



# Strategic Asset Management in the Organisational Design of Water Distribution Utilities

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## Abstract

The organisational design principles of the Strategic Asset Management Model are widely adopted by high-performing utilities globally to optimally manage and deliver stakeholder and customer outcomes.

Despite the recently increasing business risk profile of water distribution utilities, Marchment Hill Consulting's observations indicate these principles are less consistently reflected in the organisation structures of the industry.

The following paper explores why this may be the case and the benefits that could be realised from a change in approach.

## The Strategic Asset Management Model

### SAM Model Concepts

Strategic Asset Management (SAM) can be used to describe a broad suite of principles and processes associated with optimising the performance of a large asset such as a utility. The most significant implication of the SAM Model in organisation design is the separation and mutual exclusion of four key roles at the Executive level:

1. The *Asset Owner* (AO) Role, which sets the short and long term investment objectives for the asset. These objectives relate to financial aspirations, risk appetite, legal and regulatory compliance, and successfully managing political, corporate and social responsibilities.
2. The *Asset Manager* (AM) Role, which makes decisions to satisfy all of the AO objectives, whilst managing the delicate balance between asset life, service level and capital and operating expenditure.
3. The *Asset Services Provider* (ASP) Role, which provides services to satisfy the decisions made by the AM, and reports on progress of these services against time, budget and standards.
4. The *Corporate Support Services* (CSS) Role, which provides the necessary corporate services to support the AO, AM and ASP roles in delivery of investment objectives.

Figure 1 below represents the symbiotic relationship that is necessary for the SAM Model to result in successful outcomes for the utility.

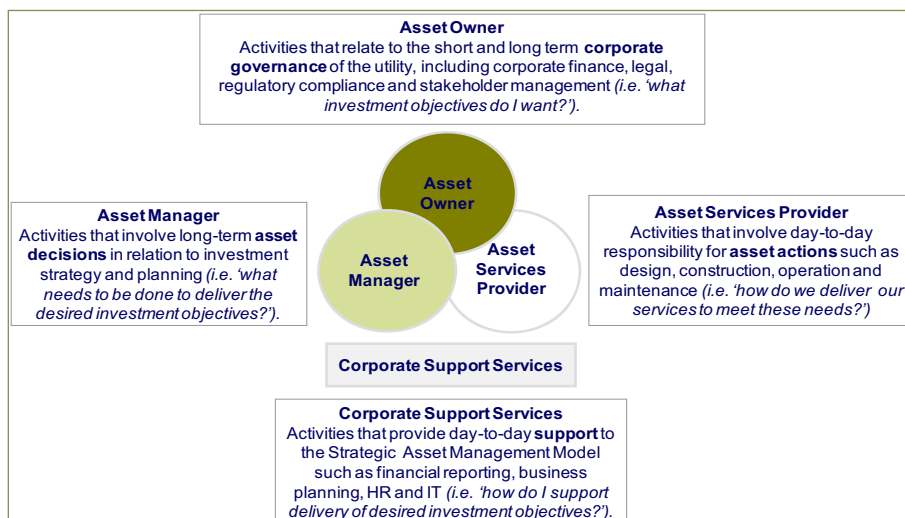


Figure 1: SAM Model

## Implications of SAM for Utility Organisational Structures

The implications of the SAM Model for the organisational structure of a utility are important to understand and can be summarised into the categories of:

- Constructive Tension
- Flexible Workforce Management
- Pragmatic Breadth of Application.

### Constructive Tension

Organising the Executive roles of a utility in alignment with the SAM Model enables a business to more easily achieve its objectives through clarity of organisational accountability. This clarity helps to build a constructive organisational 'tension' between the three key asset management roles of AO, AM and ASP. Each role is accountable for the specific functions that best support this tension.

The tension between the AO and the AM consists of:

- the AO setting the target expectations of the asset in terms of performance, cost and risk (i.e. within the bounds of applicable regulation), and with a strict indifference to the physical programs of work and mechanisms via which these needs are met.
- the AM plays only an informative role in the setting of these expectations (i.e. through the assessment of alternative strategies and in describing the impact of these strategies on the AO's target expectations).

