

TOOLKIT EDITION 1 2018

CITIES' INFRASTRUCTURE
DELIVERY AND
MANAGEMENT SYSTEM

CIDMS



MODULE 2

System for the
management of assets



national treasury

Department:
National Treasury
REPUBLIC OF SOUTH AFRICA

cltiEs SUPPORT
PROGRAMME



IUFD

INTEGRATED URBAN DEVELOPMENT FRAMEWORK



MODULE PURPOSE

An asset management system comprises the people, policies, processes, plans and information to deliver value from assets. This module:

1. Describes the scope, content and requirements of a city asset management system;
2. Provides the means for identifying internal and external stakeholders who establish requirements for the asset management system;
3. Defines an asset management policy, states its purpose as providing the principles according to which asset management objectives are established, and that the asset management system and assets must respond to, states requirements for an asset management policy, provides guidance for developing such a policy, and attends to matters relating to policy approval; and
4. Describes requirements for and the elements of asset management strategy. The asset management strategy contains asset management objectives for both the asset management system and assets, as well as strategies for delivering on these objectives. The asset management strategy is presented in the city's strategic asset management plan.

WHY

1. An asset management system ensures that city investments, assets and actions deliver value from assets, contribute towards achievement of a city's strategic objectives and lead to stakeholder satisfaction.
2. A well-designed asset management system enables cross-functional integration and collaboration, generates new insights and innovations, and generally stimulates improvements in key organisational processes and outputs.
3. It supports the creation of an asset management value centric organisation with a strong learning culture.
4. Organisational decision-making is improved and decision-making is risk-based.
5. City decisions and implementation actions increasingly contribute towards sustainability and future resiliency.

OUTPUTS OF MODULE 2:

1. Identification of both external and internal stakeholders and their requirements for the asset management system.
2. Establishment of a city asset management policy that articulates the intentions of city leadership and provides direction for the establishment of asset management objectives, as well as stipulating requirements for asset accounting treatment.
3. A strategic asset management plan that establishes asset management objectives for the asset management system and for assets, states the strategies and programmes for service delivery, infrastructure investment, the asset management system and for managing organisational change, and that coordinates and optimises between immovable asset-based portfolios and services, and other organisational functions and priorities.

KEY RELEVANT NATIONAL REGULATIONS, POLICIES AND STRATEGIES:

1. SABS: South African National Standard 55000: Asset management – Overview, principles and terminology
2. SABS: South African National Standard 55001: Asset management – Management systems – Requirements
3. SABS: South African National Standard 55002: Asset management – Guidelines for the application of ISO 55001
4. Standard for Infrastructure Procurement and Delivery Management

CONTENTS

Module 2 System for the management of assets



2.1	PURPOSE OF THIS MODULE	2.1
2.1.1	What is asset management?	2.1
2.1.2	What is an AM system?	2.3
2.1.3	Asset management scope of practice	2.11
2.1.4	Why implement an asset management system in cities	2.14
2.1.5	Objectives of this module	2.14
2.2	DEFINING THE SCOPE OF THE AM SYSTEM	2.15
2.2.1	Elements and dimensions of the scope of the AM system	2.15
2.2.2	Asset portfolios managed or controlled	2.15
2.2.3	Functions, policies and processes	2.19
2.2.4	Stakeholder requirements	2.23
2.2.5	Plans within the AM system	2.31
2.3	AM POLICY	2.33
2.3.1	What is an AM policy?	2.33
2.3.2	Requirements for an AM policy	2.33
2.3.3	What goes into an AM policy?	2.34
2.3.4	Concluding remarks on the AM policy	2.38
2.4	AM STRATEGY	2.39
2.4.1	AM objectives	2.39
2.4.2	AM strategies	2.39
2.4.3	AM system strategy	2.40
2.4.4	Service delivery strategies	2.43
2.4.5	SAMP planning horizon and template	2.54
2.4.6	Preparation, approval and updating of the SAMP	2.57
2.5	CONCLUSION	2.57

LIST OF

Figures that appear in this toolkit

FIGURE 2.1:	Asset lifecycle management	22
FIGURE 2.2:	The South African city asset management system	2.4
FIGURE 2.3:	Levels of asset optimisation	2.5
FIGURE 2.4:	AM objectives and stakeholder requirements	2.8
FIGURE 2.5:	Some of the key disciplines involved in asset management in a city	2.11
FIGURE 2.6:	39 Subjects comprising the asset management landscape	2.12
FIGURE 2.7:	Process for developing the AM system	2.14
FIGURE 2.8:	Identifying key processes and activities within the supply chain (potable water service)	2.24
FIGURE 2.9:	Stakeholder analysis using the asset lifecycle	2.27
FIGURE 2.10:	City external stakeholder classification system	2.29
FIGURE 2.11:	Plans within the AM system	2.31
FIGURE 2.12:	Structure and components of an AM policy	2.38
FIGURE 2.13:	Key components of city AM strategy	2.39
FIGURE 2.14:	Graphical illustration of asset system (potable water supply, Buffalo City)	2.45
FIGURE 2.15:	Graphical illustration of a solid waste system (Buffalo City)	2.46
FIGURE 2.16:	Service provision objectives matched to the city spatial structure (potable water supply)	2.47
FIGURE 2.17(A):	Customer LOS strategy (all customer categories – potable water)	2.52
FIGURE 2.17(B):	Costing LOS strategy (all customer categories – potable water)	2.52
FIGURE 2.A.1	Illustrative condition distribution for various asset portfolio health grades	2.59

LIST OF

Tables that appear in this toolkit



TABLE 2.1:	Risk types	2.6
TABLE 2.2(A):	Criticality of the service	2.16
TABLE 2.2(B):	Asset intensity	2.17
TABLE 2.2(C):	Revenue capacity of service	2.17
TABLE 2.2(D):	Risk to service delivery if assets fail	2.18
TABLE 2.3:	Scope and importance of assets to be managed: identification and ranking table	2.18
TABLE 2.4:	Identification of AM functions within the “Strategy and Planning” domain	2.19
TABLE 2.5:	Policies and processes relating to AM functions (selected/limited linkages for illustrative purposes)	2.21
TABLE 2.6(A):	Identifying stakeholders within the supply chain (Internal stakeholders: potable water service)	2.25
TABLE 2.6(B):	Identifying stakeholders within the supply chain (External stakeholders: potable water service)	2.26
TABLE 2.7:	Suitability of stakeholder analysis methods	2.27
TABLE 2.8:	Key issues imbedded in the policy principles offered	2.36
TABLE 2.9:	Conventions and systems for inclusion in the AM system strategy that are detailed in this CIDMS Toolkit	2.41
TABLE 2.10:	Establishing time-bound customer level of service targets for customers that are currently underserved and for future customers (limited to informal residential customers)	2.51
TABLE 2.11:	SAMP template	2.54
TABLE 2.A.1:	General interpretation of asset consumption ratio	2.58
TABLE 2.B.1:	Process performance requirements: Asset data	2.65
TABLE 2.A.2:	AM objectives relating to asset data confidence	2.67

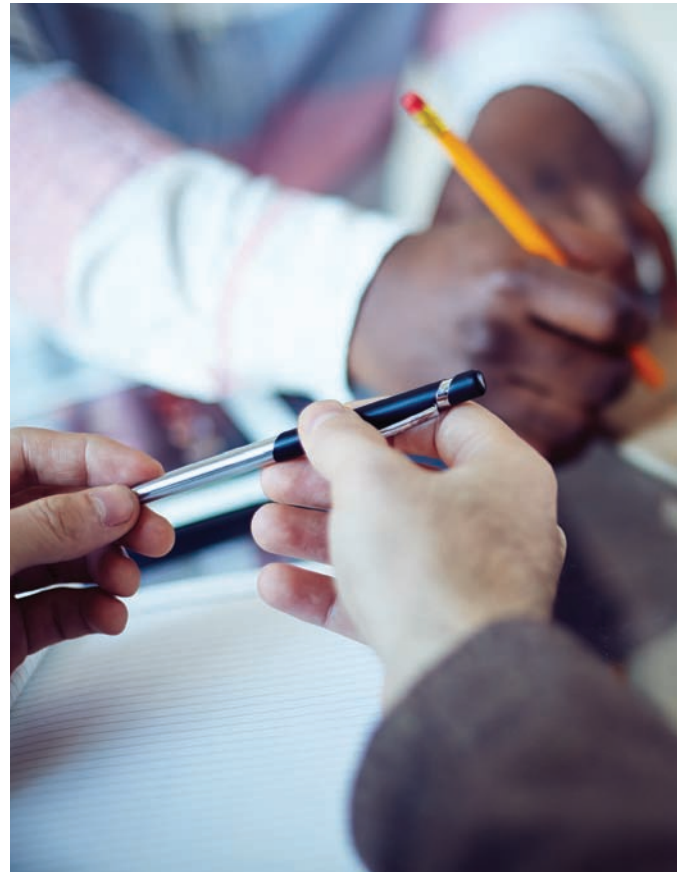
2.1 PURPOSE OF THIS MODULE

2.1.1 What is asset management?

SANS 55000 (Asset Management – Overview, principles and terminology) defines asset management as “the coordinated activity of an organisation to realise value from assets”. The overarching goal of asset management (AM) is to manage assets in such a way that city strategic and customer service requirements are met in the most cost-effective manner for the benefit of present and future customers.

Key elements of infrastructure asset management in the South African urban space include:

- Providing defined levels and standards of service.
- Managing the impacts of changes in demand as well as changes in supply relating to climate change through spatial optimisation, demand management, infrastructure investment and other strategies.
- Adopting a full lifecycle approach to the management of infrastructure which includes cost-effective, long term strategies that meets defined service requirements.
- Optimising asset portfolios in relation to the desired spatial structure of the city.
- Identifying, assessing and managing risk in accordance with the risk appetite of the city.
- Pursuing optimised decision-making by
 1. Balancing opportunities, performance, costs and risks,
 2. Designing sustainable, net-benefit solutions that support the strategic objectives of the city and
 3. By supporting long term city strategy through analysis of policy options, scenarios and other impacts.
- Developing long-term financial plans indicating lifecycle expenditure needs, probable revenue to be generated from asset portfolios and how lifecycle needs are to be funded.



The nature of asset portfolios (e.g. roads network, potable water system and real estate portfolio) in the city space tends to be characterised by longevity, with the lives of assets typically measured in decades.



Accordingly, AM is not only concerned with current customers and infrastructure, but also with sustainability and intergenerational equity.



AM therefore adopts a sustainable approach comprising lifecycle management over multiple human generations.



