

## Water and Wastewater

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The company operates in a number of countries and offers specialist skills to enhance the provision of water and wastewater services. NRW Specialists although providing services in mainstream cities and towns, also has a niche capability to provide innovative engineering solutions in developing countries as well as to indigenous communities within and outside of Australia.

### Our Services

#### Project and Program Management

NRW Specialists has undertaken a number of significant Project and Program Management roles and has experience in both local Australian and international projects. Satisfactory delivery of projects requires the assignment of Project Managers skilled in the utilisation of appropriate procedures and methods to bring about completion of projects within time, budget and to the required quality. Appropriate project management software ranging from the Microsoft Project to Primavera is used according to specific project needs and Client requirements.

Program Management skills also prevail within the organisation and appropriate methods are implemented to manage larger packages of projects. Suitable procedures and control mechanisms exist to ensure that the appointment of Design Consultants, Contractors and ancillary service providers is delivered in a manner that provides surety of program delivery to the Client.

#### Infrastructure (Capital Works) Planning

The development of a Capital Works Program with multiple civil projects represents significant investment by Utilities and to a large extent dictates how successful they will be in achieving their service delivery targets. Usually in such cases there is a shortage of funds to meet all needs and utilities are faced with the challenge of selecting the most beneficial projects.

NRW Specialists assists Clients by either developing the Capital Works Program in conjunction with them or by reviewing the Client's Capital Works Program to maximize benefits to the customers. As part of this process a methodology is adopted which considers both the benefits of each project as well as the risks to the Utility if the project were not implemented. Each project is evaluated against a set of criteria and points are assigned to each component of the assessment. Ultimately each project achieves a project score and the projects are then prioritised and ranked for implementation. The Client therefore has at its disposal the prioritised project list and can plan its implementation accordingly. If the budget were to be cut, the lower priority projects would then be deleted from the program.

In addition to assisting with Capital Works Programs, NRW Specialists is capable of undertaking Master Planning for Clients to determine their long term infrastructure requirements and these planned works may then be included in Capital Works Programs.



#### Water and Wastewater Treatment

NRW Specialists has a team capable of providing both advisory and design input into water and wastewater treatment processes and assessments. In particular, NRW Specialists has carried out numerous assessments of water and wastewater treatment plants ranging from small rural plants to large mainstream city works.

Typical water treatment processes evaluated in the past include conventional coagulation and filtration technologies, DAF plants, Upflow Restrained Media, as well as country specific plants such as LOVO clarifier plants. In addition, NRW Specialists has been involved in the design of Wastewater Treatment Plants including conventional activated sludge processes through to more advanced Membrane Bioreactor (MBR) Plants.

Other facets of Water/wastewater treatment covered are the development and review of Water Safety Plans, treatment process optimization assessments and plant hydraulic capacity assessments.

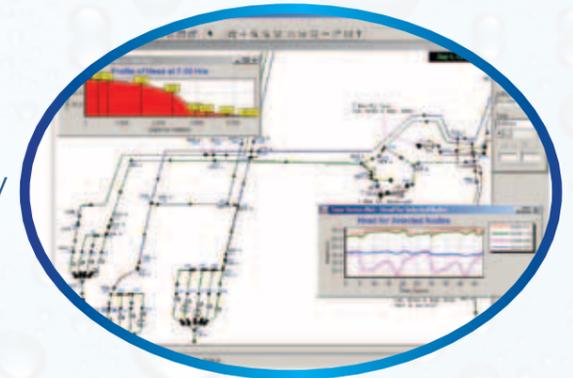
In addition to purely traditional consulting activities related to water/wastewater treatment advisory works, NRW Specialists has also procured and installed key water treatment mechanical, electrical and SCADA components to address water quality issues on behalf of Clients. NRW Specialists is prepared to adopt a flexible approach to project delivery mechanisms that puts the Client's needs first to ensure that the 'job gets done' rather than following only traditional project delivery mechanisms.

#### Network (Hydraulic) Modelling

Water distribution network modelling technology has rapidly evolved into an essential tool to facilitate design and optimised management of reliable water supply systems. A number of smaller schemes have traditionally been managed as 'stand alone' systems by on-site operator/ managers. The move toward centralized treatment, and the expansion of the networks requires a more holistic and integrated approach to Master Planning, day to day operations and maintenance planning. With linked systems, a failure with a key component in one system can impact on another system.