Tension is created where differing expectations could present challenges to the AM to implement and meet these performance, cost and risk requirements. However, at the outset the AM should be ambivalent to actual expected outcomes (i.e. the required rate of Return on Asset) with the role focused on simply presenting possible combinations of performance, cost and risk for AO approval.

Similarly, the tension between AM and ASP consists of:

- the AM articulating a program of works consisting of deliverable outcomes (i.e. volume and standard) and commensurate budget. This translates to defining what needs to be done to meet the AO's target expectations.
- the ASP delivering this program of works primarily without consideration of the choice of work (or the decisions regarding the asset), but simply how this program of work will be delivered on time, on budget, and to standard.

### Flexible Workforce Management

The applicability of the SAM Model is not predicated on the presence of external competition to the ASP role. While this competitive influence can enhance some elements of the AM – ASP relationship through increased independence of their respective management constructs, the model is flexible and equally applicable with internal workforces, or a combination of external and internal workforces, with minor amendments.

Establishing a clear delineation between the management decisions associated in the AM and ASP roles is essential. Ensuring that any assessment of the necessary workforce skills and capabilities to meet the program of works commitments and prioritisation should be duly influenced by the practicalities of how it will be best delivered.

### Pragmatic Breadth of Application

The SAM Model does not automatically need to be applied at all organisational levels, across all processes and systems, and across all assets (from water and sewage pipes and pumps, to tools, computers and desks).

For example, the SAM Model has clear benefits when applied to large assets such as primary assets, and secondary assets such as control and communications devices, fleet and facilities. However, costs begin to outweigh the benefits of the SAM Model's requisite role separation as asset complexity and scale diminish. Attempts to apply the SAM Model to asset types such as tools and test equipment may result in overly complex processes and accountabilities that may not generate sufficient benefits for the effort invested.

The application of the SAM Model to functional areas of the organisation responsible for the management of assets on a day-to-day basis and to assets critical to the delivery of stakeholder and customer outcomes provides a pragmatic and cost effective asset management solution.

### Adoption of the SAM Model in the Water Industry

Asset management continues to evolve in the water industry, and accordingly, many water utilities have adopted fit for purpose asset management models driven by stable, slowly increasing asset bases, a good understanding of asset performance and condition, and well defined risk profiles. These have stood the industry in good stead for the past 40 years and have been adapted in response to more pressing business risks such as labour availability, cost reduction pressures and capital program delivery. Frequently, asset management responsibilities are assigned on product or geographic lines, or according to the operational synergies to be gained from combining functions.

Whilst these models have performed adequately in many cases, the operating environment for water utilities across the globe is changing and presenting new, complex risks and challenges. Recent developments in the water industry have increased the relevance and potential benefit of adopting the SAM Model:

- *Increasingly complex asset systems:* Introduction of more complex assets into the supply chain including desalination, automated network and zonal metering, automated valving, SCADA and telemetry systems, as well as more complex systems operations through systems integration, supply interconnection, source diversification and quality management, present increased risk to supply through asset failure.
- *Increasing economic regulatory pressure:* The increasing influence of economic and performance regulation in the industry is driving improved understanding of and certainty around asset performance and costs.
- *Scarcity of water resources:* Water scarcity is driving improved asset planning and asset performance requirements, especially around leakage and unaccounted for water.
- *Ageing workforce:* Workforce resource constraints will require greater understanding and management of the skills and capabilities needs of the business.

In Marchment Hill Consulting's experience, these growing challenges are similar to those faced by the energy industry during the past 15 years. Electricity distributors have been challenged to integrate diverse energy sources (e.g. solar, wind geothermal, embedded generation) into their current asset bases. They have had to report performance to multifarious owners (e.g. investment banks, superannuation funds, leveraged infrastructure owners), and operate within heavy-handed regulatory regimes.



A single Executive role managing all AM activities results in a consistent asset management view and application across various asset portfolios (i.e. electricity and gas, or primary and secondary assets), and a single point of accountability for the development of the works program.

