

NATIONAL WATER SERVICES INFRASTRUCTURE ASSET MANAGEMENT STRATEGY



water affairs

Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

PREFACE

Water services infrastructure asset management (IAM) is without doubt one of the most critical issues in South Africa today. Municipalities are at the forefront of government's drive to eradicate all basic services backlogs. Government's initial focus has been on infrastructure backlogs, which remain a huge challenge. However, with the expansion of infrastructure, the challenge to effectively operate and properly maintain is growing in magnitude.

The recent work by the Department of Water Affairs (DWA) and others in assessing and documenting the state of water services infrastructure served to underline the need for a National Water Services Infrastructure Asset Management (IAM) Strategy, and the importance of it being programmed, budgeted for, and implemented without delay. Water services infrastructure cannot be allowed to deteriorate to crisis levels, impacting and affecting national government's growth and poverty reduction targets.

The development of this Strategy is a key milestone signalling determination on the part of DWA as sector leader, and its partners, that increasing attention be paid to water services IAM. It is part of a broad set of initiatives to improve IAM at all levels of government.

This Strategy was developed over a two year period by DWA, with support from National Treasury, the South African Local Government Association (SALGA), the Department of Cooperative, Governance and Traditional Affairs (CoGTA), the Development Bank of Southern Africa (DBSA), the Water Research Commission (WRC), the South African Municipal Workers Union (SAMWU), Rand Water and Johannesburg Water.

It is written as a road map of commitment and intention for DWA and its partners at national level; a statement of the rationale for and a specification of the high-level actions required to empower and guide water services institutions (WSIs) in practicing sound IAM practices. It is also written to inform WSIs on the support they can expect, and will also be useful in holding national government and its partners to account, and to contribute to a shared vision of appropriate support.

The Strategy provides an introduction to IAM (definition, problem statement, etc); it provides the vision, aim, objective and principles; and the benefits, scope and process of IAM. The main part articulates the outputs of the National Water Services IAM Strategy; and defines a process to take WSI support forward through the development of a National Water Services IAM Implementation Plan.

In terms of the Strategy outputs, DWA will lead the actions within each output, taking responsibility for those within its power to do so, and working closely with other national government departments where responsibility for the envisaged action is statutorily with those departments. DWA will cooperate with all stakeholders, including national government departments, local government and other sector role players.

It is envisaged that the Implementation Plan will in broad terms identify the "who, what and when" to be considered for support, and will indicate prioritisation in terms of urgency and importance. It will also determine the "how", including tactics, culture and incentives and it will identify key performance areas and will set key performance indicators.

I would like to thank everyone who participated in the development of this water services sector Strategy, and look forward to continued participation in national IAM support to WSIs.

Director-General

Department of Water Affairs

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ACRONYMS

| | |
|--------|---|
| ASGISA | Accelerated and Shared Growth Initiative for South Africa (The Presidency 2006) |
| CSIR | Council for Scientific and Industrial Research |
| DBSA | Development Bank of Southern Africa |
| CoGTA | national Department of Cooperative, Governance and Traditional Affairs |
| DPW | national Department of Public Works |
| DWA | national Department of Water Affairs |
| GIAMA | Government Immovable Asset Management Act (Act 19 of 2007) |
| IAM | infrastructure asset management |
| IDP | (municipal) integrated development plan |
| IIMM | International Infrastructure Management Manual (IMESA et al 2006) |
| IMESA | Institution of Municipal Engineering of Southern Africa |
| M&E | monitoring and evaluation |
| MFMA | Municipal Finance Management Act (Act 56 of 2003) |
| MSP | municipal services partnership |
| NIMS | The National Infrastructure Maintenance Strategy (DPW et al 2006) |
| O&M | operation and maintenance |
| PFMA | Public Finance Management Act (Act 1 of 1999) |
| R&D | Research and development |
| SALGA | South African Local Government Association |
| SAMWU | South African Municipal Workers Union |
| WISA | Water Institute of Southern Africa |
| WRC | Water Research Commission |
| WS | water services (water supply services and sanitation services) |
| WSA | water services authority |
| WSDP | (municipal) water services development plan |
| WSI | water services institution |
| WSP | water services provider |
| WSSCU | Water Sector Support Coordination Unit (of DWAF) |

1. INTRODUCTION

1.1 Definition of infrastructure asset management

Infrastructure asset management (IAM) is an integrated process of decision-making, planning and control over the acquisition, use, safeguarding and disposal of assets to maximise their service delivery potential and benefits, and to minimise their related risks and costs over their entire life.

Thus IAM includes operation of infrastructure assets, and also planned maintenance and repair, refurbishment and renewal, and provision for replacement of the infrastructure.

This definition indicates that IAM:

- (a) Takes an organisation-wide perspective and draws upon applicable principles and techniques in the management, engineering, accounting and social sciences (including human resources).
- (b) Has an outcomes focus (i.e. a focus on outcomes such as maximisation of service delivery potential, protection of network(s) to deliver services, cost effectiveness and efficiency).
- (c) Confers a custodianship role on the managers of infrastructure and their political leaders – i.e. that they are the “custodians”, responsible for the lifelong sustainable operation of the infrastructure, and for service delivery not only to the current users of the infrastructure, but to future users as well.
- (d) Must take into account both consumer expectations (including levels of service, and cost of the service) and the legislative environment (e.g. financial and environmental legislation, including any regulatory regime (e.g. regulation of drinking water quality)).

"Water services"

The Water Services Act (Act 108 of 1997), s(1) (xix), defines “water services” as “water supply services and sanitation services”

the ability of the infrastructure

“Water services institutions”

The Water Services Act defines “water services institutions” (WSIs) as water services authorities (WSAs) and water services providers (WSPs) (i.e. the definition includes water boards)

1.2 Problem statement

South Africa has progressed well with legislating for IAM in the water services sector (see Annexure A for detail), and many WSIs deliver infrastructure services reliably, without unscheduled interruption, and according to speciation. These WSIs have skilled staff, and the management of infrastructure assets and services is sufficiently budgeted for.

However, where WSIs are not prioritising IAM, where there may be insufficient political will, and where skilled staff and budgets are not available, there has been failure of service provisioning which, in the worst cases, has resulted in total collapse of service provisioning.

A key requirement of water services legislation is for WSIs to develop and apply IAM through their water services development plans (WSDPs) and water board business plans. To date these plans have focussed more on the development of new infrastructure to address the basic services backlog, and less on the IAM requirements over the life of existing and new infrastructure.

1.3 Requirements for effective IAM

Studies, for example by or on behalf of DWA (e.g. DWA (2006)), have undertaken situation assessments and problem analyses to identify the challenges, and the factors that lead to poor IAM. These studies have made it clear that effective IAM needs the following:

- Available funding.
- Suitable skills and knowledge.
- Integrated planning.
- Effective management and control.
- Attitude and commitment.
- Compensation for the ageing skills base and retirements.
- Improvement in the financial viability of the institutions owning the infrastructure.
- Realignment of socio-political priorities that currently may not recognise the need for adequate IAM.

1.4 Key challenges

The following IAM key challenges are critical for sustainable water services delivery:

- Improvement in planning (including adequate asset registers and asset management plans).
- Improvement in policy, supporting measures, regulation and tools.
- Improvement in municipal systems.
- Management of community expectations for higher levels of service within the local affordability and economic development scenarios.
- Development of necessary expertise, experience and commitment of elected representatives and officials.
- Balancing the need for infrastructure creation with appropriate care of existing infrastructure.
- Compliance with requirements of the Municipal Finance Management Act (MFMA) (Act 56 of 2003) and other legislative imperatives.
- Development of appropriate financing strategies.
- Structured communication with communities and sector partners.
- Improved ability to prove business cases to donors and funders.
- A clear regulatory system with incentives.
- Development of sound information base.

1.5 Critical success factors

The following critical success factors have been identified:

- Awareness and appreciation of the IAM challenges.

Most sector stakeholders are not fully aware of the extent of IAM problems that the sector faces. Recent failures of key water services infrastructure (e.g. wastewater and water treatment works) have raised some awareness and concern amongst the general public, municipal officials and national sector departments. Much more needs to be done to improve the overall awareness and appreciation of the IAM challenges.

- Mind shift and culture change.

To mobilize appropriate actions, it is necessary to change the way of operating within the WSI. A radical change of culture is required towards caring for infrastructure. It requires a mind-shift from all stakeholders including, politicians, managers, operators and consumers.

- Skills development and capacity building.

Recent surveys indicate that the water services sector lacks the skills to undertake proper IAM. It is therefore necessary to build adequate IAM capacity through training and support mechanisms.

- Adequate funding for IAM.

Dedicated and / or ring-fenced funding for IAM is crucial for success. This involves improved budgeting, financial management and cost-efficiency.

- Competent governance.

The key to sustaining and growing water services delivery is to improve the management by WSIs of the infrastructure for which they are responsible. A plan of action, embracing awareness, a funding formula, a legislative review, performance management, improved incentives to the owners of the infrastructure to responsibly manage it, and a skills plan, among other measures, needs to be put in place.

1.6 Current state of water services infrastructure and of water services IAM

In 1994 the democratic South African government evaluated the imbalance in infrastructure that characterised the nation, and embarked on an ambitious plan to put matters right by addressing the backlog. For example, the government has invested in providing water to 15 million people. Other infrastructure provided, such as sanitation and road infrastructure, has further improved the quality of life of the people of South Africa. Acting on its mandate, the government is continuing to invest at a rapid pace in infrastructure for previously disadvantaged communities. The water services sector in South Africa is currently responsible for infrastructure assets of a replacement value approaching two hundred billion Rand¹.

Water services are essential to maintain healthy and effective domestic living, associated social services (e.g. schools, hospitals, police stations and prisons) and proper business, commercial and industrial operations. While many people in South Africa do not have access to the minimum basic water services infrastructure, others do have the infrastructure but may not be receiving the services due to poor management, inadequate maintenance and a high cost of service delivery.