FIGURE 2.1: Asset lifecycle management



2.1.2 What is an AM system?

Asset portfolios are managed to deliver on the strategic objectives of the city, they are not an end in themselves. The SANS 55000 series of AM standards specify a management system for the establishment of AM policies and objectives, processes to achieve AM objectives, and control instruments. The following SANS AM standards have been published, which exactly mirror their ISO counterparts:

- SANS 55000 Asset Management – Overview, principles and terminology
- SANS 55001 Asset Management – Management systems – Requirements
- SANS 55002 Asset Management – Management systems – Guidelines on the application of SANS 55001

The scope of such an AM system comprises people, policies, processes, plans and information. To avoid confusion, the AM system is the framework of all elements involving AM decision-making and execution of those decisions. Software systems used in the AM environment are referred to as asset management information systems, and form one element of the AM system. The following figure illustrates the AM system for a South African city.



01 STAKEHOLDERS

ISO/SANS 55 000 defines a stakeholder as an individual or organisation that can affect or be affected by a decision or activity of the city. Note that the stakeholder does not actually need to be affected, but must only perceive to be affected, to be regarded as a stakeholder. Stakeholders are of critical importance to the AM system. They establish both needs and expectations (such as service delivery requirements) as well as constraints (whether regulatory constraints, customer

affordability constraints or other constraints). As shown in **Figure 2.2**, stakeholders include both external parties such as other spheres of government, the community and investors, as well as internal stakeholders, such as Council and employees. Given the importance of stakeholders, and the need for the asset management system to respond to stakeholder requirements, this module presents several techniques for identifying and analysing stakeholder requirements.



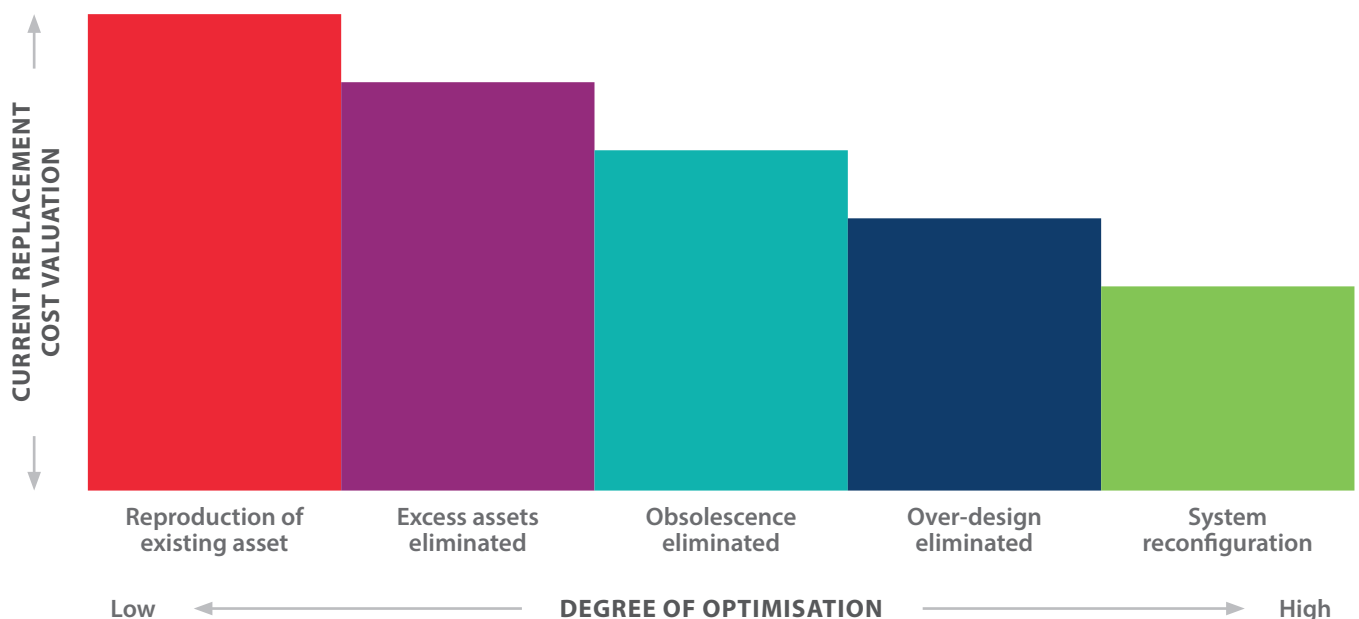
FIGURE 2.2: The South African city asset management system

02 STRATEGY AND PLANS

As noted in **Section 2.1.1**, the asset management system and asset portfolios must support the city strategy. Asset managers interpret city strategic objectives and undertake demand analysis to identify stakeholder requirements and then develop AM policy, objectives, strategy and plans to achieve city strategic objectives and to address stakeholder expectations. **Section 2.2.4** provides guidance on determining stakeholder requirements, **Module 4** deals with customer profiling and levels of service, and **Module 5** with future demand. **Sections 2.3 and 2.4** deal with the development of AM policy, objectives and strategy. The preparation of asset management plans are dealt with in **Module 7**.

The AM plans cover the whole lifecycle (see **Figure 2.1**) of each asset portfolio. These plans also feature asset lifecycle strategies aimed at asset lifecycle optimisation, and more advanced plans pursue asset portfolio optimisation. **Module 6** provides guidance on asset lifecycle planning, and the figure below shows a continuum of asset optimisation. Starting on the left, a city may simply opt to renew or replace an existing asset, with no regard to matters such as changing demand, cost or operating efficiency. No optimisation is achieved. Moving to the right, asset portfolios are rightsized in relation to service demands and acceptable levels of risk, cost and affordability.

FIGURE 2.3: Levels of asset optimisation



03 LIFECYCLE DELIVERY, OPTIMISATION AND FINANCIAL MANAGEMENT

To be effective, AM plans must be implemented through activities, projects and programmes across the lifecycle. **Modules 9 to 11** describes the Infrastructure Procurement and Delivery Management System (IPDM) for cities. It is through this system that the lifecycle activities, projects and programmes specified in the AM plans are actioned, services are delivered, assets optimised and AM objectives related to asset portfolios achieved.

04 AM CAPABILITY DEVELOPMENT

AM strategy and planning, and the delivery of those plans, together with other AM activities, require coordinated capability. The nature of capability required will depend on the AM objectives decided upon, and the service delivery model(s) agreed to deliver on AM objectives. Various service delivery models are available, ranging from full inhouse capacity through to outsourcing – these are discussed in **Section 12.2.5**. Regardless of the service delivery model(s) chosen, across lifecycle activities and asset portfolios the city will require AM capacity in the form of a dedicated AM unit and formal organisational roles, functions and processes. There are also likely to be suppliers of goods and services, and as these suppliers form part of the supply chain that ultimately delivers services to the city’s customers, they are considered part of the city’s AM capability. **Module 12** provides guidance on AM capability development, inclusive of organisational arrangements, competency development and service delivery models.






05 RISK AND PERFORMANCE MANAGEMENT

Asset management follows a risk-based approach to realise value from assets, by managing risk and opportunity to achieve the desired balance between cost, risk and performance. As such the consideration of risk, in relation to performance and cost, carries through in all asset management decisions and activities. Risk comes in many forms, some examples of which are shown below:

TABLE 2.1: Risk Types

RISK TYPE	RISK SOURCE/TYPE
 <p>External risks</p>	<ul style="list-style-type: none"> Community resistance to services offered, the cost thereof, or nature or location of assets Developers/construction companies damaging municipal infrastructure supply lines Informal settlers locating in demarcated flood lines Informal settlers locating in demarcated servitudes Legislative/regulatory requirements External strike action affecting municipal supply chain
 <p>Malicious/unlawful intent</p>	<ul style="list-style-type: none"> Anti-social behaviour or criminal activity in public spaces Cyber attack End-user abuse e.g. vehicle overloading causing damage to road surfaces Operators resisting technology/new assets, intent on damaging/breaking it Protest action resulting in damage/destruction of municipal property Sabotage Terrorism Theft/burglary Vandalism
 <p>Management risks</p>	<ul style="list-style-type: none"> Financial risks Information risks People risks System/control risks
 <p>Natural phenomena and disasters</p>	<ul style="list-style-type: none"> Contagious diseases Drought Earthquakes/unstable soils/seismic activity Electrolytic activity Floods Lighting Rising water table Veld fires
 <p>Operating risks</p>	<ul style="list-style-type: none"> Communication failure Control failure Procedural failure

RISK TYPE	RISK SOURCE/TYPE
 <p>Physical asset risks</p>	Design error Substandard construction Gradual deterioration/ageing Insufficient or inappropriate maintenance Operator error/unintended misuse
 <p>Planning risks</p>	Communication and consensus risks Climate change Demand uncertainty Information risks
 <p>Supply chain/delivery risks</p>	Insufficient number of CIDB-registered contractors in all categories required Procurement risks Project management risks Contract risks Supplier performance failures

The above table shows that there are both asset and non-asset risks related to the delivery of services. Asset management concerns itself with both the risks and performance of (1) asset portfolios and (2) the AM system itself.

A robust asset management system follows a structured approach to the identification, assessment and management of both asset and non-asset risks. As a general approach, asset-related risks are identified and assessed using the failure mode, effects and criticality analysis (FMECA) method, described in Section 3.3.5. Assets are also rated in terms of criticality and managed accordingly; this is also dealt with in Section 3.3.5.