Such a single AM role:

- promotes the timely development, definition and approval of a comprehensive and sufficiently long-term Asset Management Plan (for effective resource and contract planning)
- ensures that performance management is streamlined by having a single Executive accountable for all component elements of the Asset Management Plan
- encourages process integration and ensures that optimal decisions are made across all asset classes, regions and activity types and that these programs are coordinated for deployment.

All of the above outcomes may be achieved across multiple roles, but doing so requires significantly increased governance and decision making forums and processes, and more complex performance management frameworks.

A single Executive role managing all ASP activities again achieves a single point of accountability for the delivery of the program of works. When performance requires active management, this arrangement:

- allows easier isolation of performance levers across multiple service provision groups (internal and external)
- improves management of the complex interrelationships between physical resources, plant and materials and operations activities
- promotes improved customer management through singular accountability for the multiple processes that in aggregate influence the customer experience.

Ultimately, this translates to improvements in the management of service provision across different asset classes, regions and activity types.

## Application of SAM Principles in Utility Organisation Structures: Approaches in the Water Distribution Industry

As part of an ongoing and annual cycle of process benchmarking, the International Water Association (IWA) and Water Services Association of Australia (WSAA) engaged Marchment Hill Consulting to conduct a global Asset Management Benchmarking Study, representing one of the largest benchmarking programs ever attempted globally. The study showed a significant uptake of many strategic asset management practices in the areas of:

- corporate policy and business planning
- asset capability and forward planning
- asset acquisition
- asset operations and maintenance
- asset replacement and rehabilitation.

Whilst organisational structure was not the centrepiece of the IWA-WSAA Study, it indicated that few water utilities arranged their organisation in alignment with SAM Model principles. Those water utilities with approaches not aligned with SAM principles adopted fit for purpose organisational structures.



with all support functions deployed from Workforce Capability or Corporate Services, with the exception of Field Services which has its own Deployment function

- provides a central strategic capability for Workplace Health & Safety, Environment, Quality, Risk and HACCP (Hazard Analysis and Critical Control Points)
- requires all groups within the value chain to interact with each other - the centralised Support Services works across all organisational groups.

### Approaches not aligned with SAM Model principles

The organisation structures of some water distribution utilities do not necessarily reflect SAM Model principles, and in some cases this impedes further development of their asset management capability. By example, the organisational approach of some water distribution utilities demonstrates the following departures from SAM Model principles:

- unclear or undefined accountability for the AO, AM, ASP and CSS roles
- disaggregated accountability for the AM and ASP roles, either by activity type (i.e. planning versus delivery), type of expenditure (i.e. OPEX versus CAPEX), or asset class (i.e. water versus wastewater).

Figures 4, 5 and 6 represent three organisational approaches employed by some water distribution utilities that are inconsistent with SAM Model principles. The reasons why these approaches have been adopted and their departures from SAM principles are discussed below.