Wastewater treatment works are of particular concern. For example, In 2005 and 2006 DWA and the WRC undertook a national investigation and found that 35% of surveyed plants required capital investments to upgrade; approximately two thirds of the plants were experiencing problems with disinfection of treated sewage; and an estimated 105 fully trained and equipped mechanical and

¹ Preliminary figures from a DWAF analysis still in progress (2008) indicate that the current replacement value of water services infrastructure is of the order of at least R200 billion.

electrical maintenance teams were immediately required to prevent further deterioration of valuable infrastructure and equipment.

Other areas of concern include water treatment works, water and sewer reticulation, on-site sanitation, and water and sanitation at some health and education facilities.

Ultimately, unless IAM is improved in these areas, funds to address the cost of unplanned repairs and replacements may have to be prioritised over new construction, which would severely limit the programme for addressing backlogs and expanding service delivery.

It is important to note that “Money ‘saved’ on management of assets is not a saving. This is a short-term outlook, often said to be due to political short-term imperatives and lack of capacity and know-how within the municipality. It can become a vicious cycle once infrastructure is allowed to deteriorate. Expensive refurbishment becomes necessary and there is even less money for ongoing maintenance. In addition, deteriorating infrastructure leads to poor service delivery and reduced payment by consumers, exacerbating lack of cost recovery. Government is facing a looming crisis unless something is done.” (DWA 2005a)

Further, inadequately skilled contractors and poor construction supervision negatively affects the life expectancy of infrastructure. On the operation side it is apparent that many municipalities do not have suitably skilled and adequate resources to operate and maintain their water services infrastructure effectively. At a management level, municipal systems for infrastructure management are in many cases non-existent, sub-standard or simply too complex for the circumstances in which they are employed.

All of the above leads to poor services quality. Poor service quality in turn leads to consumer dissatisfaction and non-payment for services. Insufficient cost recovery affects the financial viability of schemes and further reduces the institution’s ability to provide effective services. This vicious cycle must be stopped through appropriate interventions.

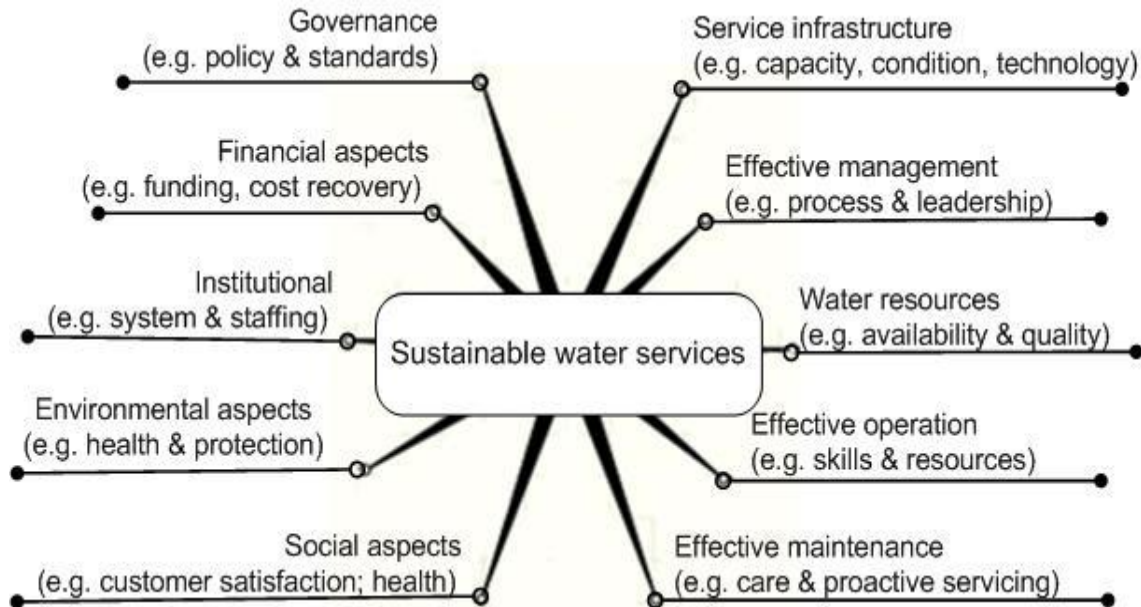
1.7 Towards effective service delivery and IAM

Government's initial focus on the provision of basic water services infrastructure remains a huge challenge. However, with the increase in the amount of infrastructure the challenge of effective operation and proper maintenance is growing in magnitude. This Strategy is part of government’s taking a proactive approach to provide guidance, training, implementation hands-on support and continuous improvement systems.

“Delivery” needs to be understood as embracing not just the construction of infrastructure but the operation, maintenance and augmentation of that infrastructure throughout its design life

Sustaining services delivery requires more than just the design and construction of infrastructure. It includes various physical (infrastructure) elements as well as various human, institutional and financial aspects. This was comprehensively demonstrated in the Phase 1 and 2 undertaken in the development of this Strategy (DWA 2005a, DWA 2005b, DWA 2006, DWA 2007), and is captured in Figure 1 below.

Figure 1: Key elements to ensuring sustainable water services (from DWA 2006, page 3)



Providing effective service delivery requires a combination of management, financial, engineering, economics and social practices and techniques within a robust framework and management plan.

The “chain” nature of service delivery, including of IAM, must be understood. The chain, in the case of IAM, is not the sequence between project identification and commissioning of the infrastructure, but rather the much longer sequence, from the formulation by the owner of the infrastructure of its infrastructure policy, through identification of the elements of the service delivery programme, project design, etc, and then commissioning, and on through the lifetime operation and maintenance (O&M) of the infrastructure.

In respect of this, therefore:

- Delivery results from a process – which process has to be understood and subscribed to by all those with significant influence on the process.
- The process can be viewed as a chain of events – and this chain is only as strong as its weakest link.
- For the chain to be strengthened, its weakest link must be identified and addressed.
- As the weakest link is improved, the next weakest link becomes apparent, and that must also then be addressed. (Note there is no immediate value in allocating resources to stronger links until all weakest links have been addressed.)

It is essential therefore that any support provided to WSIs must adopt a “systems approach” which looks at the entire water services delivery chain, identifies the constraints within the system as a whole, and then methodically addresses each of the constraints.

Thus constraints along the entire management delivery chain need to be addressed. In addition to the key elements mentioned in Figure 1, the following must also be considered, among others:

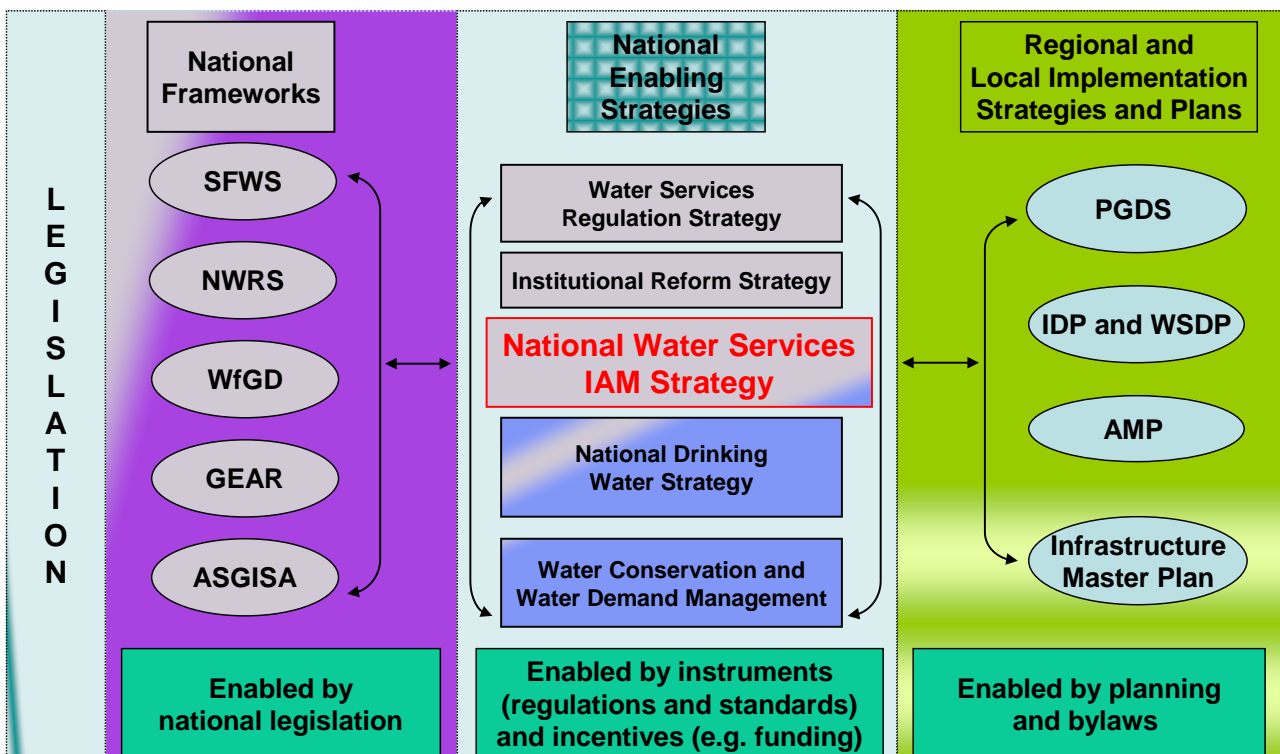
- Revenue – raising the revenue needed for the IAM budget.
- Budgeting – allocating sufficient budget for IAM.