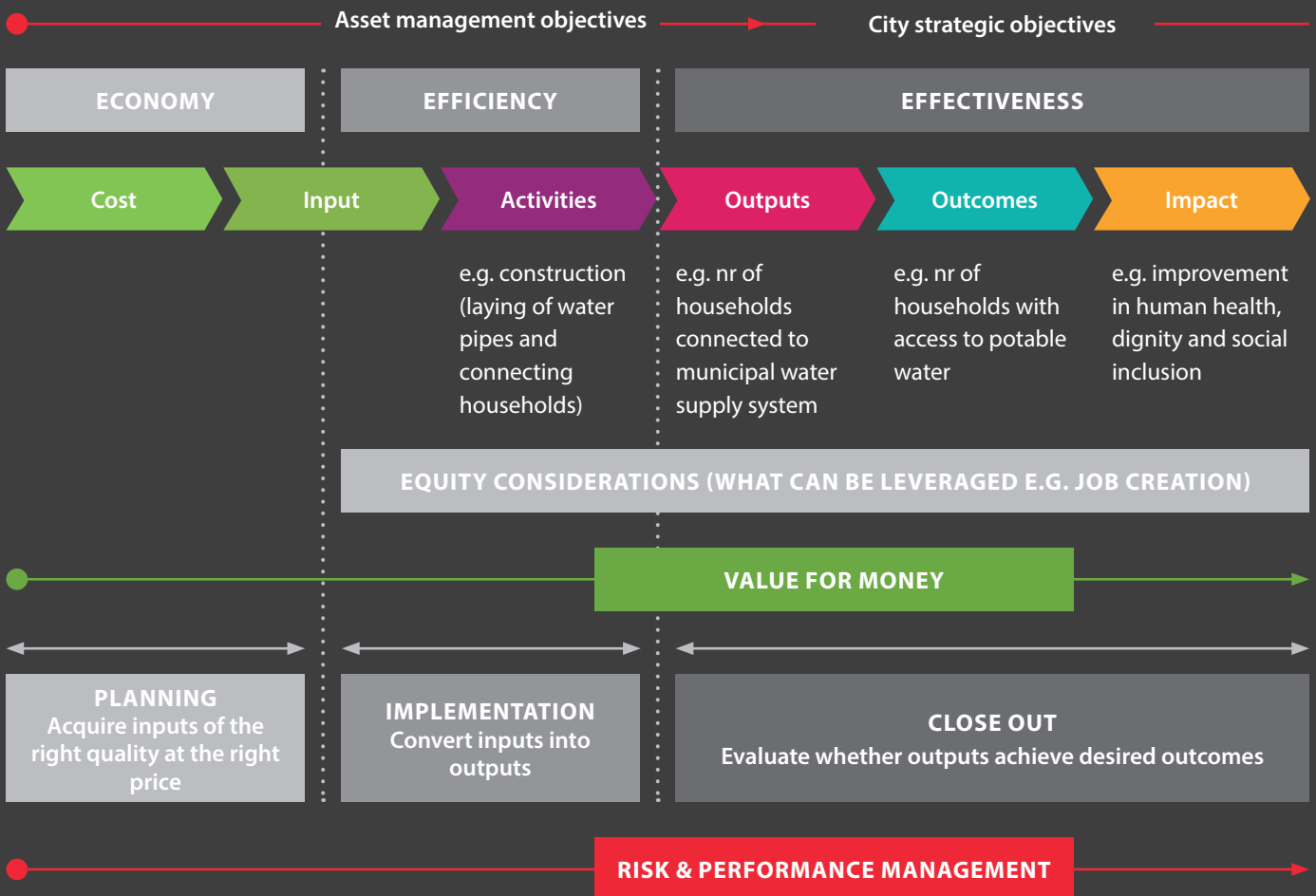


ISO 31000:2009 Risk Management provides the principles, framework and process for managing risk. ISO 31010:2009 describes risk assessment concepts, processes and deals with the selection of risk assessment techniques.

Performance monitoring and improvement ensures that the city achieves objectives established for the AM system and for assets. It requires that outputs and outcomes are specified and monitored (see Figure 2.4). Performance monitoring is not a static reporting function. The AM system demands two more functions of performance monitoring and improvement. The first of these is feedback from performance monitoring, focused on continuous improvement in AM practice within the current framework of AM policy, plans and procedures. The second is strategic review, which may indicate that to improve performance, changes are required to the AM policy, procedure, strategy or AM plans.



FIGURE 2.4: AM objectives and stakeholder requirements



The AM system should be periodically audited, for the following reasons:

- An audited opinion stating that a city has a well performing AM system provides assurance to the investor and regulatory communities that funding applications have been well thought through, that investments will deliver net benefits, and that a city is able to both deliver value from assets and to care for those assets. A favourable audit opinion, and the assurance it provides, reduces risks to investors that may result in higher uptake rates in municipal bonds issued, or more favourable lending conditions for cities.
- Communities and other stakeholders have an interest in knowing that city assets are well managed. City assets represent community wealth, effectively held in trust by the metropolitan municipality on behalf of the community as a whole. Communities, who pay rates and tariffs, invest in community assets and expect those assets to benefit them. An audited opinion on the performance of the asset management system supports the principles of good governance and transparency, and provides the community and other stakeholders with the assurance that management systems appropriate to the scope, scale and complexity of assets are in place, and performing well.
- An independent audit provides an objective assessment of the appropriateness and performance of the asset management system, and confirms that the AM practices (system) improvement plan of the city pursues levels of practice appropriate to the scope and complexity of assets, and the demands of regulation and customers. It provides management with the opportunity to reflect on past, current and future performance, and to identify scope for further improvements.

06 ASSET INFORMATION

The asset portfolio of even a small city is worth billions of Rands whilst in a larger metro the replacement value of asset portfolios can measure well over a hundred billion Rand. Most cities spend several billion annually to augment, renew, operate and maintain these portfolios. Since infrastructure assets typically have lifespans measured in decades, and in several instances, in generations, decisions made tend to lock in expenditure levels and patterns for a very long time. And because infrastructure assets have such long lives, deterioration patterns are not always evident until such time that a renewals bow wave hits a city. Moreover, decisions on infrastructure directly affect the

quality of life of citizens and the economic performance of the city. Informed decisions based on sound information is therefore highly desired. Furthermore, there are also legal requirements on the structure, quality, availability and reporting of asset information. GRAP, for example, demands that a municipality prepares and annually maintains and updates its asset register. This asset register is the subject of annual scrutiny by the Auditor General, and performance in this regard is a major cause of many municipalities receiving undesired audit outcomes.

07 DECISION-MAKING, THE "UNSEEN" ELEMENT

A decision is a choice made between two or more alternatives, and decision-making is the process followed in selecting the best alternative to meet an AM objective. Many asset management decisions are made at multiple levels in a city on an ongoing basis. These decisions can be categorised by the nature or type of decisions made, and by the scope of decision-making i.e. the things or issues about which decisions are made. Many types of asset management decisions are made, some of which include:

- **Complex decisions:** such as decisions on system reconfiguration and capital budget optimisation. Decisions of this type normally require the availability of large quantities of data and information, and tend to involve the efforts of several people to analyse information, develop and assess alternatives, to present the business case, and to make the decision.
- **"Yes/No" decisions:** In these instances there are only two options, you either proceed with a course of action, or you don't.
- **Original decisions:** This type of situation requires the development of original alternatives by the city – they are non-standard decisions. An example of an original decision is the decision to implement a waste-to-energy plant, assuming that the city has not done this before. Design options must be generated and evaluated, and careful thought is required on appropriate management and operational arrangements, probable expenditure and likely revenue, and other relevant matters, such as appointing or training capable operators for the plant.
- **Programmed or routine decisions:** These are repetitive decisions governed by policy and standard operating procedures, examples of which are decisions on appointing new staff, the ordering of stock, and appointment of suppliers.



“ Governance is a key requirement and feature of modern, successful societies.”



Asset information can, however, be costly to develop and maintain. Clear thought is required to determine what information is necessary on a continuous basis, e.g. to measure performance of the AM system or asset portfolios, or to determine asset life trends and expected useful lives, and which datasets are necessary only when the need arises or are required at periodic intervals. Thought also needs to be given to the depth (detail) and accuracy required for data and information.

Good AM practice dictates the adoption of an asset information strategy and formal, documented asset information standards.



Many standard decision rules apply in an asset management environment, some examples of which are:

- To depreciate an asset over x number of years.
- To replace a pipe of a certain diameter size and material after x number of bursts.
- To rewire a motor of a certain size for x number of times, until the power loss factor becomes unacceptable.
- To assign a particular condition rating to the wall of a concrete reservoir given evidence of crack widths within specified ranges.

In asset management, all decisions must contribute towards the achievement of AM objectives. The AM policy, described in **Section 2.3**, describes the dimensions or outcome areas that AM must contribute towards, e.g. social upliftment, economic competitiveness and environmental sustainability. The AM strategy interprets these outcomes and defines specific AM objectives, taking into account stakeholder requirements.

Governance is a key requirement and feature of modern, successful societies. Since public money is involved, cities should adopt robust decision making criteria or rules of decision-making. This supports sound decision making, and provides transparency as to how decisions are made. **The ISO/SANS 5500x series of AM standards requires an organisation to develop and implement decision-making criteria for the following (scope of AM decisions):**

- Capital investment decision-making
- O&M decision-making
- Lifecycle value realisation
- Resourcing strategy
- Shutdown & outage strategy

Module 8 provides financial appraisal techniques to assess the financial merits of decisions. It also presents a multi-criteria analysis (MCA) system for capital investment decision-making. Take some time to become familiar with the MCA, and then return to this section.

This MCA system serves as an exemplar of the approach to asset management. It interprets stakeholder and organisational objectives, which are formulated as key outcome areas (e.g. environment sustainability, spatial efficiency, and financial health and sustainability). Within each of these impact areas specific outputs are identified, that can be positive or negative. So, within the outcome area of, say, spatial efficiency, an output measurement can be “compact city”, and a capital investment proposal can be measured as to whether it contributes or acts against city compactness, which can be measured in terms of (a) average gross residential density/ha, (b) redevelopment of greyfields and (c) land use intensification. Each outcome or impact area is ascribed a value, as is every specific impact in the MCA system – these comprise the decision rules for the MCA system.

2.1.3 Asset management scope of practice

Cities are asset-intensive entities, with large and varied asset portfolios. Their asset worth is measured in billions, and these assets provide the essential services such as water, energy and transport without which cities can simply not function. Asset management is not the exclusive domain of any particular profession. Instead, asset management as a discipline draws on techniques from many fields, and as a set of processes within the system defined in this module it serves an integrating function within the city. Many departments and functions in a city are involved in the management of assets, or otherwise have an interest in assets and the management thereof.

Engineers design, operate, maintain and manage civil and electrical engineering asset portfolios, these being the key asset portfolios in cities. The way in which assets are funded, their lifecycle needs and revenue potential directly determine the financial viability of metropolitan municipalities, and hence asset management is also of great interest to finance

practitioners. They are extensively involved in many asset management activities, including funding strategies, budget compilation, investment appraisal and tariff setting, to mention a few. Furthermore, the finance departments of cities have to report on asset values and consumption in the statement of financial position.