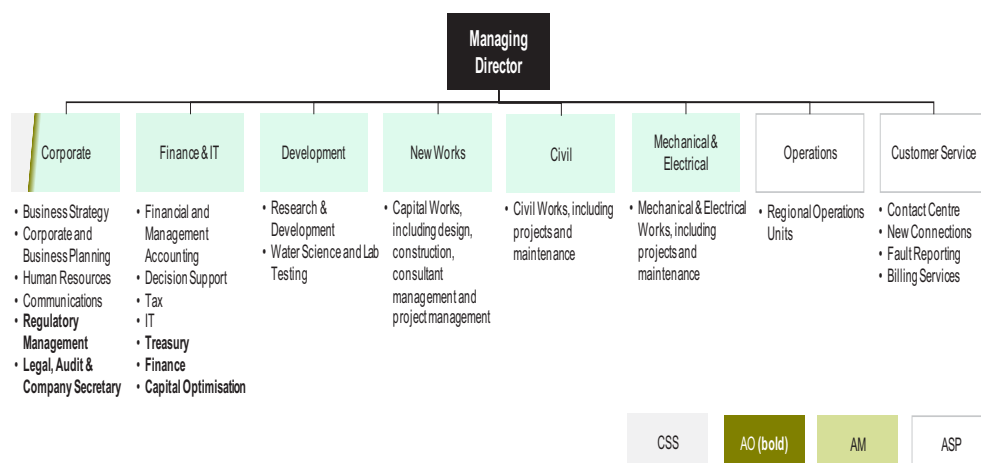


Figure 4: Unclear AO, AM, ASP and CSS Roles

*Why the above approach has been adopted by some water distribution utilities:*

- for some water distribution utilities under Council control, the AO and CSS functions are spread between the Council and the water utility and tend to have low levels of focus and centralisation
- adoption of SAM principles within an organisational structure quite often reflect the maturity of the economic regulation arrangements, particularly if water utilities want to drive outcomes that balance asset life, asset service level, and capital and operating expenditure – water utilities with low levels of economic regulation tend to place less emphasis on clarity of AM activities
- water industry benchmarking programs have tended to focus on shared services, civil maintenance, mechanical-electrical maintenance and customer service functions, and have ultimately driven similar organisational arrangements.

*Key observations:*

- two Executive roles (i.e. Corporate and Finance & IT) are responsible for combinations of the AO and CSS functions. Apart from the role of Chief Executive, the accountability for setting of the short and long term investment objectives of the utility lacks clarity
- no clear, singular AM role
- multiple Executives with accountability for delivery of different elements of the capital and operating works program (i.e. separation of accountability for capital works, civil maintenance, and mechanical & electrical maintenance)
- civil and mechanical & electrical maintenance operate independently across the AM and ASP roles, and increase the potential for resource constraints throughout the works management process, due to potential competition amongst different AM groups for the same ASP resources for their 'own' projects.

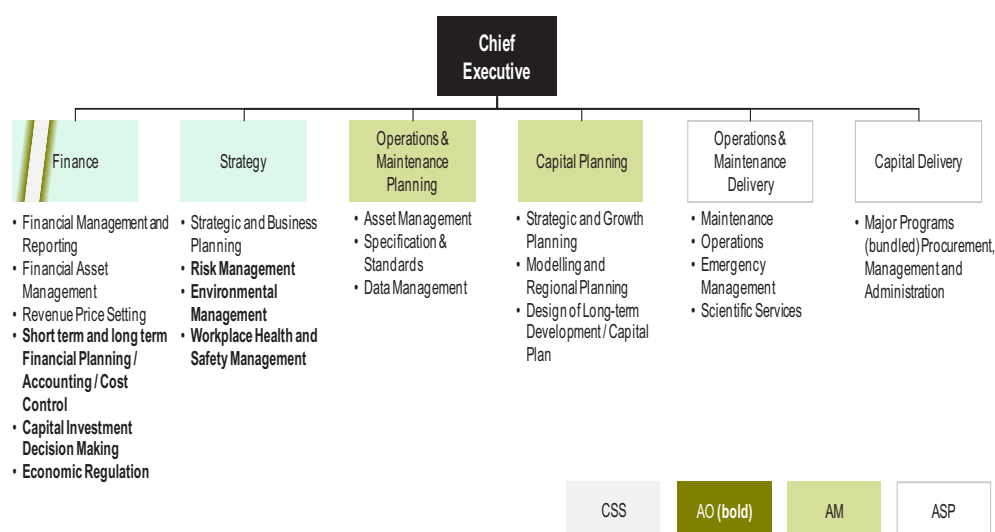


Figure 5: AM and ASP Roles split by Operating and Capital Expenditure

*Why the above approach has been adopted by some water distribution utilities:*

- operating and capital expenditure is managed and delivered by separate workforces (i.e. internal versus an external workforce, different internal workforces, or different external workforces) and sometimes are regulated differently
- different sourcing strategies are adopted for operating and capital expenditure (i.e. operating projects are delivered under long term alliance arrangements or a mixture of alliance and internal staff, whereas capital projects are typically tendered on an individual project basis).