- Prioritising – preferential treatment of strategic infrastructure, which, in respect of water services, would typically include water and waste treatment, and strategic reservoirs and pump stations.
- Planning – of multi-year management in a programmatic way.
- Skills – including recruitment and retention, especially of key staff.
- Procuring suitable management services through appropriate procurement models.
- Implementing management in a programmatic away.
- Monitoring for achievement of results.

1.8 National Water Services IAM Strategy in context of other documents

In the water services and related sectors many documents have been developed to address and support aspects of the water services business. Figure 2 below shows the context of the National Water Services IAM Strategy in relation to the most relevant of the national legislation, national frameworks, water-only national enabling strategies, and regional and local implementation strategies and plans.

Figure 2: The National Water Services IAM Strategy in context with other documents (developed by PDNA)



1.9 Water services IAM in relation to water resources IAM

There exist definitive commonalities in the management of infrastructure in both water resources and water services. Approaches and methodologies in matters such as the condition, assessment and valuation of assets and the preparation of asset registers can be applied and shared in both these components.

Resources and services are, however, discrete sector components, each with its own regulatory framework, differentiated asset portfolios and unique consumer base – for example, unlike water resources, the retail nature of water services introduces a specific commercial focus, and revenue surpluses are quite common.

A further dimension to consider is DWA’s constitutional obligation to strengthen the capacity of local government to discharge its powers and functions in respect of water services provision.

Recognising the particular characteristics of water services, the National Water Services IAM Strategy firmly focuses on improving IAM of WSIs. The Strategy reflects a joint commitment by both Water Resources and Water Services Branches of DWA to pursue excellence in IAM, to provide leadership to the sector, and to share asset knowledge and best practice.²

² Recognizing also local reasons for close integration of water services IAM with water resources IAM. For example, that some municipalities own water resources infrastructure, and that bad water services (e.g. non-compliant treatment works effluent) affect water resources.

2. VISION, AIM, OBJECTIVES AND PRINCIPLES

2.1 Vision

The vision the Strategy has for the sector is that proper life cycle management of water services assets are fully integrated into the water services business of all WSIs in South Africa.

2.2 Aim

The aim of this Strategy is that DWA and its partners will empower and guide WSIs to practice sound IAM, aimed at ensuring optimal utility from public investments in water services infrastructure, and the reliable and sustainable meeting of service delivery obligations.

2.3 Objectives

The objectives of this Strategy are to:

- Create a platform for coordination of principal role players to support WSI IAM as a matter of national priority.
- Address water services infrastructure failures in targeted WSIs in the short term, and effect improvements that can be publicised in order to demonstrate the benefits of IAM.
- Develop in the water services sector in the longer term a culture of sustained improvement in the management of infrastructure.

2.4 Principles

The following principles underpin this Strategy:

1. **Systems approach.** IAM planning must look at the entire delivery chain (i.e. delivery of water services), identify the constraints within the system as a whole, and then methodically address these, prioritising the most serious constraints.
2. **IAM is an integral part of ongoing service delivery.** As an integral part, IAM is a continuous process, not a once-off project or an event. It is a process firstly in the sense that improvement must be planned, and improvement must be progressive. It is a process secondly in the sense that improvement is not static – demands, performance objectives, technologies all change with time, and infrastructure is subject to wear and tear and to obsolescence. And it is a process thirdly in the sense that infrastructure management and improvement in infrastructure management is, or should be, a day in and day out duty of the owners of that infrastructure.
3. **Water services focus.** This Strategy addresses improvements in the practice of water services IAM, as opposed to the management of water resource infrastructure or other municipal infrastructure such as roads and stormwater, electricity, solid waste facilities or public amenities.
4. **IAM focus.** Numerous challenges are encountered in IAM, such as the lack of technical expertise. This Strategy recognises the broad array of challenges with which infrastructure managers are presented, but concerns itself with the formulation of priority actions to address IAM-specific issues.
5. **Recognition that water services delivery is both a human right and commodity-based.** Water services infrastructure is utilised to treat convey or store a commodity – i.e. water. The quality of water services is directly linked to the protection of water as a scarce resource, the

quality of potable water and its impact on health and safety, and the quality of discharge into river systems.

6. **Outcomes-based.** Each priority must be outcomes-based and measurable.
7. **An appropriate mix of short term successes and long term sustainability.** Properly managed infrastructure assets have life spans that can be measured in decades, and thus the full benefits of IAM are felt over successive generations. Whereas this Strategy recognises that the full establishment of IAM practices has a medium to long term horizon, it also recognises that short term successes are not only possible but are required to establish credibility, harness support and to improve failing service standards.
8. **Promotion of an integrated, inter-disciplinary and inter-sectoral approach.** IAM operates at the interface of several functional disciplines, some of which include accounting and finance, town and regional planning, and engineering. The role of communities and of political leadership is also important – the latter sometimes of overriding importance. This Strategy promotes appropriate inter-disciplinary and inter-sectoral alignment, and thus an integrated approach to IAM.
9. **Focus on the key challenges, and prioritise.** Numerous challenges present themselves in the management of water services infrastructure. The Strategy recognises that only a select group of challenges can be addressed at any one time, and that the key challenges that impede the adoption and practice of sound IAM must receive priority attention.
10. **Adoption of the Pareto (80/20) Principle.** This Principle states that a small proportion of the full effort required to achieve a particular result generally achieves close to the desired result. And that further efforts are often subject to diminishing returns. This is sometimes stated as “80% of the full result from 20% of the full effort”, or the 80/20 Principle (or rule). It is usually valid for IAM. (Extending this thinking, a “scan” effort, to determine as quickly as possible where the most critical problems lie, followed by the first steps of what would be a longer improvement process, would often be worthwhile. This effort can, quickly and cheaply relative to a more thorough effort, both bring about some rapid incremental improvement and also ascertain the extent of a problem and how much further effort would be required.)
11. **No one size solution fits all.** While the general principles of IAM remain valid for all institutions, the priorities differ from institution to institution, and also change with time – as do the techniques, the technological and non-infrastructure options and other factors.
12. **Start with the basics, and get them right.** The approach must be incremental. Do not attempt to progress further until the basics are right. Address the weakest links in turn – and as each is improved and is no longer the weakest link, attend to the new weakest link. Where there is strength, support it, and build on it.
13. **Political, management and operational focus.** All levels must commit to IAM in order for it to be successful – from politicians who ensure political will, legislative compliance and community requirements, to planning by management, to implementation at the operations level.

3. BENEFITS, SCOPE AND PROCESS OF IAM

3.1 Benefits of IAM

It is internationally recognised that the application of IAM practices has numerous benefits for asset owners, the beneficiaries of infrastructure services and other stakeholders.

Effective management of infrastructure is central to public sector institutions that seek to provide an acceptable standard of services to the community. Infrastructure impacts on the quality of living environment and economic health.

Not only is there a requirement to be effective, but the manner in which the institutions discharge their responsibilities as public entities are also important. They must demonstrate good governance and consumer care, and the processes adopted must be efficient and sustainable. Councillors and officials are custodians on behalf of the public of infrastructure assets, the replacement value of which, even in a small municipality, can amount to several hundred million Rand, and in larger ones, to several billion Rand.

Infrastructure asset management:

- Keeps infrastructure operational and delivering services
- Improves revenue-earning potential through delivering those services for the use of which charges are made
- Creates sustainable jobs
- Saves costs in the long term, and often in the short term as well
- Ensures that more funds for new infrastructure are available in the future

An integrated IAM process and programme will have very significant positive impact. It will:

- Assist public sector infrastructure owners to improve decision making about their capital plan requirements.
- Change cultures, with the aim of instilling an integration of information and decision making across all owners of public sector infrastructure (including through different spheres of government).
- Provide an environment for more productive relationship with government stakeholders and consumers.
- Provide a cradle-to-grave picture of their IAM that will guide owners in their planning and sustainable implementation of IAM.
- Focus institutions on providing services that will improve in quality over the short, medium and long term.
- Enable institutions to identify and maintain key assets, which will lead, among other things, to fewer instances of non-compliance with national standards (e.g. drinking water quality regulations).

The business model for IAM must focus on minimising the lifetime total costs of infrastructure assets, while still achieving service goals with respect to:

- Delivering those services, and meeting goals with respect to reliability.
- Complying with statutory requirements with respect to, for example, quality and resource usage.
- Buying new capital assets.
- Operating current assets.
- Maintaining current assets.

-
- Refurbishing and renewing assets.
 - Replacing aged assets.
 - Disposing of non-functional assets.

3.2 Scope and process of IAM

IAM is not a once-off or external intervention. It must become integrated into the operations of the institution owning or managing the infrastructure.

Furthermore, it must be a process that involves continuous improvement. However good or bad the IAM of an institution currently is, the performance cycle must be upwards. For example, knowledge of assets might be minimal to start with, but improved asset O&M will lead to improved performance and more effective service delivery, and all the time knowledge of assets will be improving. If knowledge of assets is good to start with, then attention might focus on improving demand prediction, risk analysis, and identifying optimum technological solutions.

In brief, the scope and process of IAM constitute:

- Assets can only be managed if they are known about. Thus, at minimum, there must be knowledge of at least those assets most critical to service delivery³ – what they are, where they are, to what extent they are still working, and their capacity.
- The level of service of each infrastructure facility or component⁴ must be known, including its capacity, and relationship to demand – how much spare capacity is there?
- There must be knowledge of current demand and prediction of demand; and whether an asset is still required, whether an asset needs its capacity supplemented, etc.
- Finance is of fundamental importance. Can the infrastructure owner afford to manage the assets, given the costs of operation and of maintenance, and of renewal and recapitalisation? If the costs cannot be afforded, what are the consequences? To what extent is finance dependent on revenue derived both directly and indirectly from provision of the service? And to what extent is the overall viability of the owning institution dependent on that revenue? Then – can the owner afford not to manage the assets, given the loss of revenue, loss of amenity, and other losses were the infrastructure to deteriorate and the service delivery to be hampered?
- Planning is also of fundamental importance. How will the infrastructure be managed, and the service provided – bearing in mind that IAM involves people, processes, systems and finance? This needs to be set out in an IAM plan (which can be very simple to start with).