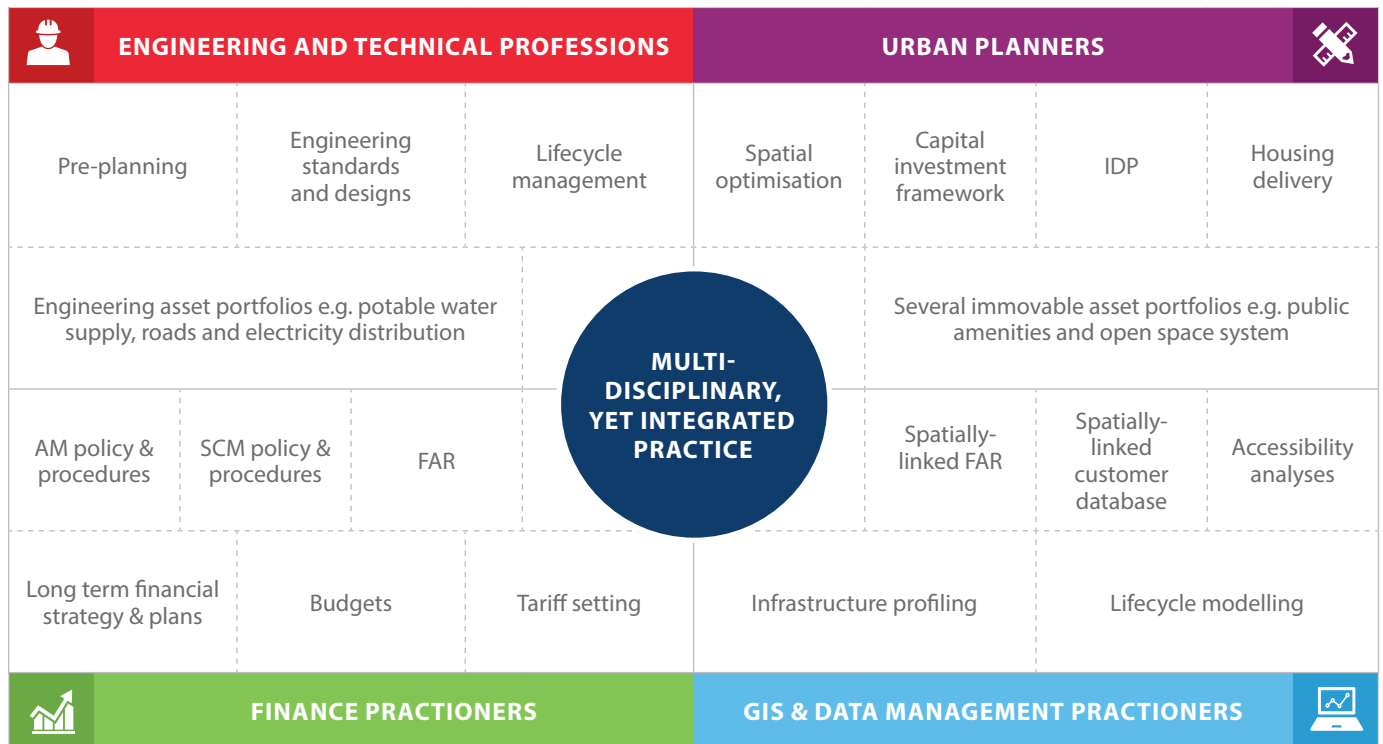


FIGURE 2.5: Some of the key disciplines involved in asset management in a city

Urban planners are responsible for establishing the spatial vision of cities and to spatially optimise cities. Infrastructure investment is one of the key tools that urban planners have at their disposal to restructure and optimise cities and, recognising this, SPLUMA places the responsibility for the city’s capital investment framework on the urban planning function as part of the process of preparing the city’s spatial development framework. Urban planning decisions such as changes in land use, relaxation of the urban development boundary or instituting controls geared towards compaction directly impact

on the nature and extent of infrastructure, and should also be informed by available infrastructure capacities, costs and risks. Urban planners generally also prepare city IDPs and facilitate consultations with communities regarding their needs and requirements, including for infrastructure provision. In several cities urban planning functions also have responsibility for housing delivery and the management of community, sport and recreation services, inclusive of the asset portfolios required to deliver those services. Urban planners therefore clearly also have a role in asset management.



The Global Forum on Maintenance and Asset Management defined the “Asset Management Landscape”, comprised of 39 subjects across six subject groups (see Figure 2.6 below). This landscape aptly demonstrates that asset management touches on most functions in a metropolitan municipality.


 STRATEGY AND PLANNING	 ASSET MANAGEMENT DECISION-MAKING
Asset management policy	Capital investment decision-making
Asset management strategy & objectives	O&M decision-making
Demand analysis	Lifecycle value realisation
Strategic planning	Resourcing strategy
Asset management planning	Shutdown & outage strategy
 ORGANISATION AND PEOPLE	 ASSET INFORMATION
Procurement & supply chain management	Asset information strategy
Asset management leadership	Asset information standards
Organisation structure	Asset information systems
Organisation culture	Data & information management
Competence management	
 LIFECYCLE DELIVERY	 RISK & REVIEW
Technical standards & legislation	Risk assessment and management
Asset creation & acquisition	Contingency planning & resilience analysis
Systems engineering	Sustainable development
Configuration management	Management of change
Maintenance delivery	Asset performance & health monitoring
Reliability engineering	Asset management system monitoring
Asset operations	Management review, audit and assurance
Resource management	Asset costing and valuation
Shutdown & outage management	Stakeholder engagement
Fault & incident management	
Asset decommissioning & disposal	Source: GFMAM, March 2014

FIGURE 2.6: 39 Subjects comprising the asset management landscape





2.1.4 Why implement an asset management system in cities?

Each city should implement and operate an asset management system, the performance of which should be periodically audited and reported.

Why implement an asset management system?:

- The interdisciplinary nature of asset management requires an enterprise-wide, integrated systems approach. This ensures that all departments and disciplines coordinate their thinking, resources, processes and activities to deliver optimal value from assets in a systemic manner.

“...AM system establishes clear line of sight towards the strategic objectives of the city...”

- Integration is not only horizontal (between functions), but also vertical. It carries through from Council, who establish the growth and developmental agenda for the city, to executive management who provide strategic leadership, to operational staff involved in the creation and maintenance of assets and the ongoing delivery of services. A properly designed and implemented asset management system establishes a clear line of sight towards the strategic objectives of the city, and ensures that all staff contribute towards meeting those objectives.

2.1.5 Objectives of this module

This module describes the scope, elements and relationship between elements comprising the AM system in cities. It also provides specifications for each element in the AM system, such as for the AM policy, and offers guidance on how to go about developing, integrating and implementing these elements, and over time to improve on the AM system. The following process is recommended for developing the AM system:



FIGURE 2.7: Process for developing the AM system

2.2 DEFINING THE SCOPE OF THE AM SYSTEM

2.2.1 Elements and the dimensions of the scope of the AM system

The first step in defining and establishing or reviewing the AM system is to define and document its scope, inclusive of the following:

- The asset portfolios managed or controlled.
- The policies, plans, functions and processes within the AM system.
- Main internal and external linkages in the AM system, within the city and to other organisations such as regulators, auditors, funders, service providers and suppliers.
- The current and desired future level of maturity of the AM system.



AM system scope documentation forms part of the City Integrated Infrastructure Plan, discussed in Module 7 of this Toolkit. SANS 55001, CI 4.3 requires that the following should be considered in determining the scope of the AM system:

- Asset management objectives.
- External and internal issues relevant to the purpose of the city which affect its ability to achieve the intended outcomes of its asset management system.
- Stakeholders relevant to the AM system, their requirements and expectations with regards to AM, as well as their requirements for the recording and reporting of information.
- Criteria for AM decision-making.
- The interaction and linkages with other management systems.

These elements are described in the remainder of this module.

“The first step in defining and establishing or reviewing the AM system is to define and document its scope...”

2.2.2 Asset portfolios managed or controlled

The following factors should be taken into account when deciding the scope of asset portfolios:

- The city’s service commitments, and the extent to which those services are discretionary in nature e.g. does some law compel the city to provide the service, or is rendered by decision of Council?
- To what extent is the service dependent on assets for achieving the intended outcomes?
- Is the service rendered directly by Council, or through a third party on behalf of Council?
- Does the service generate revenue for the City?
- What is the risk to service delivery should assets fail?

These factors are rated for each service provided to the community, using the rating tables provided below (Table 2.2a – d):



**TABLE 2.2(A):** *Criticality of the service*

CRITICALITY DESCRIPTION	RATING
Priority 1 function: Critical	High
Priority 2 function: Important	Medium
Priority 3 function: Discretionary	Low

Service priorities have been determined by the Municipal Demarcation Board, as follows:

PRIORITY 1 FUNCTIONS (CRITICAL)	PRIORITY 2 FUNCTIONS (IMPORTANT)	PRIORITY 3 FUNCTIONS (DISCRETIONARY)
Potable water	Air pollution	Municipal parks and recreation
Electricity reticulation	Beaches and amusement facilities	Local sport facilities
Sanitation	Cleansing	Public places
Refuse removal	Control of public nuisances	Local tourism
Cemeteries	Fencing and fences	Local amenities
Fire fighting	Sell food to public	Municipal airport
Municipal health services	Noise pollution	Licensing of dogs
Municipal planning	Pontoons and ferries	Child care facilities
Municipal roads and stormwater	Pounds	Sell liquor to public
Traffic and parking	Street lighting	Markets
Building regulations	Street trading	Burial of animals
Municipal public transport	Trading regulations	Municipal abattoirs



It is generally easy to identify asset portfolios by considering the type of services offered by a city, such as for municipal parks and recreation. Cities however also have other asset portfolios not reflected in the priority ranking list offered by the Municipal Demarcation Board. Examples of such asset portfolios include:

- Information and technology networks
- Municipal operational buildings (e.g. administration buildings, workshops, depots, stores and yards)
- Investment properties (e.g. international convention center, blocks of flats)

Therefore, take care not to limit the identification of service and asset scope only to the list provided above.

TABLE 2.2(B): Asset intensity

ASSET INTENSITY DESCRIPTION	RATING
The service can't be rendered without a dedicated asset portfolio uniquely designed for the purpose of that service	High
Service delivery to some extent dependent on the availability and use of assets	Medium
Service can be delivered without the use of assets	Low

TABLE 2.2(C): Revenue capacity of service

REVENUE CAPACITY DESCRIPTION	RATING
Trading service: the service generates a surplus of income for the city	High
Economic service, operating at breakeven: it generates neither a loss nor a surplus	Medium
Subsidised service: the service operates at a loss, and is subsidised	Low

Typical classifications for revenue capacity are as follows:

REVENUE CLASSIFICATION	SERVICE
Trading services	Abattoir
	Electricity
	Markets
	Potable water
	Sanitation
	Solid waste
	Traffic and parking
Economic services	Beaches and amusement facilities
	Cemeteries
	Halls
	Sport facilities
Subsidised services	Child care facilities
	Public spaces
	Roads
	Stormwater
	Street lighting

**TABLE 2.2(D): Risk to service delivery if assets fail**

RISK TO SERVICE DELIVERY IF ASSETS FAIL	RATING
Major to severe: (e.g. injuries or loss of life, notable negative media coverage and public perception, damage to property, revenue losses)	High
Moderate: (e.g. minor service interruptions, minor injuries, passing media interest)	Medium
Low: managed through normal operating procedures	Low

Using the rating system provided above, all services can now be ranked to determine their reliance on assets, and the criticality of asset portfolios to be managed. An example of such ranking is provided in **Table 2.3** below.