*Key observations:*

- independent responsibility for operating and capital expenditure inhibits effective life cycle optimisation process (i.e. there are individual Executives accountable for Maintenance Planning and Capital Planning). This model provides an organisational impediment to the effective trade-off between the maintenance and capital activities required for asset life cycle optimisation
- at best, coordination of these elements requires unnecessary governance constructs to ensure both needs are balanced. At worst, coordination suffers to the point of perverse outcomes for individual assets (i.e. upgrades or major maintenance immediately prior to replacement, capital inefficiency exacerbated by over-maintenance, etc).

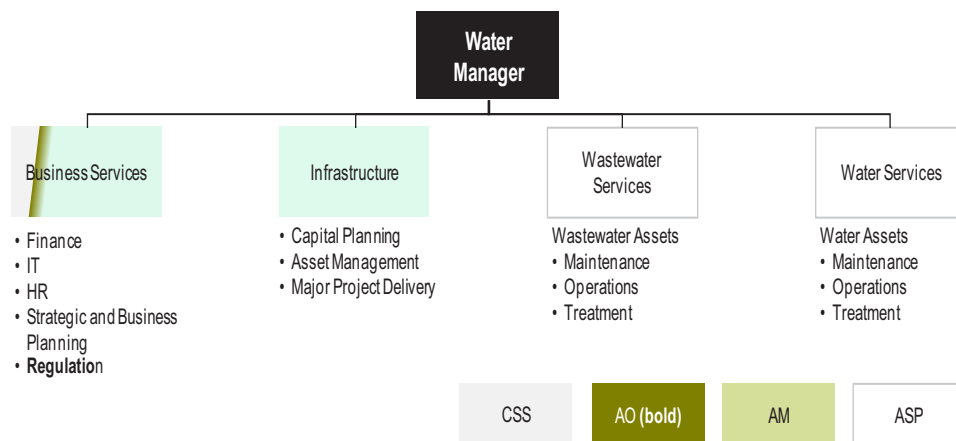


Figure 6: Separation of Roles by Asset Class

Why the above approach has been adopted by some water distribution utilities:

- different regulatory jurisdictions can apply to water supply (i.e. health and safety driven regulation) and wastewater service provision (i.e. environmental impact driven regulation)
- many jurisdictions impose legislation which mandates that water utilities are obliged to avoid possible contamination of their potable water supplies as a result of their field based activities
- reluctance to mix water and wastewater workforces – driven by different operational standards, different skills and training, and quite often different field based equipment
- different nature of these asset classes, for example water distribution systems tend to be pressurised and wastewater distribution systems tend to be gravity fed
- tends to reflect the natural geographical separation of water and wastewater assets and the different footprint of water and wastewater catchments and supply zones.

Key observations:

- complete business resource separation (i.e. staff and equipment) associated with the delivery of water and wastewater programs can lead to impediments to optimal coordination of the delivery of water and wastewater programs
- such arrangements promote limited transfer of knowledge between these delivery teams, limited multi-skilling and limited resource optimisation. In an era of capital rationing, the challenge for water distribution utilities with restricted workforces and budgets quite often remains in the optimisation of the delivery of work between water and wastewater.

## An Organisation Structure Aligned to the SAM Model Can Drive Better Outcomes for Water Distribution Utilities

There are a number of beneficial outcomes of adopting SAM principles into organisational design which may be achievable in the water industry. These outcomes include:

- *Greater alignment of corporate objectives between AO, AM and ASP:* The alignment of corporate objectives between the AO, AM and ASP roles translates to collective and responsible management of stakeholder and customer outcomes, and business risk.

The cascading and holistic accountabilities of the three key SAM Model roles also provide a substantially clearer avenue for ownership expectations to be transformed into actions on the

ground. For example, departures from the stated business or regulatory strategy, or agreed risk profile, are more readily identified and managed.