It is useful to depict all of the above as steps of the “basic IAM cycle” (the upper half of Figure 3 below).

Improved service delivery leads to improved finances, then to better IAM planning, better knowledge of the assets, and so on, leading to improved service delivery – and the cycle of improvement continues.

Even if an owner has, for example, very little knowledge of its infrastructure assets, that knowledge which is available must be used to do a first round of IAM planning to best effect. Each subsequent

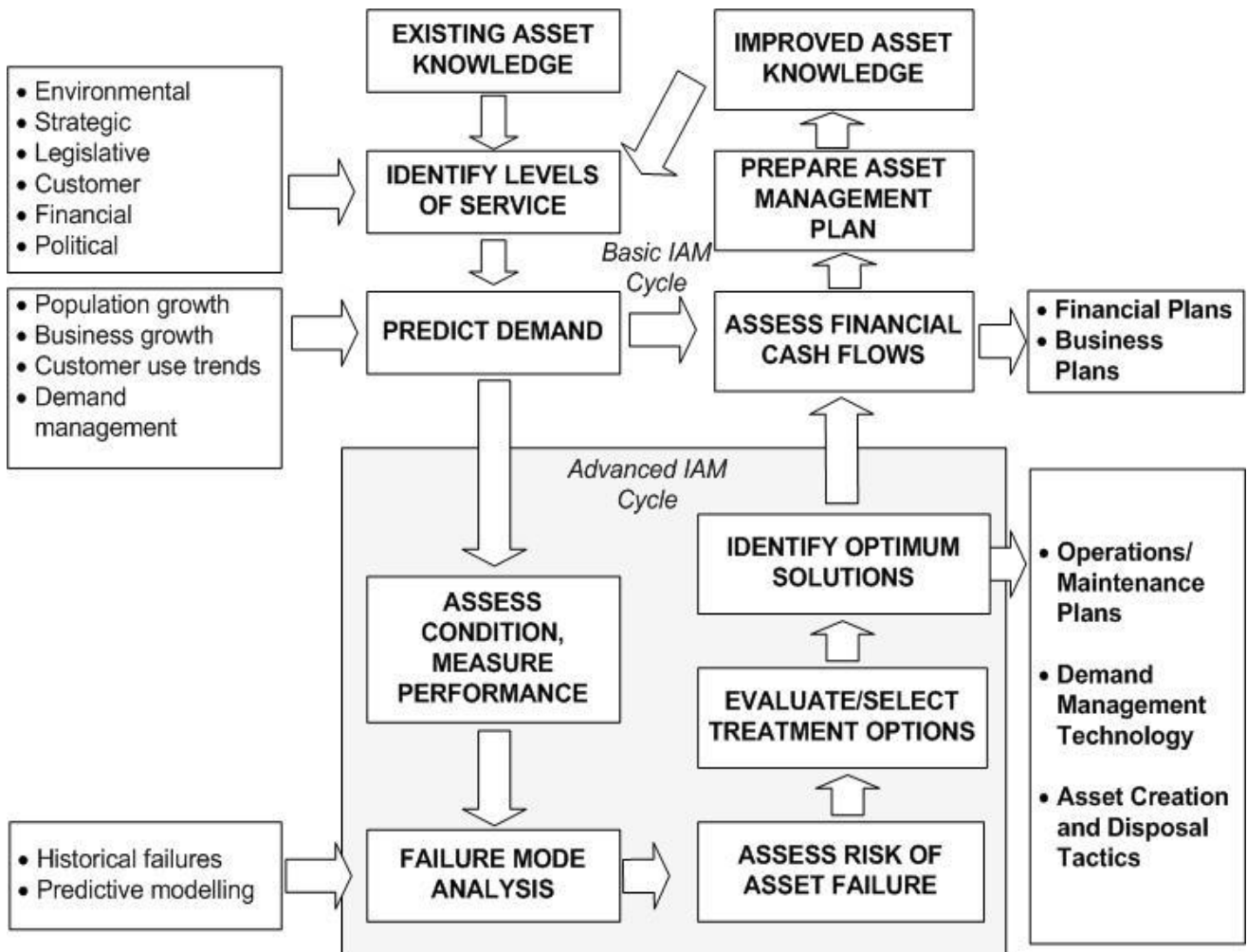
³ In the case of a municipality, this might be the water treatment works and a number of key pumpstations.

⁴ Examples of “infrastructure facility”: a treatment works (and its “components” include filters, channels, digesters), a pump-station, a length of main, and a reservoir.

round will build on and improve each of the steps depicted in Figure 3, and each iteration will add to the knowledge base, improving financial capability, improving demand prediction – and improving both IAM and service delivery.

The scope of IAM is depicted below. This Figure brings out the process nature, grouping the core activities outlined above. The Figure also brings out the iterative nature of the IAM cycle.

Figure 3: Major IAM activities in process format (adapted from IIMM 2006, page 3.2)



The lower half of Figure 3 shows the “advanced IAM cycle”. When the basics of IAM are in place, the cycle can be improved by collecting data and measuring performance, in order to strengthen asset knowledge. Thereafter issues such as assessing the risk (and consequences) of failure of key infrastructure elements can be introduced into the cycle. And then solutions involving, for example, demand management and considerations of asset disposal, can be optimised.

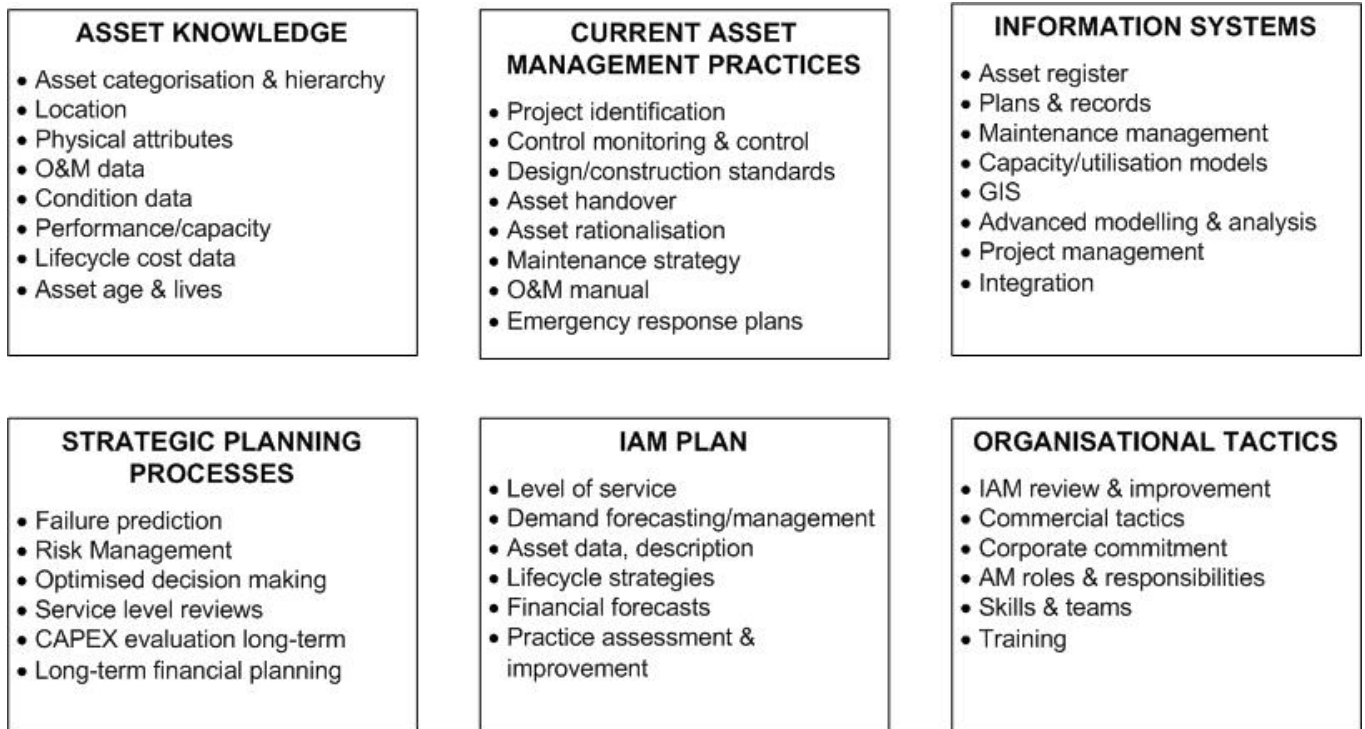
It is evident from the above description that the key components of IAM practice are:

- **Asset data and knowledge**, its appropriateness, reliability and accessibility.
- **Current IAM practices**, and also emergency response plans.
- **Information systems** to support IAM processes and to store and manipulate data.
- **Strategic planning processes**, including risk management and capital works planning.
- **IAM planning** for current and future demand, including financial forecasts and life cycle IAM strategies.

- **Organisational tactics**, including contractual, institutional, and people issues.

The scope of the components identified above is shown in Figure 4.

Figure 4: Scope of IAM practices (from i @ Consulting)



4. OUTPUTS OF THE STRATEGY

4.1 Introduction

The outputs in this National Water Services IAM Strategy which will be defined in detail in the National Water Services IAM Implementation Plan, and taken further by DWA and its partners to ensure appropriate national level IAM support to WSIs.

The order of listing is not intended to indicate priority (whether priority of urgency or of importance). It is the outcome of an extensive and consultative investigation into water services IAM in South Africa. All actions should proceed together if water services IAM is to improve significantly. None must be omitted or put on hold for an indefinite period. Putting some on hold will jeopardise progress with others.