Where a water supply comprises multiple sources, pumps, and reservoirs, this understanding cannot be achieved without computer analysis using network modelling. A variety of modelling activities may be undertaken including steady state, dynamic hydraulic analysis, system optimisation, Master Planning, model calibration, water quality modelling as well as maintenance planning.

NRW Specialists has experienced Network Modellers who model the systems in a range of software. Depending on Client preferences, in-house capability, budget and needs, network modelling may be carried out using the simple but effective EPANET2 software or more upmarket and fully featured and upmarket software such as WaterGEMS may be used. NRW Specialists owns various software packages and is available to undertake modelling in the package that best suits the Client requirements and desired outputs.





### Fieldwork for System Monitoring

NRW Specialists does not only provide typical office related consulting based activities but also undertakes its own fieldwork in a variety of countries. In developing countries there is often a lack of As Constructed drawings as well as high levels of uncertainty regarding current operations and the performance of key assets. NRW is equipped with a variety of field equipment that allows it to acquire its own network information with least impact upon the Client's day to day operations.

In particular, the deployment and use of equipment such as pressure dataloggers, ultrasonic flowmeters and insertion flowmeters allows NRW Specialists to acquire actual field data on which to base its conclusions and understandings of water supply asset performance. Such information is invaluable when used as an input into network modelling activities and takes the "guesswork" out of the analysis.

The investigation and resolution of network operation anomalies detected in this manner can lead to solving water supply problems that have existed for many years as well as identifying large cost savings as the system may then be operated in a more efficient manner than before.



### Non Revenue Water (NRW) Reduction

NRW Specialists was started with the intention of providing valuable Non Revenue Water reduction services. The global dwindling supply of water sources coupled with the effects of climate change and increasing populations mean that utilities have to increasingly look to reductions in NRW to responsibly manage their operations to reduce the wastage of precious water. In addition, the effective management of NRW means that increases in levels of service may be obtained with lower operating costs and the possibility of deferring capital investment in additional infrastructure.

NRW Specialists specialises in NRW reduction techniques and practices. By tackling both "apparent " and "real" (leakage) losses, NRW Specialists provides Clients with expert advice and opportunities to maximise the use of the assets in an environmentally responsible manner. In addition, NRW Specialists provides training in leak detection techniques and develops skills within Utilities and Contractors to better deliver the NRW savings required.



### Design of Civil Infrastructure

NRW Specialists has carried out the design of a number of key water/wastewater installations including the design of pipelines, long span pipebridges, river intake structures and design inputs into water and wastewater treatment plants.

In particular the use of hydraulic modelling to size infrastructure correctly as well as the strict adherence to design standards and the selection of quality materials ensures that the Client receives a quality product that is fit for purpose. Peer review processes are adopted as part of the overall design process to ensure that value can be added to the infrastructure design at key stages in the design process. In addition, NRW Specialists has suitably qualified staff to supervise construction activities and ensure that the infrastructure is constructed according to the approved design.



### Rural Water Supply Schemes

The supply of water to the required quality and adequate pressure in developing countries remains a key challenge. NRW Specialists is ideally placed to assist in this regard with impressive experience in such difficult and challenging environments. In addition to the provision of water supply services in developing countries, NRW Specialists has extensive experience in providing water supply solutions to Indigenous communities within Australia. The remoteness of communities, ageing or inappropriate infrastructure coupled with the shortage of in-house technical skills are all key challenges that need to be addressed in such cases.

NRW Specialists has an excellent team of engineers with an impressive record of overseas work experience in developing countries, including India, Bangladesh, South Africa, Zambia, Sudan, Somalia, Chechnya, Indonesia, Malaysia, Vietnam, East Timor, Samoa and Fiji.



### Organisational/Institutional Strengthening

NRW Specialists provides a key service in evaluating Water/Wastewater Utilities and developing strategies to enhance organisational performance. Key activities include assessments based on various models including Total Management Planning Guidelines while also including performance based benchmarking. The key objectives are to analyse and derive the most appropriate methods to improve service delivery and enhance performance through organisational alignment with corporate objectives and statutory requirements.

