ARMS Reliability have had a great deal of success with water utilities improving their asset management strategies and reliability.

The combination of professional consulting services coupled with powerful Reliability Software from Isograph® has delivered business goals to the following companies.
The objectives of this study were:
- Evaluate the cost benefit associated with current maintenance practices
- Determine the optimum age to replace major capital expenditure items
- Pumps
- Generate a 10 year budget prediction for
  - Capital
  - Scheduled Maintenance
  - Unscheduled Maintenance

The sewer pumping stations were grouped into categories to reflect the common configurations. Each individual pumping station was then assigned a category in order to develop a reliability model containing the entire population of sewer pumping stations.

RCM Analysis of Water Treatment Plant: Quantifying the monetary impact associated with replacing/not replacing plant and equipment at various sites

The RCM (Reliability Centred Maintenance) analysis undertaken aimed to quantify the monetary impact associated with replacing/not replacing plant and equipment at various sewage treatment facilities that is deemed to be reaching the end of its economic life cycle due to rising maintenance requirements.

Comparisons were made using plant upgrade scenarios with consideration being taken for maintenance costs and the cost of risk (public image, EPA fines etc) only.

The assessment of RCMCost is based on plant failure frequencies that have been determined using data from the Mainpac CMMS (Computerised Maintenance Management System) and data from equipment suppliers.

The work history available from the Mainpac CMMS covers a period of six years and details all works performed by Siemens (the maintenance contractor) at the sewage treatment station in question.

Ongoing Support
SEW continue to utilize the RCMCost and AvSim+ software programs to review and optimise their maintenance and then evaluate system performance.

ARMS provide ongoing support to the SEW organisation ranging from model refinement, annual budget predictions and data analysis.

“SEW continue to utilize the RCMCost and AvSim+ software programs to review and optimise their maintenance...”
ARMS Reliability were engaged by Watercare Services Limited to undertake a RAMS analysis of Sewer Pump Stations which would address the dominant failure modes and provide an effective maintenance plan and generate budget and performance predictions.

The pump stations completed were:
- DPS016 - a large critical station
- DPS015 - a medium sized medium criticality station
- DPS012 - a small sized low criticality station

The approach taken for this analysis was to build a Failure Mode Effect and Criticality Analysis (FMECA) model that represented the likely failure modes, provides an assessment of the Effects of Failure, and to allow the most effective maintenance tasks to be chosen. Once the maintenance tasks were chosen, the information was loaded into an Availability model so that the predicted spares can be generated. These models were used as templates to allow rapid building of stations across the network.

Water Pump Station Models
ARMS Reliability were engaged by Watercare Services Limited to undertake a RAMS analysis of Sewer Pump Stations which would address the dominant failure modes and provide an effective maintenance plan and generate budget and performance predictions.

Water Treatment Plant System Availability model
ARMS Reliability were engaged by Watercare Services Limited to undertake an Availability analysis of a water treatment plant which would predict system performance on the basis of maintenance plans derived.

The model also identifies critical items within the treatment plant which may be targeted for improvement.

Water Pipe Network Criticality Model
ARMS Reliability were engaged by Watercare Services Limited to undertake a high level criticality model of their entire water pipe network including dams, reservoirs and treatment plants. This was a Reliability Block Diagram model which generated a criticality ranking of elements within the network in order to assist long term asset planning.

Ongoing Support
Watercare continue to utilize the RCMCost and AvSim+ software programs to review and optimise their maintenance and then evaluate system performance. ARMS provide ongoing support to the Watercare organisation ranging from periodic support meetings, remote model review rapid model building, and training.

“A Reliability Block Diagram based criticality model generated a criticality ranking of elements within the network in order to assist long term asset planning.”
Water Utility Experience

**Sydney Water**

ARMS Reliability were engaged by Sydney Water for a period of 18 months and had an engineer embedded to improve the capability of the reliability team. During this period, we completed complete maintenance strategy development and availability modeling project work as well as training staff in Availability Workbench in RCMCost and AvSim Modules.

With this mentored, structured approach to improving their internal capabilities, not only were many modeling projects completed but also the Sydney Water team were left with the knowledge to maintain and develop their own models.

**Goulburn Murray Water**

ARMS Reliability were engaged by the Water for Rivers organisation to undertake a RAMS analysis of Flume Gates and develop an effective maintenance plan. GMW recently purchased the Maximo portal in Availability Workbench which is being used to download data into RCMCost and AvSim to complete budget predictions for the coming years.

**SA Water**

Over the years we have completed many projects for SA Water. These projects have included reliability modeling for the Heathfield Wastewater Treatment plan using RCMCost, performing FMEA analysis and developing hierarchies based on process & function. We have also completed a generic water pump station model with good practices which has been used as a base for other pumping stations.

**Brisbane Water**

Brisbane Water engaged ARMS Reliability to build a Failure Modes and Effects (FMEA) based model to review/develop and optimise maintenance strategies, and then constructing a Reliability Block Diagram (RBD) based Availability model to determine availability of the Sewer Pump Control System. Brisbane Water has also purchased Availability Workbench RCMCost & AvSim Modules to support and monitor the maintenance improvement initiatives.

**BHP Nickel Ravensthorpe**

Develop Reliability based maintenance plans, work instructions and spares recommendations for new desalination plant.