Each output of the Strategy is listed along with the responsible national government department(s) or national structure. Where actions to improve water services IAM is part of another government department's brief, DWA may also be named where it will be responsible for raising the issue and monitoring progress.

Some outputs may not relate to DWA's mandate, may not be IAM-specific, and / or may be the subject of existing initiatives (by DWA and others). DWA has neither the mandate nor the resources to address all of them. Where the outputs are the responsibility of other parties to resolve DWA will seek to influence what must be addressed, and its outcome.⁵

It will no doubt assist implementation of this national Strategy for improved IAM that there currently is –

- A growing recognition on the part of national and provincial government of the serious problems facing many WSIs, and of the necessity for water services IAM improvement – if necessary, through intervention from outside the institutions; and
- Increasing public pressure for improvement in service delivery – including for improvement in delivery by existing infrastructure.

It must be noted that there may be cases where WSIs are unviable and / or unsustainable and, therefore, IAM within these institutions is greatly retarded. In these cases an intervention must be focused on the unviability of the WSI, and not on sorting out individual challenges such as IAM.

It is also noted that the National Infrastructure Maintenance Strategy (DPW, 2006) identifies many actions similar or complementary to these,⁶ as do other national non-water IAM initiatives and it is essential that this Strategy seeks synergy with them, where appropriate.

⁵ By way of examples: the issue of procurement is the responsibility of CoGTA and National Treasury; the financial situation of WSAs, and regulation of their budgets, is the responsibility of National Treasury; performance measurement of WSIs is not specific to IAM, and will be taken up in other directorates of DWA where alignment must be sought.

⁶ Particularly of interest here are the NIMS proposed actions in respect of: strengthening the regulatory framework governing planning and budgeting for infrastructure management; requiring that skilled staff manage the planning and implementation of IAM programmes; identifying key strategic infrastructure; developing norms and standards for the maintenance of infrastructure; identifying actions to address skills shortages; and building the maintenance sector within the construction industry (and inter alia attending to procedures for procurement). (DPW et al 2006)

4.2 The outputs in summary

The outputs, with the national government departments or structures that will play a leading role in each, and approximate time frames, are listed in the table below:

| | Output | Responsibility | Time frame |
|-----|--|---|--------------------------------|
| 1 | Increased IAM awareness in the water services sector | Stakeholder Reference Group, with DWAF taking the lead | Immediate and over 5 years |
| 2 | Greater synergy with water services IAM initiatives achieved | Stakeholder Reference Group and Municipal Reference Group, with DWA taking the lead | Immediate and ongoing |
| 2.1 | SYNERGY: IDPs, WSDPs and water board business plans prioritise water services IAM | DWA with CoGTA and National Treasury | Within 1 year |
| 3 | Improved WSI IAM through targeted support from national government | Stakeholder Reference Group with DWA, CoGTA and National Treasury taking a leading role | Within 1 year and ongoing |
| 4 | Appropriate WSI IAM tools are available and used | Municipal Reference Group and Stakeholder Reference Group, with DWA | Immediate to 3 years |
| 4.1 | TOOL: Asset register template | Municipal Reference Group, DWA and National Treasury | Immediate and within 12 months |
| 4.2 | TOOL: WSI IAM pro forma recovery plan(s) | | |
| 4.3 | TOOL: Resources for sound WSI IAM identified | | |
| 4.4 | TOOL: Water services IAM case studies of lessons and good practice | WIN-SA and WRC with Municipal Reference Group and Stakeholder Reference Group | |
| 5 | Water services IAM M&E system developed and linked to current WSI IAM M&E initiatives | Stakeholder Reference Group, with DWA taking the lead | 3 to 5 years |
| 6 | A regulatory framework is defined and implemented | National Treasury, with CoGTA and DWA | 1 to 3 years |
| 7 | WSI IAM skills procurement supported through outsourcing | National Treasury and CoGTA, with input from DWA | Immediate and ongoing |
| 8 | Appropriate IAM human resources development within WSIs supported | Stakeholder Reference Group in consultation with NIMS and others | Immediate and within 6 months |
| 9 | Increased research and development (R&D) and knowledge dissemination in water services IAM | Stakeholder Reference Group and Municipal Reference Group, with WRC taking the lead | 5 years |
| 10 | Implementation Plan Programme is managed on time, according to budget, and with appropriate guidance | Stakeholder Reference Group and Municipal Reference Group, with DWA providing facilitation, line management and a secretariat, as appropriate | Immediate and ongoing |



4.3 The outputs in detail

This second table contains a summary of the outputs, along with challenges and activities. The National Water Services IAM Implementation Plan will further articulate detailed actions, time frames and budgets per output:

| | OUTPUT | DESCRIPTION | CHALLENGES | ACTIVITIES | RESP |
|-----|--|---|---|--|---|
| 1 | Increased IAM <u>awareness</u> in the water services sector | Develop and implement a multi-pronged national WSI IAM awareness / communication campaign | Persuade WSIs of the importance of IAM where IAM is not given sufficient priority (including the need for sufficient resources such as budget and skills) | Develop and implement a multi-pronged awareness campaign which takes the following target audiences into account: local government councillors, WSI officials, water boards (Board members and employees), and national and provincial government | Stakeholder Reference Group, with DWA taking the lead |
| 2 | Greater <u>synergy</u> with water services IAM initiatives achieved | Scan and analyse initiatives other than those of DWAF Achieve synergy, where appropriate | Coordinate efforts to improve water services IAM between DWA, WSIs, CoGTA, National Treasury and others Determine the specific actions that are in the best interests of WSIs | Engage with and find synergy with initiatives within DWA (national and regional) e.g. WSDPs and Councillor Development Programme | DWA |
| | | | | Engage with and analyse initiatives other than those of DWA, and find synergy, as appropriate e.g. CoGTA, National Treasury, NIMS, DBSA, SALGA, WRC and WIN-SA | Stakeholder Reference Group, with DWA taking the lead |
| | | | | Ensure IAM is foregrounded when documents are developed for the water services business. By way of example: a review of all aspects to ensure a focus on core responsibilities, on funding and budgeting in the context of the total service delivery responsibility, and on ring-fencing (financial, institutional and operational) | Stakeholder Reference Group and Municipal Reference Group |
| 2.1 | <u>SYNERGY:</u> <u>IDPs, WSDPs and water board business plans</u> prioritise water services IAM | Review the content of and relationship between the IDP, WSDP and IAM, and between the water board business plan and IAM | IDP, WSDPs and water board business plans do not always fulfil their intended functions and are sometimes not well integrated IAM is not satisfactorily addressed in many of these plans | Determine gaps in current generic plans <ul style="list-style-type: none"> Review the purpose and content of the plans, and the relationship between them, in terms of IAM Prioritise and rationalise in respect of what national government expects | DWA with CoGTA and National Treasury |

| | OUTPUT | DESCRIPTION | CHALLENGES | ACTIVITIES | RESP |
|---|--|---|--|---|--|
| | | | | <p>Ensure changes to generic and specific plans</p> <ul style="list-style-type: none"> Engage with national custodians of documents to effect changes and to ensure these are communicated to WSIs Assist WSIs (through <i>targeted support</i> and over time) in strengthening their plans Track progress on improved WSI IAM in WSDPs and water board business plans through the <i>M&E system</i> | DWA with CoGTA and National Treasury |
| 3 | Improved WSI IAM through <i>targeted support</i> from national government | <p>Plan and commence implementation of targeted WSI support from national government</p> <p>This includes direct intervention by national government (e.g. complete refurbishment of the asset, or even its replacement) where infrastructure asset decay is particularly serious</p> | <p>National government has limited resources to address water services IAM – it must therefore be selective in how and where it directs its efforts</p> <p>The choices must be transparent and justifiable</p> <p>The action plans must ensure basic problems are dealt with by prioritising attention to the weakest links, building on successes and prioritising quick wins</p> | <p><u>Provide guidance and support to selected WSIs</u></p> <ul style="list-style-type: none"> Develop criteria for selection of WSIs, and create links to existing and evolving databases and including the <i>M&E system</i> Determine status quo of individual WSIs and determine priorities for support Select WSIs (and ensure that WSIs receiving support are viewed as ‘pilots’ for <i>tools</i> development) Draw up individual WSI action plans, implement with appropriate resources, and monitor through the <i>M&E system</i> <p><u>Provide direct assistance to prioritised crisis cases</u></p> <ul style="list-style-type: none"> Undertake functional assessment of infrastructure Develop criteria for selection, and create links to existing and evolving databases and including the <i>M&E system</i> As sufficient information emerges, select interventions (and ensure budgets [including grants and access to credit]), implement, and monitor through the <i>M&E system</i> | <p>Stakeholder Reference Group with DWA, CoGTA and National Treasury taking a leading role</p> <p>National Treasury with CoGTA and DWA</p> |

| | OUTPUT | DESCRIPTION | CHALLENGES | ACTIVITIES | RESP |
|-----|---|--|---|---|---|
| 4 | Appropriate WSI IAM <u>tools</u> are available and used | <p>Identify the range of tools required</p> <p>As part of “synergy” component, assess usefulness of existing tools</p> <p>Adapt tools, identify and develop additional tools, as required, and develop means for their use</p> | <p>Ensure tools are appropriate to the needs of WSIs (in terms of range of issues, orders of magnitude and capacity differences)</p> <p>Ensure tools are accessible</p> <p>Ensure lessons and good practice feed into the improvement of existing tools and the development of new ones</p> | <p><u>Develop appropriate tools</u></p> <ul style="list-style-type: none"> Identify WSI IAM levels of need Identify the range of tools (including guides and systems) required for each level of need Identify existing tools and assess usefulness as part of <i>synergy</i> output Adapt existing tools; and identify and develop additional tools, as required – as part of the learning from <i>targeted support</i> to WSIs Engage in iterative process for ongoing improvement of tools – particularly through lessons and good practice | Municipal Reference Group and Stakeholder Reference Group |
| | | | | <p><u>Ensure tools are readily available and used</u></p> <ul style="list-style-type: none"> Publicise and disseminate tools as part of the <i>awareness campaign</i> and <i>targeted support</i> Provide support and guidance on appropriate use of tools – through <i>targeted support</i> and through one-on-one requests | Stakeholder Reference Group and DWA |
| 4.1 | TOOL: <u>Asset register template</u> | Develop, through examples of good practice, a tool for WSIs | To provide WSIs with a detailed, useful template for compiling an asset register | <p>Identify key elements for an asset register adopted from national and international good practice</p> <p>Develop a template (or, if advisable, a small selection of templates)</p> <p>Pilot adaptation of the template(s) through <i>targeted support</i></p> <p>Publicise and disseminate tool as part of the <i>awareness campaign</i> and <i>targeted support</i></p> | Municipal Reference Group, DWA and National Treasury |

