame: no suit’ approach, which establishes a relationship intended to encourage the participants to find solutions to problems rather than assigning blame. A fundamental feature of the alliance is that it does not assign the responsibility for tasks to any one participant, but to all participants (including the off-taker). There is a prohibition on litigation, except in the case of wilful default or fraud. As projects come to be tested, it remains to be seen whether the ‘no litigation’ principle will prevail in the manner it was intended. If it does (and there is no suggestion to date that it should not), the alliance offers a project delivery model that allows the participants to avoid the difficulties of court-based dispute resolution, and focus on resolving obstacles in order to successfully deliver water projects and services.

It remains to be seen how each contract model will cope with and adapt to the changing economic environment. The different key elements of each model may well be challenged as the economic environment continues to change. One thing is certain though, the success of each model will depend on the strength of the relationship that it has established.

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Photograph: South West 1 Enterprise Park and Berrinba Wetlands, Logan

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