NRW Specialists conducts a number of workshops and discussions at all levels including "Risk" and "SWOT" (Strengths, Weaknesses, Opportunities and Threats) workshops to determine key challenges and issues faced by the organisations. Appropriate structures, performance measures, and policies can then be developed to guide the organisation towards implementing meaningful changes that improve organisational performance and mitigate key risks. In addition, NRW Specialists carries out training for management teams in Utilities on how to improve management skills and ultimately service delivery to Clients.



## Risk Management

The identification of management of risk are key challenges facing all utilities in today's demanding and litigious environments. NRW Specialists undertakes a number of risk assessments using both established qualitative matrix risk assessment methodologies and other techniques such as HAZOP studies and workshops.

The early identification of risks across all corporate and engineering areas serves to prepare the organisations for meeting the challenges and possible consequences of everyday operations. In particular, the identification, ranking and prioritisation of risks allows organisations to develop appropriate risk mitigation controls to minimise risks for the organisation.



## Asset Management

NRW Specialists provides asset management services appropriate to the organisational needs and regulatory compliance targets. Asset management services cover a wide spectrum and scope and cross over both capital works planning activities and operations and maintenance functions. Asset management services assist the Client in the optimisation of the use of its assets from procurement through to disposal with targeted capital investment to minimise life cycle costs of the assets.



### Relevant services include:

-  the development of asset registers to record the location and details of infrastructure assets;
-  asset valuation;
-  condition assessments;
-  evaluation of asset performance; and
-  asset optimisation

The adoption of enhanced asset management practices enables Clients to derive benefits across many areas including enhanced Operation and Maintenance, Management Information for decision making, Developing Capital Asset Renewals Program based on asset replacement profiles and improvements in operational efficiency.

## Value Engineering

NRW Specialists offers the benefit of value engineering to Clients across a range of projects. The benefits of value engineering are well known where value is added to the design at various project stages. In particular, early adoption of value engineering at say 25% of the design stage is highly effective in terms of ensuring that design concepts and proposed detailing meets the objectives in the most effective and cost efficient manner. Savings in terms of cost and time are achieved by the early adoption of value engineering as well as risk mitigation due to the avoidance and correction of inappropriate design approaches.

NRW Specialists possesses a team of highly skilled engineers capable of significantly adding value to other Consultants or Clients designs at any stage of the design process. Such work is often carried out as independent design reviews.

## Training

There is usually a significant opportunity to enhance the skills of either the Client's staff or NRW Specialists local partner staff in overseas projects. During the course of these projects NRW Specialists carries out staff training that is both meaningful and practical. Specific objectives are developed and agreed with the Client at an early stage and suitable training courses and practical sessions are developed around these areas.

Training carried out by NRW Specialists in the past includes management training of senior water utility staff as well as technical training including leak detection, network modelling and the installation and operation of field equipment for data collection. The focus of the training is to impart knowledge in a manner that is sustainable in the long term and remains in the organisation long after the project has been completed.



## RECENT PROJECTS

NRW Specialists has been the lead consultant or played a key role in the following projects:

### AUSTRALIA

1. Demand Management - Bamaga, Injinoo, New Mapoon, Seisia and Umagico Communities
2. Water Loss and Demand Management - Ipswich Water
3. Water Supply Least Cost Options Study - Gladstone
4. Program Management - Doomadgee and Mapoon Aboriginal Communities
5. Review of Capital Works Program - Gold Coast Water
6. Capital Works Benchmarking Study - Gold Coast Water
7. Project Management - Weipa Wastewater MBR Plant
8. Remote Indigenous Communities Municipal and Essential Services Audit – Northern Territory

### FIJI

1. Review of Capital Works Program and Waila Plant Assessments
2. Strategic Water Supply Study for Major Centres in Fiji
3. Emergency Water Supply Works in Suva/Nausori and Other Areas
4. Critical Works - Supply Augmentation, Asset Remediation and Design Works Project

### MALAYSIA

1. State of Sarawak Water Supply Infrastructure Assessment Project
2. Sarawak Major Centres (Kuching, Miri, Bintulu & Limbang) Water Supply Project
3. Development of Calibrated Network Model for Kuching, Sarawak
4. Development of Calibrated Network Model for Bintulu, Sarawak

### SAMOA

1. ADB Preparing the Water Supply, Sanitation and Drainage Project

### UNITED ARAB EMIRATES (UAE)

1. Privatisation of Wastewater Services - Abu Dhabi and Al Ain

Tailor Making Your Solutions



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