TABLE 2.3: Scope and importance of assets to be managed: identification and ranking table

SERVICES	CRITICALITY OF ASSET PORTFOLIOS TO SERVICES RENDERED BY THE CITY				
	SERVICE CRITICALITY	ASSET INTENSITY	REVENUE CAPACITY	RISK OF SERVICE FAILURE	OVERALL RANKING
Air pollution	M	M	L	L	M
Beaches and amusement facilities	M	H	M	L	M
Cleansing	M	M	H	M	M
Electricity	H	H	H	H	H
Local sports facilities	L	H	M	L	M
Noise pollution	M	L	L	L	L
Parks and recreation	L	H	M	L	M
Potable water	H	H	H	H	H
Public transport	H	H	M	H	H
Roads	H	H	L	H	H
Sanitation	H	H	H	H	H
Solid waste	H	H	H	H	H
Stormwater	H	H	L	H	H
Etc.					

Information from this ranking exercise can be used as follows:

- To determine the scope of asset portfolios
- To determine the criticality of asset portfolios
- To determine appropriate arrangements (plans, processes and resource) for asset portfolios. It would for example not be necessary to prepare a dedicated asset management plan for the noise control function, as it does not rely on assets. Public amenity functions, generally rated “Medium” can be grouped

and dealt with in one asset management plan. A function such as electricity, or water, is asset intensive and failure of such assets can have a major to severe negative set of impacts for the city. Consequently a function such as electricity or water will each have a dedicated asset management plan, and if the asset portfolio is sufficiently extensive and the city has the administrative capacity, probably a dedicated asset management planner for each such function as well.

2.2.3 Functions, policies and processes

The next step is to identify functions and processes within the AM system. The 39 subjects comprising the asset management landscape (see **Figure 2.6**) provide a basis for identifying AM functions. Functional analysis of the first subject group of the asset management landscape may result in identification of the following AM functions (first three subjects in the “Strategy and Planning” domain):

TABLE 2.4: Identification of AM functions within the “Strategy and Planning” domain

AM SUBJECT DOMAIN	AM SUBJECT	FUNCTIONS
Strategy and planning	AM policy	Analyse the city’s long term strategic plan and identify requirements for the delivery of services that are reliant on assets
		Identify statutory requirements for asset management
		Determine the principles that will direct the management of physical assets and which will enable, facilitate or support the achievement of both the requirements of the city’s long term strategy and of legislation
		Identify linkages with other corporate policies and ensure alignment with such policies as appropriate
		As a specific, significant element of the AM policy, establish, maintain and update the asset data model (see Module 3)
		Establish roles and responsibilities, inclusive of committee mandates, structures and responsibilities, and delegations
		Include requirements for periodic review of the AM policy, or as city strategy, legal requirements or business drivers change
		Prepare draft AM policy
		Subject the draft policy to inputs and review, and finalise for approval
		Formal approval of the AM by senior management
		Communicate the AM policy
Periodic review and updating of the AM policy		





AM SUBJECT DOMAIN	AM SUBJECT	FUNCTIONS
Strategy and planning	AM strategy and objectives	Establish a framework for levels and standards of service (see Module 4)
		Establish a spatial segmentation system for service delivery and asset portfolio analysis and reporting (see Modules 3 and 4)
		Establish a customer classification system (see Module 4)
		Establish decision-making criteria (see Module 8)
		Establish AM objectives relating to both the performance of (1) the AM system and (2) performance of each service and asset portfolio
		Establish AM performance, output and outcome indicators linked to AM objectives, and the framework for reporting on such
		Establish current and desired levels of AM practice
		Preparation of AM strategy as part of the City Integrated Infrastructure Plan, and submission for approval
		Formal approval of the AM strategy
		Periodic review and updating of the AM strategy
	Demand analysis (see Module 5)	Develop consolidated current customer profile
		Determine current demand for land and infrastructure per customer type and per infrastructure service
		Prepare one consolidated customer growth forecast for the city as a whole
		Spatial apportionment of future customer growth
		Approval and communication of the consolidated city customer growth forecast
		Interpret customer growth forecasts per sector and calculate net additional demand
		Formulate appropriate asset and non-asset responses to demand
		Formulate demand response plan



Next, identify policies and processes relating to the above functions. Considering the functions identified in the above table, the following policies, processes and stakeholder relationships:

STAKEHOLDER ACRONYMS:			
AG	Auditor General	MDB	Municipal Demarcation Board
DCoG	Department of Cooperative Governance	NGO	Non-Governmental Organisation
DEA	Department of Environmental Affairs	PMU	Project Management Unit
DRDLR	Department of Rural Development and Land Reform	NT	National Treasury
IDP Unit	Integrated Development Planning Unit	SG	Surveyor General

AM SUBJECT	FUNCTIONS	RELATED POLICIES, PROCESSES AND PLANS	INTERNAL RELATIONSHIPS	EXTERNAL RELATIONSHIPS
AM policy	Asset accounting	Asset accounting policy and procedures	Finance Department Internal Audit	AG
	Risk management	Corporate risk management policy	Corporate Services	---
	Disaster management	Disaster management policy, plan and processes	Community Protection Department	DCoG
	Environmental management	Environmental management policy, framework, plan and processes	Environmental Management Department	DEA, NGOs
	Financial management	Financial policies, strategies and plans (e.g. policies on investment and insurance)	Finance Department	NT
	Supply chain management	Supply chain management policy and processes	Finance Department Project Management Unit	NT
AM strategy	Levels of service	Customer service charter	IDP Unit	Community (current and prospective customers)
		Free basic services policy	Finance Department	DCoG, NT
		Community consultation and the IDP process	IDP Unit	DCoG, Community, Business Chamber, NGOs, sector departments
		Municipal spatial development framework	Urban Planning Department	DRDLR, DCoG
	Spatial segmentation system	Spatial structuring elements defined in the municipal spatial development framework	Urban Planning Department	DRDLR, NT
		"Regional Segment" of mSCOA	Finance Department	NT
		Ward system	IDP Unit	MDB, DCoG
		Regional administrative/service delivery system	Senior management team	---



AM SUBJECT	FUNCTIONS	RELATED POLICIES, PROCESSES AND PLANS	INTERNAL RELATIONSHIPS	EXTERNAL RELATIONSHIPS
AM strategy	Customer classification system	Rates and tariff policy	Finance Department	NT, DCoG
		Customer classification system adopted in the financial reporting system	Finance Department	NT
		Land use classifications adopted in Council's land use management scheme(s)	Urban Planning Department	DRDLR
		Land use classification adopted in the municipal property valuation roll	Finance Department	DCoG
	AM objectives, outputs and outcomes	Long term growth and development strategy	Senior management team	DCoG, NT, Community, Business Chamber, NGOs, sector departments
		Integrated development plan	IDP Unit	DCoG
		Performance management system	Corporate Services Department	DCoG
		SDBIP	Finance Department	NT
		Grant & funder required reports	Finance Department, PMU	NT, funders
		GRAP	Finance Department	AG, NT, community and stakeholders
		MFMA Section 71 & 72 reports	Finance Department	NT
		mSCOA	Finance Department, all units with budget votes	NT, AG
		Sectoral regulatory requirements	Sector-specific departments e.g. Water	Sector departments/regulators
		Billing system data	Finance Department	AG
	Future demand	Long-term city growth and development strategy	Senior management team	DCoG, NT
		Municipal spatial development framework	Urban Planning Department	DRDLR, DCoG, NT
		Municipal housing plan and committed housing projects	Housing Department	Department of Housing
		Pending and approved township applications, changing land use patterns	Urban Planning Department	DRDLR, SG
		Sectoral master plans	Sector-specific departments	Sector departments/regulators
		Capacity/master/investment plans of bulk providers	Sector-specific departments	Bulk providers e.g. Eskom and water boards

TABLE 2.5: Policies and processes relating to AM functions (selected/limited linkages for illustrative purposes)

2.2.4 Stakeholder requirements

VARIOUS MEANS OF IDENTIFYING STAKEHOLDERS

The previous sub-sections demonstrated how the listing of asset management functions can assist in identifying core and related asset management processes and policies, as well as internal and external stakeholders. **Table 2.4** identified such stakeholders at a high level, for demonstrative purposes.

When identifying stakeholders, it is necessary to be specific, and to identify all relevant stakeholders. Large cities for example are advised to identify not only the local business chamber as one stakeholder only, but also economic sector representatives (e.g. manufacturing, logistics and transport, hospitality, and wholesale and retail services). Also consider large parastatals as key stakeholders where relevant, for example Portnet, ACSA and Telkom.

Using the Asset Management Landscape is one means to identify stakeholders. Stakeholders can also be identified, at the level of infrastructure service provided, by way of supply chain analysis and asset lifecycle analysis.

IDENTIFYING STAKEHOLDERS BY WAY OF SUPPLY CHAIN ANALYSIS

Using the supply chain analysis method to identify stakeholders, the first step is to identify an infrastructure service. For demonstration purposes, a potable water service is selected. The second step involves identifying key processes or steps along the supply chain.

For a potable water service, this may include, at a high level, abstraction, treatment and distribution. More detailed processes or steps could include abstraction, bulk conveyance, treatment, storage, reticulation, billing etc. Now, having decided on the main processes in the potable water supply service, the third step is to list key activities comprising each process. An example of key activities per process is provided in **Figure 2.8**.

Next, identify stakeholders involved in, affected by or interested in the various activities identified. **Table 2.6** lists internal and external stakeholders associated with various processes and activities.



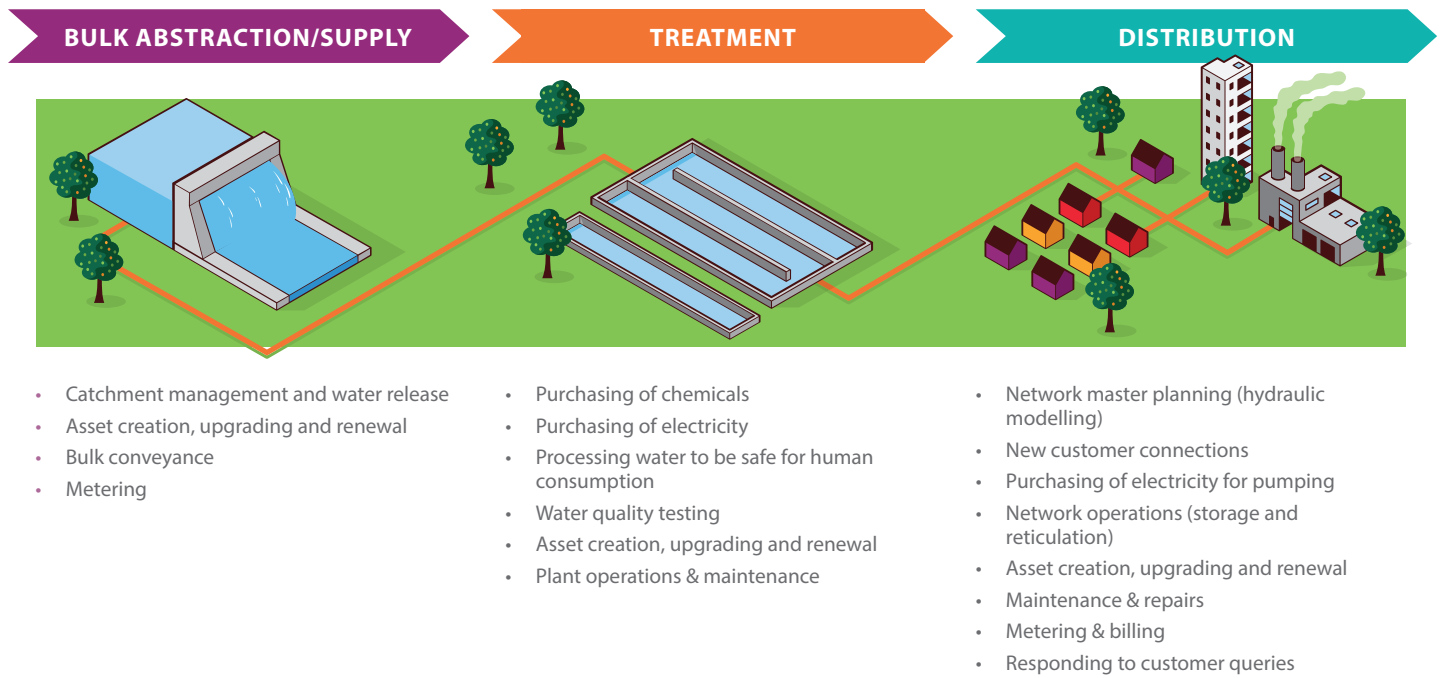


FIGURE 2.8: Identifying key processes and activities within the supply chain (potable water service)



