



Water

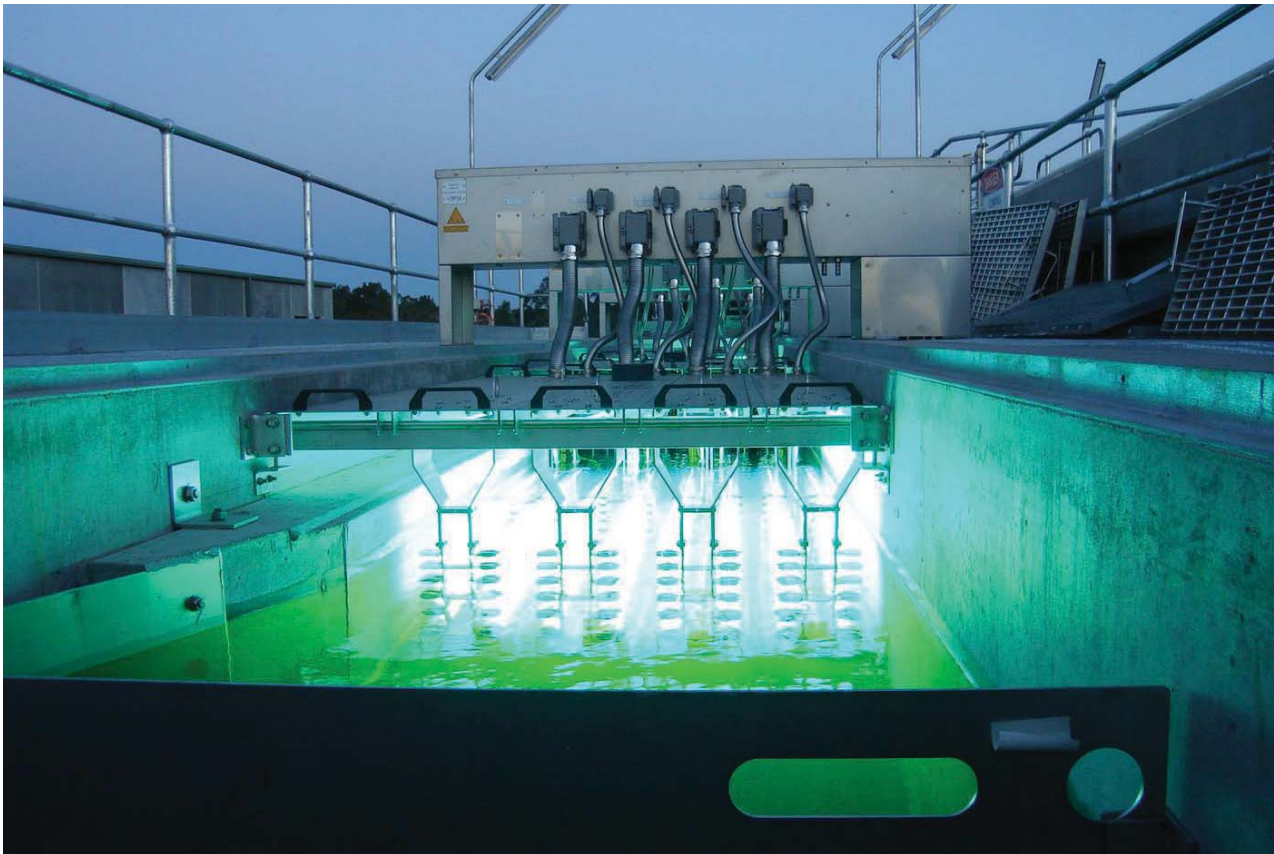


### The Beca Group

Founded 90 years ago, Beca is one of Asia-Pacific's leading engineering and related services consultancy groups. From prestigious landmark developments and functional to environmentally sustainable projects, Beca's multi-disciplinary range is broad.



Our water industry projects are a showcase for our passion. The experience gained from delivering these projects has enabled us to develop innovative and practical solutions to meet our clients' needs, be they optimising existing assets or developing long term, sustainable outcomes.