- *Increased attention to the long-term:* A focussed Asset Management function has the capacity to deal with long-term asset decisions without being too distracted by day-to-day asset operations and services. This translates to formal asset planning processes to deal with the introduction of complex systems, and managing this asset complexity with life, service level and expenditure.
- *Effective resource management and utilisation:* Single-point accountability for the development of the program of works allows more effective performance management of plan development, the management of churn, and ultimately the development of plans that are more detailed and forecast over longer periods. This in turn results in programs that are more reliable and stable, allowing more effective deployment of resources and materials, higher utilisation of scarce plant and specialists, and ultimately an increased likelihood of successful plan delivery.
- *Less money for better results:* In turn, more reliable and stable programs of work allow greater commitment to suppliers. Suppliers and service providers consistently regard reliability of work volume as the most fundamental driver of risk premiums they apply to unit rates. For internal workforces, more reliable and stable programs of work also allow works management functions to drive higher resource utilisation, reducing down-time and over-time.
- *A more motivated and satisfied workforce:* A consistent driver of staff dissatisfaction as identified through Health Check and Cultural surveys is a lack of clarity regarding accountability. Symptoms associated with this root cause can include:
  - difficulty in resolving issues as a group as rules and policies around consultation and final decision accountability are unclear, which further drives excessive governance and approval mechanisms and processes incorporating relevant stakeholders
  - wasted effort as some accountabilities become duplicated, as more than one group perceive their control of accountability over the same function – such as confirming detailed design for construction projects or construction standards and work practices
  - mixed messages for stakeholders, customers and suppliers as unclear accountabilities drive multiple entry points for the business (i.e. on development applications, release of work packages, etc)
  - missed opportunities through gaps forming between accountabilities.
- *Increased clarity and productivity:* When applied to organisational structure, the SAM Model provides fundamentally clear accountabilities. More motivated and less frustrated staff leads to greater satisfaction, and in turn higher productivity and lower turnover.
- *Other financial benefits come from:*
  - more scale leverage in materials procurement through greater certainty of forward work programs
  - less wasted work where programs for different asset types (or different activity types on the one asset) were uncoordinated
  - less administration associated with the removal or simplification of complex governance processes typically employed to manage too many stakeholders involved in Asset Management and Asset Service Provision functions.

## Conclusions

The increasing pressure on water distribution utilities through changing asset complexity, economic regulation and resource availability will lead to the need to achieve a step change in their certainty of future asset performance, cost and risk.

As our paper has highlighted, over the last 15 years the energy industry has gone down a path of more comprehensive adoption of Strategic Asset Management (SAM) Model principles to address similar challenges to the water industry. For these utilities, the SAM Model principles have enabled clear organisational separation of responsibilities, with associated positive implications for span of control, governance mechanisms, risk management and the associated internal business processes and controls.

Marchment Hill Consulting concludes the following:

- Utilities facing increasing asset risk and uncertainty have demonstrated the mechanisms and benefits arising from the incorporation of SAM Model principles in their organisation structure, with the key feature being the alignment of senior roles to 'asset decisions' and 'asset actions', and rigorously clarifying the interface between these roles.
- To date, many water utilities have adopted fit for purpose asset management and have not needed to align their organisational structure to the strict principles of strategic asset management. In the context of increasing asset complexity and regulatory and resource risk, this will have impacts on their continued ability to manage the efficiency of operating and capital expenditure, manage service levels, understand revenue requirements and operate in a proactive and planned manner as opposed to a reactive and operations-focussed way.
- Addressing the underlying organisational structure issues is a critical first step in moving towards strategic asset management and comprises a significant challenge for management, both in terms of realignment of the existing business and in sustaining the change to ensure that the benefits are realised.

In summary, the energy distribution industry provides an informative insight to water distribution utilities looking to further embed strategic asset management into their business. This points to an early examination of the impact of the organisational structure on the ability for the water distribution utility to manage their future asset performance, cost and risk.

## About The Authors



**Ben Woodman** leads Marchment Hill's Organisation Practice, and has led the organisational review and redesign of many Australian utilities including Ergon Energy, Transend Network and Brisbane Water. Ben has been a management consultant specialising in utilities for over eight years throughout Australia, New Zealand, Europe and the Middle East.



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**Alex Coe** is a highly experienced utility industry professional with strategic and implementation experience at all levels of the utility value chain. As leader of Marchment Hill's Performance Practice his particular expertise includes strategic and asset planning, performance management, program and process development, regulation, risk management and business development. Alex has 15 years experience predominantly within major Water Utilities, and is currently focused on supporting regional utilities in transition.