STAKEHOLDER GROUP	BULK ABSTRACTION/SUPPLY	TREATMENT	DISTRIBUTION
Planning for water services	<ul style="list-style-type: none"> Urban Planning (IDP, Capital Investment Framework and MSDF) Finance (budgeting and sourcing of finance) Council (strategic visioning and approval of budgets) 	<ul style="list-style-type: none"> Urban Planning (IDP, Capital Investment Framework and MSDF) Finance (budgeting and sourcing of finance) Council (strategic visioning and approval of budgets) 	<ul style="list-style-type: none"> Water Services Planning Unit (Master planning) Urban Planning (IDP, Capital Investment Framework and MSDF) Finance (budgeting and sourcing of finance) Council (strategic visioning and approval of budgets)
Capital activities	<ul style="list-style-type: none"> Bid Adjudication Committee Supply Chain Management Unit Project Management Unit 	<ul style="list-style-type: none"> Bid Adjudication Committee Supply Chain Management Unit Project Management Unit 	<ul style="list-style-type: none"> Bid Adjudication Committee Supply Chain Management Unit Project Management Unit
Suppliers	<ul style="list-style-type: none"> Suppliers (own dams & other abstraction sources/points) 	<ul style="list-style-type: none"> Supply chain management unit (external purchases and stores) Electricity department (electricity and asset-related electrical services support) 	<ul style="list-style-type: none"> Supply Chain Management Unit (external purchases and stores) Electricity department (electricity and asset-related electrical services support) Purchasing of electricity for pumping
Water operations	<ul style="list-style-type: none"> Bulk asset operators Bulk asset maintenance crews 	<ul style="list-style-type: none"> WTW operators Laboratory services (internal) Maintenance crews (internal) 	<ul style="list-style-type: none"> Network operators Maintenance crews (internal) Finance (meter reading & billing)
Internal customers			<ul style="list-style-type: none"> Land Administration Division (Council Building Services) Fire and Emergency Services (Fire and ambulance stations, fire hydrants) Parks' Division
The Executive (Council, City Manager and Senior Management Team)	<ul style="list-style-type: none"> Council City Manager Director: Infrastructure Services Finance (asset register, spending performance, Section 71 & 72 reports) 	<ul style="list-style-type: none"> Council City Manager Director: Infrastructure Services Finance (asset register, spending performance, Section 71 & 72 reports) 	<ul style="list-style-type: none"> Council City Manager Director: Infrastructure Services Finance (asset register, spending performance, Section 71 & 72 reports)

TABLE 2.6(A): Identifying stakeholders within the supply chain (Internal stakeholders: potable water service)

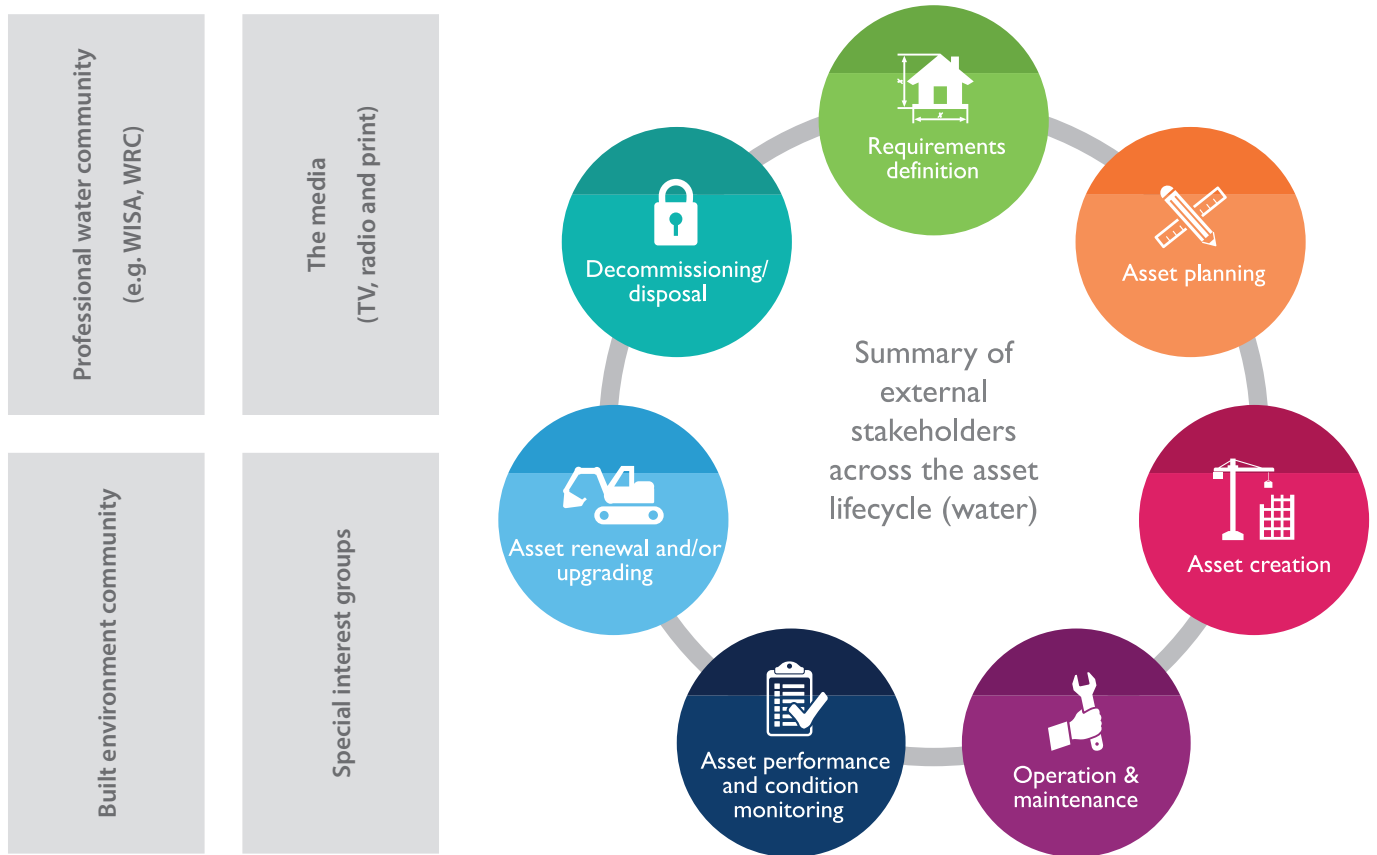




STAKEHOLDER GROUP	BULK ABSTRACTION/SUPPLY	TREATMENT	DISTRIBUTION
Policy & planning community: Planning for water services	<ul style="list-style-type: none"> Department of Water Affairs and Sanitation Department of Cooperative Governance and Traditional Affairs The National Treasury Office of the Premier Provincial Planning Commission Relevant Water Board 	<ul style="list-style-type: none"> Department of Water Affairs and Sanitation Department of Cooperative Governance and Traditional Affairs The National Treasury 	<ul style="list-style-type: none"> Department of Water Affairs and Sanitation Department of Cooperative Governance and Traditional Affairs The National Treasury
Regulatory community: approvals to construct or operate	<ul style="list-style-type: none"> Department of Water Affairs and Sanitation Department of Environmental Affairs 	<ul style="list-style-type: none"> Department of Water Affairs and Sanitation Department of Environmental Affairs 	<ul style="list-style-type: none"> Department of Water Affairs and Sanitation Department of Environmental Affairs
Investment community: funding & financing	<ul style="list-style-type: none"> The National Treasury Donors Financial institutions Equity markets 	<ul style="list-style-type: none"> The National Treasury Donors Financial institutions Equity markets Private sector developers 	<ul style="list-style-type: none"> The National Treasury Donors Financial institutions Equity markets Private sector developers
Suppliers: goods and services	<ul style="list-style-type: none"> Consulting engineering services Feasibility assessment services Construction materials and services Manufactured plant and machinery Bulk water provision Asset inspection services Maintenance and repair services 	<ul style="list-style-type: none"> Consulting engineering services Feasibility assessment services Construction materials and services Manufactured plant and machinery Chemical suppliers Energy suppliers Software system and associated service providers Training services related to water treatment Laboratory services Asset inspection services Maintenance and repair providers (parts and services) 	<ul style="list-style-type: none"> Consulting engineering services Feasibility assessment services Construction materials and services Manufactured plant and machinery Meter connection providers Energy suppliers Software system and associated service providers Asset inspection services Maintenance and repair providers (parts and services) Third party payment service providers (e.g. Pick & Pay and Postnet)
Customers			<ul style="list-style-type: none"> Residential Business and commercial Mining Industrial Agriculture Institutional Public sector infrastructure
Regulatory oversight (within government structures)	<ul style="list-style-type: none"> Department of Water and Sanitation The National Treasury Auditor General SALGA 	<ul style="list-style-type: none"> Department of Water and Sanitation The National Treasury Auditor General SALGA 	<ul style="list-style-type: none"> Department of Water and Sanitation The National Treasury Auditor General Department of Cooperative Governance and Traditional Affairs SALGA
Community transparency and accountability structures (outside of the government structure)	<ul style="list-style-type: none"> The Media (TV, radio, print and electronic media) Special pressure group/lobby groups (e.g. those concerned with the environment) The general public 	<ul style="list-style-type: none"> The Media (TV, radio, print and electronic media) Special pressure group/lobby groups (e.g. those concerned with the environment) The general public 	<ul style="list-style-type: none"> The Media (TV, radio, print and electronic media) Special pressure group/lobby groups (e.g. those concerned with the environment) The general public
The professional water community	<ul style="list-style-type: none"> Water Research Commission Water Institute of South Africa Engineering associations and institutions 	<ul style="list-style-type: none"> Water Research Commission Water Institute of South Africa Engineering associations and institutions 	<ul style="list-style-type: none"> Water Research Commission Water Institute of South Africa Engineering associations and institutions

TABLE 2.6(B): Identifying stakeholders within the supply chain (External stakeholders: potable water service)

Identifying stakeholders by means of asset lifecycle analysis Using this method, stakeholders are identified for each lifecycle activity, commencing with “requirements definition”, and terminating with “decommissioning/disposal”.