| | OUTPUT | DESCRIPTION | CHALLENGES | ACTIVITIES | RESP |
|-----|---|---|--|--|---|
| 4.2 | <u>TOOL:</u> WSI IAM pro forma <u>recovery plan(s)</u> | Develop, through examples of good practice, a tool for WSIs | To provide WSIs with a detailed, useful pro forma step-by-step recovery plan With experience, to provide each WSI with a customised recovery plan | Identify key elements for a recovery plan adopted from national and international good practice Develop a generic step-by-step recovery plan (or, if advisable, a small selection of generic plans), and supporting notes for the adaptation of the generic plan(s) to the circumstances of individual WSIs Pilot adaptation of the generic plan(s) and guide(s) through <u>targeted support</u> Publicise and disseminate tool as part of the <u>awareness campaign</u> and <u>targeted support</u> | Municipal Reference Group and Stakeholder Reference Group |
| 4.3 | <u>TOOL:</u> <u>Resources</u> for sound WSI IAM identified | Define, through pilot implementation of a representative sample, the resources required for WSIs to undertake sound IAM | To be able to estimate with more certainty the full range of resources required to improve WSI IAM, including budgets | Use experiences being gained in <u>targeted support</u> and national and international good practice to estimate the full range of resources required to improve WSI IAM, including budgets Develop a checklist for WSIs, and ensure links with the pro forma <u>recovery plan(s)</u> tool, as appropriate Publicise and disseminate tool as part of the <u>awareness campaign</u> and <u>targeted support</u> | Municipal Reference Group and Stakeholder Reference Group |
| 4.4 | <u>TOOL:</u> Water services IAM case studies of <u>lessons and good practice</u> | Identify water services IAM good practice and / or access case studies already available Ensure good practice is written up and disseminated to WSIs | Identify good practice, write it up, disseminate it and ensure it is used | Through <u>synergy</u> output, and with the Water Information Network – South Africa (WIN-SA), identify existing case studies Identify and capture additional case studies, as required Publicise and disseminate case studies as part of <u>awareness campaign</u> and <u>targeted support</u> | WIN-SA and WRC with Municipal Reference Group and Stakeholder Reference Group |
| 5 | Water services | Review existing water | Measuring whether water services | Define the scope of WSI IAM M&E requirements | Stakeholder |

| | OUTPUT | DESCRIPTION | CHALLENGES | ACTIVITIES | RESP |
|---|---|---|--|--|--|
| | IAM <u>M&E system</u> developed and linked to current WSI IAM M&E initiatives | <p>services M&E in terms of IAM requirements</p> <p>Extend M&E coverage before increasing depth</p> <p>Identify how milestones will be determined</p> <p>Identify how progress towards milestones will be monitored</p> | IAM is improving, how and why, and feeding learning into good practice | <p>Review DWA water services M&E in terms of IAM requirements</p> <p>Identify effective and efficient monitoring processes for water services IAM implementation (including milestones for performance improvement)</p> <p>Identify effective and efficient evaluation processes</p> <p>Use findings to strengthen DWA's system, or to create a new system, with appropriate links to the DWA system</p> | Reference Group, with DWA taking the lead |
| 6 | A <u>regulatory framework</u> is defined and implemented | <p>Define and structure incentives</p> <p>Build on existing corporate and individual incentives</p> <p>Tighten the policy and regulatory framework</p> | Current incentives (such as drinking water quality and effluent quality regulations) generally are not yielding the desired effect and need to be reviewed and amended, as appropriate | Develop effective incentives for improving water services IAM by reviewing current incentives, and developing and implementing a performance incentive system | National Treasury, with CoGTA and DWA |
| | | | | Identify policy and legislation changes, including changes to legislation for skills procurement | National Treasury and DWA |
| | | | | Amend and / or develop regulations in terms of 3 – 5 most important issues the Minister should regulate on for water services IAM | DWA |
| 7 | WSI IAM <u>skills procurement</u> supported through outsourcing | <p>Assess frequently encountered procurement and outsourcing obstacles and find ways to resolve these</p> <p>Facilitate bringing needed IAM skills into WSIs through outsourcing</p> | <p>Processes to import scarce skills into WSIs need improvement – and immediate short term support is required</p> <p>Processes for comparison between alternative WSI service providers, and to enable procurement of alternative providers where warranted, need improvement</p> | <p>Assess frequently encountered procurement and outsourcing obstacles within WSIs</p> <p>Provide written guidance on how to use the special conditions in the MFMA / PFMA so as to circumvent current obstacles</p> | National Treasury and CoGTA, with input from DWA |
| | | | | Provide assistance through targeted support and one-on-one engagements with immediate procurement alternatives via other organisations – including as part of the Section 78 assessment for service providers | National Treasury and DWA |
| 8 | Appropriate IAM <u>human resources</u> | Create enabling framework to support WSIs to re-skill current staff in line with IAM | Both the political leadership and personnel in WSIs are sometimes under-skilled and under-resourced for | Ensure research on skills and number of staff required for different types and sizes of infrastructure and plants is used to secure and / or develop checklists for | Stakeholder Reference Group in consultation with |

| | OUTPUT | DESCRIPTION | CHALLENGES | ACTIVITIES | RESP |
|----|---|--|---|---|---|
| | <u>development</u> within WSIs supported | needs | the responsibilities they carry Some WSI posts have either no or inadequate skills' specifications | <ul style="list-style-type: none"> Current appointments to IAM posts for further training for re-skilling, or the renewal or upgrading of skills New appointments to IAM posts (particularly technical or financial) at semi-skilled or higher levels | NIMS and others |
| | | | | Support processes to re-skill and upgrade WSI IAM skills for politicians and officials (for example, the Councillor Development Programme, D: WSSD, the NIMS initiative and the IAM Learning Framework being developed by the LGSETA) | Stakeholder Reference Group |
| 9 | Increased R&D and knowledge dissemination in water services IAM | R&D supports improved WSI IAM | Skills and capacity gaps Access to information and training Funding and other resources | Identify key technical and managements needs in IAM within WSIs Develop a national R&D agenda to support identified needs Develop a knowledge platform to support WSI IAM Strengthen research capacity and infrastructure to support WSI IAM | Stakeholder Reference Group and Municipal Reference Group, with WRC taking the lead |
| 10 | Implementation Plan Programme is <u>managed</u> on time, according to budget, and with appropriate guidance | Put systems and structures in place to manage this Programme | The sector is over-stretched and under-resourced in many ways, and may not have the capacity to implement this Programme within a 5 year period | Strengthen Stakeholder Reference Group comprising DWA, CoGTA, National Treasury, SALGA, DBSA, SAAWU and WIN-SA, and ensure it is used to provide strategic oversight and guidance to this project | Stakeholder Reference Group, facilitated by DWA |
| | | | | Establish Municipal Reference Group to provide strategic guidance and practical inputs to all aspects of the Implementation Plan | Stakeholder Reference Group |
| | | | | Manage the Programme on time and according to budget Ensure indicators per output in this Implementation Plan are honed and strengthened as clarity is received on each output | Stakeholder Reference Group, with DWA providing secretariat and line management |

5. WAY FORWARD

It is envisaged that the National Water Services IAM Strategy will promote sound management of infrastructure and facilities across the whole of the water services sector.

The National Water Services IAM Implementation Plan, to be developed to support this Strategy, will set out how this objective will be achieved by DWA and its partners.

As part of the process to develop the Implementation Plan a Municipal Reference Group will be established to ensure relevance to WSI needs; and the current Stakeholder Reference Group will continue to support and guide the process.

In particular, the Implementation Plan will, among other things:

- Define the practice of IAM, in particular in respect of water services infrastructure.
- Outline what will be done to support WSIs in adopting good practice – among other things, through sector-specific guidelines, skills development and related planning, control and knowledge management tools.
- Outline what will be done to address water services delivery failures in targeted institutions in the short term.
- Outline what will be done to publicise improvements resulting from the above, and to disseminate information.
- Outline what will be done to facilitate the development of a culture of sustained improvement in the water services sector in the longer term.
- Identify major impediments to the application of sound IAM practices, and outline what will be done to engage with partners and other stakeholders to address these impediments.
- Outline what will be done to raise the profile and priority of IAM, and especially water services IAM, in WSIs and in other stakeholders key to water services IAM.
- Outline what will be done to determine regular milestones for assessment of water services reliability and sustainability and, in particular, IAM performance and what will be done to monitor progress towards these.

For each Strategy output the actions will be fleshed out in detail in the National Water Services IAM Implementation Plan, and will include a budget as well as time frames for implementation. The Plan will outline a suite of instruments designed to achieve the objectives – including both a facilitative approach (through empowerment and guidance) and an approach that relies on monitoring and regulation.