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## Welcome to reliable, knowledgeable client service

Beca provides client-focused, innovative and practical advice for water, stormwater, wastewater and environmental engineering projects.

As well as strategic advice, our engineering and project management skills have assisted clients on a wide range of water projects across the Asia Pacific such as water resources, intakes, water treatment plants, pump stations and pipelines, distribution systems, specialised software systems and modelling, short and long-term stormwater management, air and water quality, environmental management plans and systems, compliance auditing and environmental feature designs.

Beca can assist you with water engineering services within the use and recycling spectrum of projects dealing with every aspect of water distribution and treatment, including sophisticated optimisation, modelling of distribution networks and long-term strategic development plans.



## Water treatment options that look to the future

### Water resources

Whether you need assistance with hydrological studies, groundwater systems, drought reliability assessments, impounding reservoirs or water quality modelling, Beca can offer the right tools and people for the job.

### Intakes

Intakes require a careful study of the source water conditions at all stages, so that they can be adapted to construction conditions and screening and pumping equipment.

### Water treatment plants

Our specialists in water treatment plant design have investigated and designed plants for a range of industrial and municipal clients. We provide solutions for softening and boiler feed, removing turbidity, and removing specific contaminants, including iron, manganese, colour, odour and pathogens.

### Recycled water

We have designed and delivered recycled water plants that provide sustainable supplies for a range of end users, ranging from irrigation to indirect potable reuse. From concept design through to full project delivery including approvals (planning and health) and project management, we can provide solutions that reinforce our commitment to “use and recycle” our most precious commodity.

### Operation and controls

We can assist you with your strategic planning and assessment of customer service levels. We also design computer and SCADA systems for your treatment plants, providing control over plant functions, improving treatment reliability, reducing operator requirements and allowing remote supervision.

### Desalination

As joint designers for the Victorian desalination plant - Australia's largest, we understand the challenges associated with this technology. From managing the environmental and approval issues associated with marine intakes and outfalls, to selecting the pre-treatment, desalination and post-treatment processes, and the detailed mechanical and electrical engineering, we can help you deliver these complex projects.





Stormwater harvesting presents both challenges and opportunities. To develop short and long-term stormwater management solutions for our clients that support the natural environment, Beca applies specialist modelling techniques, strategic planning skills and sensitive design approaches.



## Stormwater management and water sensitive urban design

Your operations and assets can be severely affected by the risk of floods, erosion and sediment control and environmental damage. Beca's stormwater design team can provide you with effective, specialised solutions based on a thorough, scientific understanding of the environmental processes at work.

### Catchment management

Urban development can significantly affect stream systems and the quality of aquatic receiving environments. However, with an appropriate,

comprehensive approach to urban design, these effects can be managed so development can be economical without adverse effects on neighbours or the environment. Our Catchment Management Plans (CMPs) are underpinned by sound hydrological modelling of the catchment. Where the receiving environment makes it appropriate, they will include conceptual design of stormwater treatment devices (such as treatment wetlands, grassed swales and rain gardens).

We also produce CMPs for rural areas undergoing intensification of land use, such as conversion to rural residential; and CMPs for existing urban areas, where measures to prevent flooding and stormwater treatment must be retro-fitted.

### Treatment devices

In addition to water quality studies on stormwater infrastructure and the receiving environment, we design and manage the construction of treatment devices for both urban and industrial situations for discharges to land, air or water.

### Guidance and monitoring

As a trusted advisor, the Beca Water team has developed guideline documents on topics such as stormwater runoff modelling, treatment devices, riparian management, wetlands as receiving environments, and options for managing high nitrogenous wastewaters. We are also experienced in designing and implementing water quality monitoring plans.