COMPARISON OF STAKEHOLDER ANALYSIS METHODS

In general, method 1 (AM landscape) is more appropriate when designing the corporate asset management system. Methods 2 and 3 (supply chain analysis and asset lifecycle analysis) are generally more suitable for sectoral analysis (a specific infrastructure service).

TABLE 2.7: Suitability of stakeholder analysis methods

NR	DESCRIPTION	COMMENTS/NOTES
1	ID of stakeholders using the AM Landscape as reference	<ul style="list-style-type: none"> • Very comprehensive, time-consuming technique • Most appropriate for AM system design • Probably overkill for preparing one sectoral iAMP



FIGURE 2.9: Stakeholder analysis using the asset lifecycle

NR	DESCRIPTION	COMMENTS/NOTES
2	ID of stakeholders by way of supply chain analysis	<ul style="list-style-type: none"> • Very handy technique where there is incremental beneficiation or processes involved in delivering services (e.g. water, sanitation, electricity and solid waste) • Requires a depth of understanding of some sectors to apply (e.g. linking roads with the broader transport system) • Not very well suited to standalone facilities or functions (e.g. operational buildings)
3	ID of stakeholders by way of asset lifecycle analysis	<ul style="list-style-type: none"> • Intuitively easy to apply • Can be applied to all sectors/asset portfolios • Bulk linkages not always so easy to pigeon hole • Well suited to functions such as operational buildings and most public amenities, barring those that link into larger open space systems, where the private sector offers similar or complementary services, or where scalability is required for higher levels of service and greater catchments, in which case the supply chain analysis may be better suited

IDENTIFY STAKEHOLDER REQUIREMENTS

AM objectives are formulated to achieve city strategic objectives, taking into account stakeholder requirements. As shown in the preceding sub-section, a city will have multiple internal and external stakeholders interested in municipal infrastructure and the value delivered from these assets. External stakeholders can be grouped as follows:



FIGURE 2.10 City external stakeholder classification system

Note that stakeholders can assume various roles, and therefore may have more than one set of requirements of the city, its AM system and the value delivered from assets. Consider, for example, the Department of Water Affairs and Sanitation. It is a supplier, because it provides bulk raw water. It is a regulator, because it establishes national water policy, determines bulk water abstraction limits, and issues permits for municipal water works. It may also be a customer, receiving municipal services in locations where it has offices and other facilities. In the broadest sense, stakeholders, of which there are many, will generally have four broad categories of requirements for a city's AM system and the value derived from assets. **These categories are:**

01 REQUIREMENTS RELATED TO THE EFFICIENT FUNCTIONING OF THE AM SYSTEM

Requirements in this category relate to aspects such as cost-efficiency: customers want to know that they do not pay more for services than is necessary, and that their rates, taxes and investments are properly accounted for.

“...Customers want to know...that their rates, taxes and investments are properly accounted for.”

02 CORE REQUIREMENTS RELATED TO LEVELS AND STANDARDS OF SERVICE

These relate to the type and quality of services that customers achieve, for example receiving potable water connected to their houses at a certain pressure, with no more than three (3) interruptions during a calendar year, with each interruption lasting no longer than x hours. Also included in this category of requirements are other dimensions of the quality of service rendered, such as accuracy of billing and the professionalism of the city in dealing with customer queries. Levels and standards of service are dealt with in detail in Module 4.



03 VALUE-FOR-MONEY

Value-for-money is the additional value added over and above the core investment. Value-for-money is the sum total of the core output required (e.g. a new access road) plus additional equity realised (e.g. number of jobs created, road-side servitudes beautified and improved public safety).

04 IMPACTS ACHIEVED

Measured in terms of how the value that assets provide achieve the strategic objectives of the city.

The AM system of a city will establish the inputs, activities and outputs necessary to achieve the impacts desired in the city's long term vision and strategy, considering the requirements of stakeholders, as demonstrated in **Figure 2.4**. Regulators however also in many instances dictate practice and reporting requirements, and these must also be taken into account in the design of the AM system.

2.2.5 Plans within the AM system

The AM system for cities comprises several plans that function within a hierarchical context, to ensure vertical alignment aimed at giving effect to the city’s long term strategy in greater levels of detail as plans cascade down the hierarchy.



FIGURE 2.11: Plans within the AM system

Whilst the city’s long term strategy sets the scene for AM plans, they in turn also inform the city’s overarching strategy. The following two sections focus on the AM policy and the AM strategy, which, for the purpose of cities, are included in the City Integrated Infrastructure Plan. AM plans and the City Integrated Infrastructure Plan are discussed in **Module 7**. Future versions of this Toolkit will include a module on operational plans.



2.3 AM POLICY

2.3.1 What is an AM policy

Many cities already have AM policies, but with limited scope focused on the approach to accounting for assets. They tend to stipulate asset recognition criteria, the valuation model (cost or revaluation method), useful life expectations, method of depreciation, asset impairment and other matters relating to the accounting for and reporting on assets. These are important aspects of AM, dealt with in the asset data model presented in Module 3.

As important as these elements are, they do not provide direction for the management of assets. Critical aspects such as what is to be achieved from investments, assets and the AM system are not addressed in such a limited scope asset accounting policy.

A good AM policy therefore provides directives or policy principles that clearly spell out the city's approach to AM, and the outcomes desired from assets and of the AM system. It provides direction for the development of AM objectives and strategies.

2.3.2 Requirements for an AM policy

A good AM policy satisfies the following requirements:

- Appropriate to the purpose, complexity and scale of the city's service commitments, AM activities and asset portfolios.
- Well understood, because it is presented in clear, simple language, made available to and communicated to all stakeholders and employees.
- Meets all statutory requirements, the dictates of government policy and of best practice, including the provisions of SANS 55001 and GRAP with respect to assets.
- Supports or is otherwise consistent with the city's strategic plans and policies.
- Articulates the principles that set the approach and decision-making framework for the management of assets, sufficiently so that AM objectives and strategy can be developed which support the objectives and desired outcomes of the city.
- Spells out key roles and responsibilities for the AM system.
- Includes a commitment to continual improvement of the AM system.
- Includes provisions for sound governance, monitoring and review, including scheduled internal review and external audit.
- Emphasises that Council and top management support the AM policy.

“ A good AM policy...supports or is otherwise consistent with the city's strategic plans and policies.”





2.3.3 What goes into an AM policy?

Cities have two options regarding the format of their AM policies: They can keep a principle AM policy which contains the asset accounting component, and create a separate policy which focuses on strategic asset management. Alternatively they can retain the asset accounting component of the AM policy but expand it to address the requirements stated above. The following are possible sub-sections and content of such a policy (not addressing the asset accounting component of the policy), using the fictitious Protea Metropolitan Municipality as an example:

ORGANISATIONAL CONTEXT AND INTRODUCTORY STATEMENT

An introductory statement sets the scene for the policy, and informs readers of the policy as to what it is about. The following serves as an example of an introductory policy statement:

BOX 2.1: A POSSIBLE INTRODUCTORY STATEMENT FOR AN AM POLICY

Successive generations of the Protea community have invested in the creation of infrastructure and social welfare assets since 1896. This diverse asset portfolio comprises electricity, potable water, roads and transport, solid waste and sanitation infrastructure, as well as parks, recreation facilities and other buildings. These assets underpin our way of life, enable economic growth and provide the means for social upliftment, integration and satisfaction. They represent the wealth of the community.

The community of Protea entrusted its municipality with custodianship of these assets. It expects Council, the management and employees of the municipality to sustainably manage these assets to deliver benefit to both current and future generations of the community.

This policy spells out the principles according to which the Municipality manages assets on behalf of the community and demonstrates responsible stewardship of these assets.

The municipality may also opt to define in the introductory statement what asset management is, and note what it involves, such as deriving value from assets, and that it entails the balancing of performance, cost and risk through appropriate asset and non-asset responses.