It will indicate prioritisation in terms of both urgency and importance. It will also determine the “how”, including tactics and incentives. It will identify key performance areas and will set key performance indicators which will be integrated into DWA’s existing M&E system. It will also contain a communication / awareness plan to support sustainable implementation of this Strategy.

While the Strategy is firmly focussed on water services institutions (WSIs), linkages between the Strategy, the Implementation Plan and water resource IAM initiatives must, in the broader interest of the water sector and consumers, be forged, and good IAM practices pursued across the whole of the water sector.

REFERENCES

- CoGTA (2007a). "Guidelines for infrastructure asset management in local government 2006-2009." (i@consulting, in association with Maunsell).
- CoGTA. (2007b). "Guidelines: multi-dimensional targeted approach to support municipalities on infrastructure services delivery." April 2007.
- DPW et al. (2006) "National Infrastructure Maintenance Strategy. In support of ASGISA and government growth objectives." Department of Public Works, Construction Industry Development Board and CSIR. August 2006
- DWA et al. (2003). "Strategic framework for water services: water is life, sanitation is dignity." DWA, CoGTA, National Treasury, South African Local Government Association, and South African Association of Water Utilities, September 2003.
- DWA. (2005a). "Terms of reference for water services infrastructure asset management strategy." May 2005.
- DWA. (2005b). "Water services infrastructure asset management strategy study. Phase 1: status report. The state of water services infrastructure and its management: a desktop strategic study." November 2005. (CSIR, in association with Matingi and Associates, Makgoleng Projects and Pula Strategic Resource Management.)
- DWA (2006). "Water services infrastructure asset management strategy study. Phase 2A: Action plan. Proceeding from fact-finding to solution-identification." October 2006. (CSIR, in association with Matingi and Associates, Makgoleng Projects and Pula Strategic Resource Management.)
- DWA (2007). "Water services infrastructure asset management strategy study. Phase 2B: Priority actions." January 2007. (CSIR, in association with Matingi and Associates, Makgoleng Projects and Pula Strategic Resource Management.)
- DWA (2008). "Water services provider support implementation plan." "Discussion document." February 2008.
- IMESA. (2006). "International Infrastructure Management Manual (IIMM) – South Africa Edition 2006." IMESA, INGENIUM and IPWEA.

ANNEXURE A: NATIONAL GOVERNMENT IAM INITIATIVES

Legislation and strategies

Legislation demands that all municipalities and service providers must practice proper IAM to achieve sustainable service delivery.

Key themes of steadily evolving legislation on infrastructure services provision introduced in South Africa since 1994 include:

- long-term sustainability and risk management;
- service delivery efficiency and improvement;
- performance monitoring and accountability;
- community interaction and transparent processes;
- priority development of minimum basic services for all; and
- the provision of financial support from central government to address the needs of the poor.

The fundamental rationale for the need to provide infrastructure and to manage infrastructure assets effectively may be found in the Constitution. Objectives such as to promote a safe and healthy environment, ensure effective and sustainable services, support social and economic development, and strengthen democratic and accountable governance, are clearly stated.

A number of national statutes directly or indirectly require effective IAM on the part of municipalities and water boards.

Specific legislation⁷ includes:

- Municipal Systems Act (Act 32 of 2000) which sets out rights, duties, authority and core processes, and, among other things, requires municipalities to prepare integrated development plans (IDPs).
- Municipal Structures Act (Act 117 of 1998) which defines municipal functions and powers and relating systems and structures.
- Municipal Finance Management Act (MFMA) (Act 56 of 2003) which defines financial management and accounting processes. In the case of water boards, which are “national government business enterprises”, the equivalent legislation is the Public Finance Management Act (PFMA) (Act 1 of 1999).
- [Annual] Division of Revenue Act facilitates financing of infrastructure grant funding and the equitable share.

The Government Immovable Asset Management Act (GIAMA) (Act 19 of 2007) applies to national and provincial assets – and is therefore not discussed in this document.

Cross-cutting with the above are various planning requirements (e.g. the IDP, water services development plan (WSDP) and Consolidated Infrastructure Plan) as well as norms and standards. Also several other national strategies and implementation plans, in particular the annual “Implementation plan for the five-year local government strategic agenda” from CoGTA and

⁷ And of course the regulations associated with each.

documents such as “Guidelines: multi-dimensional targeted approach to supporting municipalities on infrastructure services delivery” (CoGTA 2007b).

The IDP is the principal strategic planning mechanism for municipalities. Compilation of the IDP needs to be informed by robust, relevant and holistic information relating to the management of the municipality’s infrastructure.

The MFMA is the principal (but not the only) legislation that requires municipalities to responsibly take care of their infrastructure assets (and also of other forms of assets). It places an obligation on municipal accounting officers “for the management of the assets of the entity, including the safeguarding and maintenance of those assets” (MFMA 96(1)(a) – a similar requirement in PFMA is 38(1)(d)).

Water sector specific legislation and strategy documentation includes:

- Water Services Act (Act 108 of 1997), which, among other things, requires WSAs to prepare WSDPs
- The National Water Act (Act 36 of 1998)
- Strategic Framework for Water Services (DWA et al 2003)
- National Water Resource Strategy (DWA 2004)

Other legislation that implies the need for effective water services IAM:

- Occupational Health and Safety Act (Act 85 of 1993)
- National Environmental Management Act (Act 107 of 1998)
- Environmental Conservation Act (Act 73 of 1989)
- National Health Act (Act 61 of 2003)
- Disaster Management Act (Act 57 of 2002)

There is a need to direct limited resources to address the most critical needs, to achieve a balance between maintaining and renewing existing infrastructure whilst also addressing backlogs in basic services and facing ongoing changes in demand. Making effective decisions on service delivery priorities and other infrastructure matters, particularly IAM, must be a team effort. Whereas the councillors (in the case of water boards, the board members) make the final decisions, taking community wishes into account, they must be advised by their officials. Infrastructure planning must be informed by a multi-disciplinary team effort on the part of officials, with inputs provided by specialists in, principally, infrastructure, community services, financial planning, and corporate services.

Other initiatives

In recent decades, concerns over poor service performance (often only highlighted during high profile failure of infrastructure) and unnecessary loss of asset value (arising from inadequate maintenance and capital renewal) have driven governments across the globe to demand improvements in infrastructure management practice in the public sector generally, not just in respect of water services infrastructure.

Governments are, or should be, very interested in protecting the investments they have made. The role of national governments should include looking after the infrastructure assets that they themselves own, but also passing both enforcing and enabling legislation for other spheres of government in their countries. They need, among other things, to assist these other institutions,

and also to require them to meet key legal and regulation requirements that it, national government, must then manage from a macro perspective.

In South Africa, national government has been taking a leadership role, and its roadmap on IAM is in development. Government's integration approach to macro planning and implementation will in due course cover the following, among others:

- Strengthen government's role to oversee and enforce IAM compliance.
- Information sharing within or across sectors that will help avoid duplication of efforts.
- Promote IAM, as a tool to help meet regulatory requirements.
- National support initiatives to promote IAM in all three spheres of government and throughout the public sector.

The aim of national government is to promote IAM by means of initiatives including in respect of the following:

- Legislation
- Guidance: strategy, policy and tools to manage IAM
- Training: educational material
- Implementation: hands-on technical assistance
- Continued improvement: sharing of information and research

The DWA IAM initiatives and, in particular the Strategy to which this Appendix is attached, are among a number of national IAM initiatives, planned to complement each other. Principal among these are the "National Infrastructure Maintenance Strategy" (NIMS) (approved by Cabinet in 2006), the Government-wide Immovable Asset Management Act (GIAMA) (sponsored by DPW – Act 19 of 2007), the "Guidelines for Infrastructure Asset Management in Local Government" (CoGTA 2007a), and National Treasury's several measures over recent years to increase provincial and local government accountability for assets.^{8 9}

The National Water Services IAM Strategy will further, in respect of water services, the aims of all of the above, and will assist water services infrastructure owners and other stakeholders with interpretation and alignment of these initiatives in respect of the water services environment.¹⁰

⁸ For example, National Treasury has made it compulsory for municipalities to do impairment testing at both the asset and network level.

⁹ Professional institutions are among many bodies that have taken practical measures in support. In particular, in the municipal sector the Institution of Municipal Engineers of Southern Africa (IMESA), and, in the water sector, the Water Institute of Southern Africa (WISA).

¹⁰ Note also that the Strategic Framework for Water Services lays down that:

"It is essential for water services authorities to protect their assets by ensuring that an appropriate maintenance and rehabilitation plan is developed and implemented. This plan must be based on the principle of preventative maintenance in order to ensure that, as far as this is practical, damage to assets is prevented before it occurs. The water services authority must ensure that the maintenance and rehabilitation plan is part of the water services development plan and that this plan is implemented. Assets must be rehabilitated and / or replaced before the end of their economic life and the necessary capital funds must be allocated for this purpose." (DWA et al 2003, page 28)

The National Water Services IAM Strategy is not an isolated initiative. It will need to synergise with, and will in turn to varying degrees be supported by, many current initiatives (see Figure 2 above which depicts the Strategy in context with other sector strategies and plans).

At local level, water services IAM must take cognisance of municipal implementation strategies and plans, and indeed must be implemented as part of the municipal infrastructure master plan and its IAM plan for all infrastructures. Municipal and water board plans and priorities, and budget and capacity limitations, determine the extent to which water services IAM needs will be met in the context of a WSI having a range of demands and priorities.

Certainly, it is one of the objectives of this Strategy to raise the profile and the priority of IAM, and especially of water services IAM, in the municipal and water board environment.

ANNEXURE B: WSI SELECTION CRITERIA AND INFORMATION BASE

An essential element of the National Water Services IAM Implementation Plan will be identification of the criteria for selection of which WSIs need support, and what kind of support each needs; and identification of the information base that will be needed if selection by applying these criteria is to be feasible and practical.