Our approach focuses on:

- Protecting the stream form, aquatic habitat and receiving environment
- Procedural guidance for planning and reviewing stormwater management practices
- Stormwater management solutions for specific site conditions, and
- Progressing environmentally sensitive development solutions





Investigating and designing major pumping stations and pipelines for a range of purposes across Asia Pacific region has enabled us to understand and meet the quality, maintenance and operational needs of a wide variety of clients.

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## Pumping stations, pipelines and outfalls

Our recognised expertise ranges from route planning to high pressure pipeline design. As well as designing your pump station and assisting you with pump selection, our team's engineering skills also encompass mechanical, electrical, controls, and automation aspects. We also design hydro and irrigation schemes including fish screens, headponds, rising mains, distribution and metering systems.

### The environment and the community

The Beca team will undertake comprehensive environmental assessments for your pump station or pipeline project. Our meticulous attention to helping to gain the necessary planning approvals, and our caring approach to community

consultation means our clients' projects have been delivered better and sooner.

### Using modelling to assist you with decision making

Over many kilometres of pipeline of varying materials and diameters and through designing many pump stations, we have developed and refined our special ability in computer modelling. We have applied our computer programmes to water supply systems, hydraulic analyses, surge analyses, hydraulic gradients, operation and control modelling and simulation of hydraulic systems.

We understand the types of daily operational issues you may encounter. Through proper hydraulic analysis of the pumping stations and the transmission pipeline, we aim to help you to optimise the mode of operation, material selection and assist with corrosion protection.

### Outfalls

Wastewater outfalls are challenging structures to design gain approvals and construct, and they often require rigorous environmental studies.

Beca can provide you with a complete service from dilution and dispersion modelling, environmental assessment, and approvals, through to detailed design and construction management.

We have received several industry awards for our innovative computer modelling techniques, and our outfall design skills are supplemented by specialist skills in wastewater process design, enabling us to design the complete solution from treatment to disposal.

Beca understands industrial site owners and operators are looking for integrated solutions. We offer planning, engineering design and project management services to meet those needs. Our approach mirrors the strategic values dear to our industrial clients - placing emphasis on quality, safety in design, innovation and environmental sustainability during the project delivery process.

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## Integrated, quality solutions for industrial water treatment

We can assist you with a wide range of engineering services across the lifecycle of your project, from front-end studies to engineering, procurement and construction management (EPCM), and on-site engineering, planning and management support. We also provide commissioning assistance and help with optimising equipment performance at any stage.

### Our water treatment process design

Our skilled team can prepare water management plans, assist with hydraulic modelling of industrial and mine sites and prepare water balances. Our process design capability ranges from mechanical and physical water treatment to thermal and chemical treatment solutions. We are also skilled and experienced in electro-physical, physio-chemical and biological treatment design.

Beca also designs dredging and dewatering systems for tailings dams, ponds, lakes and sea beds and waste repository and tailings deposition systems.





Collecting, treating and disposing of wastewater and other wastes in a safe, efficient and environmentally-conscious manner is essential for public health and compliance with regulations – and, as generators of wastewater and other wastes, for our clients' peace of mind.

## Taking a holistic approach to wastewater treatment

Beca is passionate about designing plants and systems to monitor and handle wastewater and waste sustainably.

Because we understand the complex interactions between liquid, solids and gaseous phases in the area of wastes and wastewater management, Beca adopts a holistic approach to wastewater treatment.

Our comprehensive spread of services includes:

- sewer network analysis and management of treated effluent
- design, implementation, dynamic simulation and monitoring of wastewater treatment plants
- handling and processing of biowaste and biosolids
- air quality management including odour and emissions management
- planning and investigation of new and existing solid wastes facilities.

### Modelling of wastewater treatment plants

Beca uses sophisticated software to simulate a wide range of wastewater processes, which allows you to try out several process configurations for your plant in the 'process options' phase. Beca process designers can build a number of models for a specific plant site and test

the ability of concept designs, both now and in future, before committing to the detailed process and plant design.