- Criteria for selection

Selection and prioritisation are paramount, given the widespread need for DWA and its partners to empower and guide WSIs in practising sound IAM, the finite resources available to do this, and the fact that needs vary widely from WSI to WSI and within each WSI.

DWA already has a process for selection of WSIs requiring support. The process is described in the discussion document entitled “Water services provider support implementation plan” (DWA February 2008). This process will be used to identify WSIs requiring support in respect of IAM.¹¹

What does, however, need to be done is to ensure that IAM matters receive adequate weighting in determining which institutions are selected for support. The 16 sources on which the analyses of the provider support implementation are based (DWA 2008, page 10) reflect a number that directly measure results of IAM – in particular “status of wastewater treatment works” and “water quality management system information (eWQMS)”.¹² Whereas it is not known what weightings are assigned to each of the 16, this is a matter that can be resolved in negotiation within the Water Services Directorate of DWA.

- Information base

Selection of which WSIs to support, and identification of the kind of support that each needs, is dependent on an information database that –

- Can be accessed when needed and in the means needed (e.g. electronic linkages).
- Can be accessed at an acceptable cost.
- Is sufficiently credible for the purpose, and is accepted by all significant role players.
- Is sufficiently reliable and up-to-date.
- Is comprehensive, with sufficiently wide coverage (that is, area coverage as well as an acceptable number of parameters).

¹¹ The process has advanced to the point where it is linking “with relevant entities and align[ing] its work with the work which has already commenced under its partner programmes (e.g. WSSCU [Water Sector Support Coordination Unit, established in May 2007], local government support, MSP and others). This is mainly in the interest of avoiding duplication and to facilitate fast-tracking of operational support to the prioritised WSPs, starting with a limited number of pilot municipal WSPs.” Furthermore, “desktop assessments of the 40 WSSCU priority municipalities will be completed by end of March 2008 and will be used as a point of departure to identify which aspects / areas within the WSP [will] be supported.” (DWA 2008, page 10).

¹² It also reflects performance in respect of a number of financial and governance issues. For example “MIG (DoRA) expenditure (CoGTA MIS)” which could serve as a simple proxy for financial and governance issues that underlie poor IAM performance (such as unsustainability and / or unviability of the WSI).

DWA currently hosts a number of databases (e.g. eWQMS, information on wastewater treatment works, compliance reports, quarterly reports by DWAF regional offices and WSDPs). These vary in accessibility, cost, credibility, comprehensiveness, etc. Collectively, they are more than sufficient for their use, together with the criteria for selection identified in this National Water Services IAM Strategy, for DWA to commence with identification of WSIs most needing support in respect of IAM and, simultaneously, identification of the kind of support needed by each institution.

ANNEXURE C: SUMMARISED FINDINGS OF PHASES 1 AND 2 OF THE NATIONAL WATER SERVICES IAM STRATEGY FORMULATION

This Annexure describes the foundation of the National Water Services Infrastructure Asset Management (IAM) Strategy, namely the rigorous process of fact-finding and solution-identifying that DWAF adopted in respect of the investigation that it carried out between 2005 and 2007 into the state of South Africa's water services infrastructure and the state of its management.

This investigation took place in three phases, Phases 1, 2A and 2B. Each of these is summarised below.

Methodology

The pillars of the strategy formulation methodology can be identified as:

- Extensive knowledge of the South African water services sector, and of the key elements to ensuring sustainable water services.
- Appreciation that the Strategy needs to adopt a systems approach.
- (Deriving from both of the above) the statement of the principles shaping the Strategy.

Phase 1

Phase 1 was a desktop strategic study, a “scan”, of water services IAM in South Africa. Essentially, this was a summary investigation and report on the state of infrastructure in WSIs, and the state of its management – whether they had or did not have IAM planning.

This Phase was the foundation upon which the work of Phase 2 was built.

Phase 2A

Phase 2A (“proceeding from fact-finding to solution-identifying”) commenced with a process of identifying the key factors that drive the existing state of water services infrastructure and the state of its management, learning this from the Phase 1 work and from meetings with sector experts. This phase involved not just problem identification, but also analysis and classification of problems. It led to identification of elements needed for an enabling environment to ensure improved IAM. It also started to broadly identify which institution should be responsible for leading each element of the improvement process.

More than 400 generic challenges were identified. They were then rigorously analysed and classified into “challenge areas”. This analytical approach facilitated better understanding of individual challenges, as well as of the bigger picture in terms of priority needs.

For the record, the challenge areas are:

- Planning problems
- Technical / design problems
- Construction / installation problems
- Infrastructure operation problems
- Repair / maintenance / refurbishment problems

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- Inadequate skills for IAM
 - Statistical / management problems
 - Financial problems
 - Social / cultural problems
 - Economic / poverty problems
 - Natural environment problems
 - Political / tactical problems
 - Legislative / guidance/incentive

Within these areas, the following priority issues were identified:

- Life-cycle management (service delivery does not end with infrastructure projects)
- Knowing the infrastructure (including asset register)
- Implementing IAM processes and procedures
- Clear responsibility and accountability for IAM
- Hands-on approach (and also that one size does not fit all)
- Water services IAM is a part of total asset management
- Funding requirements and processes for IAM
- IAM staffing requirements (number and skills)

Solution types:

The Phase 2A analysis then proceeded from challenges to the identification of a solution for each of the 400-plus generic challenges. Evaluation and finding commonality of solutions enabled classification of solutions into one or other of 9 “solution types”, namely:

- Awareness
- Finance
- Guidelines
- Human resources (i.e. including skills and appointments)
- Legal and procurement
- Monitoring and evaluation
- Management and leadership
- Operation and maintenance
- Technical

The following table shows the count of solutions per solution type:

| Solution type | Count | % of total |
|---------------------------|--------------|-------------------|
| Awareness | 27 | 7% |
| Finance | 57 | 14% |
| Guidelines | 26 | 6% |
| Human resources | 119 | 29% |
| Legal and procurement | 34 | 8% |
| Monitoring and evaluation | 12 | 3% |
| Management and leadership | 61 | 15% |
| Operation and maintenance | 31 | 8% |
| Technical | 38 | 9% |
| TOTAL | 405 | 100% |

This indicated that much needs to be done on the human resources, skills development and capacity building aspects. While the focus of capacity building is on WSI capacity building, capacitation must also include DWA and other national and provincial role players that have to manage the process and regulate effective service delivery.

Management and leadership is another important area. Specific actions need to be taken by DWA, as sector leader, and by water sector managers and their political leaders in general. To make a strategic intervention of this kind, it is essential that politicians and senior managers fully understand, appreciate and support IAM.

Financial solutions came up third in the order of frequency. This implies that finance, also, is a very important intervention area and a key success factor for sustainable IAM. The solutions include, amongst others, improved budgeting and allocations for IAM, financial incentives for effective IAM performance, cost recovery, and various other planning, regulation and administration issues.

Given the way in which the solution types were defined, and that O&M problems the direct result of skills or leadership problems were counted under “human resources” or “leadership” and not under “operation and maintenance”, that “operation and maintenance” as a class of solutions ranked only fifth in frequency is not surprising. Other key “operations and maintenance” solutions can be found under finance, management and technical.

Responsibility leaders:

The way in which the analysis was done also enabled identification of the parties –

- with responsibility to lead the way forward for each solution, and
- that should be involved, or merely informed.

It emerged that WSAs have the leadership responsibility most frequently. WSAs are at the forefront of service provisioning and hence have to take a leading role in the operation and maintenance actions. There is much that many of them can do without outside assistance to improve their skills and institutional capacity and their financial capability.

DWA has the next largest number of leadership responsibilities. DWA's leading roles relate primarily to:

- high level leadership and management
- capacity building and support to institutions (including technical support, training, monitoring and evaluation)
- the development of IAM systems, guidelines and other tools specific to the water services sector
- specific aspects of awareness, finance (e.g. tariffs and cost recovery) and operations

CoGTA has the next largest number of leadership responsibilities, followed by National Treasury. CoGTA has a leading role to play in the various capacity building aspects and the management and oversight of municipal administration. Many of these actions relate to municipality / WSA responsibilities, but CoGTA is also key to ensuring integration of the water services infrastructure outputs with all other assets managed by institutions. Hence their leading involvement in the management and leadership, and legal and procurement, solution areas.

Phase 2B

Phase 2B comprised the identification of priority strategic actions. Identification of these actions took cognizance of DWAF's mandated responsibility and what DWAF needs to do within its own sphere and also in conjunction with others, particularly with other national government departments. The priority actions identified elements needed for an enabling environment to ensure that infrastructure assets are properly managed, and they took into account the need to synergise with asset management initiatives external to DWAF. They expressed what needs to be done, irrespective of whether some of the elements of an action are or are not already under way. They also identified the "who and what" (but not the "when") to be considered by DWAF in respect of each recommendation.

The immediate basis for the recommended "priority actions" named in the Phase 2B report was the 150 "priority 1" solutions. These have been packaged into the form of multi-faceted Strategy outputs.

It can thus be seen that the strength of the list of priority actions recommended in the Phase 2B report lies in the rigorous process that was followed in Phases 1 and 2A.

The Strategy outputs include recommendations with respect to: awareness raising; funding; legislative review; performance management review; improved incentives to councillors and officials to responsibly manage the infrastructure in their care; improved IAM guidelines, and a skills plan, among other recommended measures.

The Phase 2B report acknowledged "that water services authorities, being municipalities or combinations thereof, have a range of responsibilities other than water services responsibilities".

And it is on this rigorous process of fact-finding and analysis, in turn, that the National Water Services IAM Strategy is built.

It is recognised that many of the actions are not DWA's responsibility, but are the responsibility of other government departments. However they were in Phase 1 and Phase 2 recognised to have significant effect on water services IAM, and therefore DWA must lobby, and persuade other departments to do what DWA considers is in the interests of water services IAM.