### Wastewater Treatment Plant Operation Simulation

Control system upgrade projects for operational plants can often result in commissioning problems and costly plant downtime. Our software designers use simulation tools that can assist you with this complex challenge. By interfacing the PLC/SCADA to the simulation model, we can perform software factory tests on your simulated functional plant.

Simulation also offers real time training of your operational personnel before plant commissioning. This arms them with a valuable understanding of the new plant and helps to minimise commissioning problems.

### Biosolids

At Beca we believe the solids stream of treatment plants deserves just as much attention as the liquid stream processes. We apply our extensive experience in wastewater treatment plants on a wide range of sludge stabilisation and biosolids management strategies – all focused on helping you to reduce odour nuisance and minimise the volume of solids.

We can help you to determine the appropriate strategies for managing biosolids – whether from municipal or industrial wastewater treatment plants.

Whether you need to dry your sludge for disposal or stabilise it for mine or quarry rehabilitation, we have the capability and experience to help make it happen. We can also assist with energy recovery options for standby power, or heat recovery for drying and digestion processes. Our capability covers advanced anaerobic digestion co-generation, thermal drying; composting and alkaline stabilisation.



Beca recognises that the quality of our work depends on the investment we make in our people and systems. Our people are key to our ongoing success and the success of our clients' projects. We are committed to an environment of knowledge sharing and to providing our people with the support they need to realise their potential.

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### Strategic advice

Beca can provide high level strategic advice to water authorities and related service providers. This work includes:

- whole of business situation analysis
- operational reviews
- audits (technical and operational)
- reviews of service delivery standards

We can add value to your business through our understanding of:

- business drivers
- operational systems and service standards
- data management and data validation
- stakeholder and systems relationships

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### Enterprise asset management

Beca assists clients to optimise service delivery and the whole-of-life cost of ownership of their assets and facilities. Leveraging our extensive experience of asset development and delivery and applying robust analytical processes to identify the key cost, performance and risk drivers, we focus on controlling or eliminating non-value adding activities and improving asset effectiveness and utilisation.

A key feature of these services is decision-support using quantitative information rather than relying on subjective or instinctive opinions. This has allowed us to identify significant capital cost savings for clients while establishing or maintaining their required levels of service.

Beca offers services from strategic business analysis and planning to detailed supportability engineering services. This includes Supportability Strategy and Planning, Availability Modelling, Failure Analysis, Maintenance Analysis and Level of Repair and Spares Analysis.

Beca has successfully assisted our infrastructure, utilities, industrial, financial and defence clients to realise significant value from their existing assets, often reducing or eliminating the need for extensive significant and expensive capital investment.



Since our inception in 1918, the Beca group has become an impressive global organisation, with a strong track record of success and a reputation for quality and innovation. Trust and integrity are cornerstones of our professional practice.

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## About Beca

Beca delivers professional services in engineering, architecture, planning, project management, land information, valuations and software development to clients on a global basis. The company operates from three key market hubs: Australia, New Zealand, and Singapore. In addition the group has project and representative offices throughout Asia, the Pacific and South America.

As a multi-disciplinary organisation, we supply engineering and related consultancy services to many markets including water, defence, mining and metals, food and beverage, transportation and power. With over 2400 employees globally, we have operated in more than 70 countries worldwide. With such a spread of resource, Beca can tap into a rich pool of specialist knowledge and experience.

The Beca group is an employee-owned company, focused on providing our clients with independent and impartial advice. We are committed to building strong and lasting relationships by responding to the needs and aspirations of our clients and our communities. Beca works closely with our clients with a view to delivering award-winning solutions as a single, collaborative team.

### Our values

- Partnership
- Tenacity
- Enjoyment
- Care

#### Australia

Melbourne  
Brisbane  
Sydney  
Wollongong  
Adelaide

#### China

Beijing  
Shanghai

#### Indonesia

Jakarta

#### Myanmar

Yangon

#### New Zealand

Auckland  
Christchurch  
Dunedin  
Hamilton  
New Plymouth  
Tauranga  
Wellington

#### Singapore



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