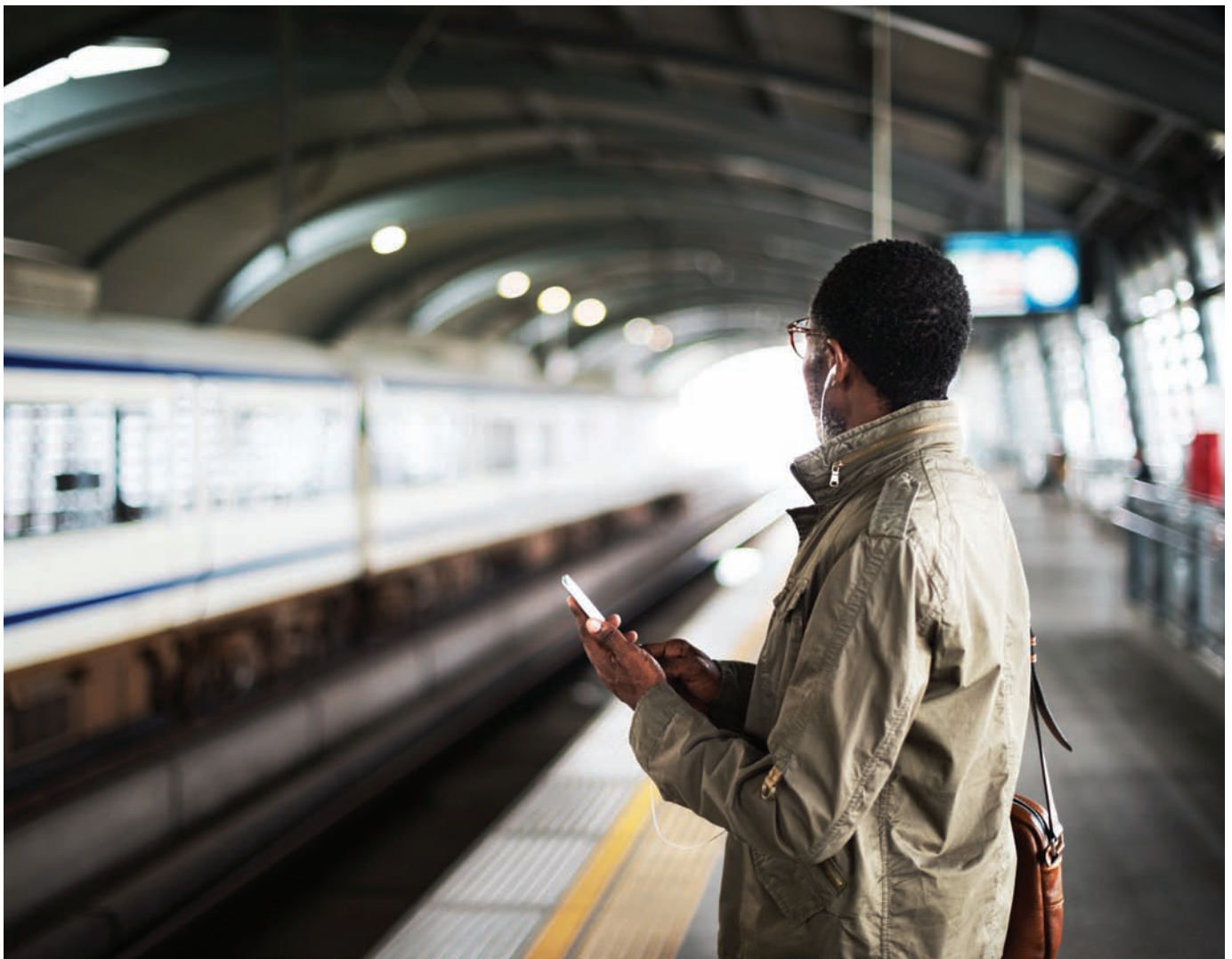


KEY PRINCIPLES DRIVING AM IN THE MUNICIPALITY

The Council and management team of the Protea Municipality will actively strive to implement the following principles in all planning, decision-making and implementation activities:

Note that the following are possible primary policy principles derived from the discussion on the South African urban legislative and policy framework presented in **Module 1**. They serve as a good guide to the type of principles to be included in the policy, however, each city should still analyse its own strategies to ensure that policy principles support the city's overall strategy.

Note the following on the list of potential principles offered above:





POLICY PRINCIPLE	KEY ISSUES/CONSIDERATIONS
Sustainable service delivery	Provided that services are delivered on the back of assets, and that the need for services will remain in perpetuity, maintaining the productive capacity of assets through a structured programme of renewals is a key requirement
Economic development	Cities with well-developed, functioning infrastructure systems are more likely to attract fixed capital investment, that in turn leads to land value capture and the creation of business and employment opportunities
Environmental sustainability	Environmental sustainability is generally concerned with the quality of the environment and its ability to deliver a range of services to humanity (e.g. recreational, medicinal and health services). A key issue for continued environmental sustainability is climate change adaptation and resilience, which, if not addressed, threatens our way of life. Some cities may opt to separate state policy principles for environmental sustainability and climate change to give particular recognition to the latter. This is not wrong, but these two issues are intimately related and separating them should be handled with care
Financial health and sustainability	Key dimensions of financial health and sustainability include (1) investing in productive capacity necessary to deliver services (building an asset portfolio) and generate revenue, (2) maintaining that productive capacity, and staying (3) solvent and (4) liquid
Social upliftment	This principle has three main dimensions. It is firstly concerned with equitable service provision, with special emphasis on spatial justice i.e. ensuring access to persons and areas previously excluded from service delivery. The second dimension is concerned with community health and safety. These first two dimensions provide citizens with basic liveable conditions. The third dimension is concerned with higher-order needs such as community empowerment and social integration.
Forging a unifying city identity whilst celebrating cultural diversity	This principle is concerned with protection of cultural heritage whilst creating the common ground that unifies a city, and that distinguishes it from other cities
Organisational effectiveness and efficiency	This includes issues such as improving resource and cost efficiencies, as well as productive, and retaining human capital through an attractive, fit-for-purpose work environment
A safe, capable and efficient workforce	Key issues include work place health and safety, investing in human capital development, and enabling employees to perform

TABLE 2.8: Key issues embedded in the policy principles offered

“ Cities with well-developed, functioning infrastructure systems are more likely to attract fixed capital investment...”

Each policy principle should be described in concise terms, but sufficiently so that its intent is clear to all who read it. Consider for example the principle “spatial efficiency”. How does this principle direct AM decision-making and action? The following is an example of how the spatial efficiency principle can be formulated in the AM policy, thus satisfying the requirements of SPLUMA, the urban transformation agenda and of organisational efficiency:

BOX 2.2: EXAMPLE OF DESCRIBING A POLICY PRINCIPLE**Spatial efficiency principle:***We commit to:*

- Optimise existing infrastructure capacities in the city.
- Adopt levels of services and asset lifecycle responses tailored to the desired status and outcomes for spatial entities as envisioned in the City's Spatial Development Framework.
- Prioritise infrastructure investment in locations that promote a compact, integrated city structure with the benefits of optimal economic functioning, citizen mobility and full realisation of social potential for all.
- Consider the cost of development in various spatial locations.
- Develop and implement spatially-based decision-making systems to ensure that infrastructure delivery maximises benefits to the community, and minimises negative financial, social, economic and environmental impacts.

KEY ROLES AND RESPONSIBILITIES

Key roles and responsibilities at a corporate level should be noted in the AM policy.

These may be addressed in a separate section of the policy, or under each policy principle or other matter dealt with, as appropriate. More guidance on roles and responsibilities are provided in **Module 12: Enablers**.

COMMITMENT TO CONTINUAL IMPROVEMENT

The policy should specifically include a section committing the city to continual improvement in AM practices.

“ The policy should specifically include a section committing the city to continual improvement in AM practices.”

REGULAR INTERNAL REVIEW AND AUDIT

The policy should include a section requiring regular internal review, and scheduled periodic external audit of the policy.

Note the following:

- The requirements noted in this section apply to the strategic AM component of the AM policy. Accounting standards require that the asset accounting component of the policy is reviewed on an annual basis, specifically with regards to matters such as useful life expectations and depreciation methods.
- The requirement for regular review by management should be set at intervals not greater than every three (3) years, or whenever there is a change in the regulatory or operating environment of the city.
- Independent audits should be scheduled at three (3) year intervals, and external audits to be conducted by certified asset management auditors meeting the requirements of ISO/IEC TS 17021-5: 2014(E) Conformity assessment – Requirements for bodies providing audit and certification of management systems – Part 5: Competence requirements for auditing and certification of asset management systems.



2.3.4 Concluding remarks on the AM policy

The AM policy interprets organisational objectives and provides the approach and principles directing the management of assets and the services enabled by those assets. It should be succinct, but provide clear direction for the establishment of AM objectives, and for decision-making on all aspects of AM.



FIGURE 2.12: Structure and components of AM policies

In developing the policy, take care not to include the following:

- Too many principles. Principles must at some point be converted into AM objectives which cascade down into the organisation. AM objectives multiply at each successive level down into the organisation and into asset portfolios. Too many principles may very well result in too many AM objectives that may overwhelm the AM system and the resource capacity of the city.
- Commitments that the city is not able to meet. Once the policy is approved, it commits the city and it can be held accountable against the commitments made in the policy.

Once the policy has been approved, it should be clearly communicated to all members of Council, the city's management team and the employees of the city. Simply distributing the policy is not sufficient – management should take active steps to ensure decision-makers and employees understand and support the policy. Where other stakeholders are required to abide by the policy, such as service providers and suppliers, the policy should also be communicated to them.

Finally, management should ensure that responsibility for implementing the AM policy is allocated with sufficient resourcing, including funding.

2.4 AM STRATEGY

2.4.1 AM objectives

The AM policy establishes AM principles, derived from the strategic objectives of the city. AM objectives are formulated based on these AM principles. There are two types of AM objectives, these relating to:

- Performance of the AM system, its effectiveness and efficiency – these relate to the required level or maturity of AM practice.
 - Performance of the asset network – these relate to levels and standards of service, described in **Module 4: Customer profiling and levels of service.**
- AM objectives must be documented in the city’s AM strategy, which is contained in the City Integrated Infrastructure Plan.

2.4.2 AM strategies

There are a number of focused strategies comprising the city AM strategy, as indicated in the figure below. These are discussed in more detail in the following sections.



FIGURE 2.13: Key components of city AM strategy

The AM strategy should, regardless of which focused strategy it addresses (e.g. service delivery strategy):

- Formulate AM objectives.
- Consider options for achieving AM objectives, as well as risks and opportunities in delivering on asset management objectives.
- Assess the impacts of options selected.
- Document key assumptions.
- Ensure vertical and horizontal alignment of AM objectives.



2.4.3 AM system strategy

DESIGN A FIT-FOR-PURPOSE SYSTEM

When planning, reviewing or auditing the city's AM system, the city's internal and external contexts should be considered, inclusive of stakeholder requirements and the risks and opportunities presented or inherent in these contexts. The AM system to be implemented, reviewed or audited needs to:

- Provide assurance to stakeholders that the AM system can achieve its intended outcomes, defined by the AM principles adopted in the AM policy and the AM objectives adopted in the city's AM strategy.
- Capitalise on opportunities and prevent or mitigate undesired effects as appropriate.
- Accomplish continual improvement.
- Achieve the above within the financial, administrative and technical capacity of the city.

Table 1.1 in Module 1 described the AM Maturity Index for South African cities, ranging from "Initiate" level through to "Innovator" level. **Appendix 2.1** defines maturity in practice for AM activities, and can be used to assess current and expected levels of maturity in practice. What is the appropriate level of maturity in AM practice that cities should strive for? One may instinctively want to pursue "Innovator" level practice, as it is the most mature or sophisticated level of practice. This is however not necessarily the most appropriate level of practice. Developing a mature AM system requires a sizeable investment in managerial attention, skills, processes, electronic systems and data. The decision on the required level of practice will depend in large part on whether the higher level of practice will deliver benefits over the costs incurred to effect the improvement. The following needs to be understood when deciding on the "appropriate" level of practice:

- The "appropriate" level of practice is the level which delivers on stakeholder requirements and that capitalises on opportunities whilst dealing with risks. Adopting higher levels of practice may exceed the requirements of stakeholders with regards to the cost they are willing to spend.
- It is neither feasible nor desirable to determine that all AM activities should be practiced at a particular level of maturity in practice, or even that the same level of sophistication in practice should be adopted across all services or asset portfolios.



Consider the last point. An older city faced with an aging asset portfolio and limited growth prospects will likely require more sophisticated practices relating to asset data and asset care (maintenance and renewal) regimes. A city experiencing high growth rates will likely require more robust demand analysis and response as well as investment planning practices. Likewise, a city that has a wealth of available land but limited access to water resources is likely to require more advanced demand analysis and management practices for its water services function, and less advanced practices for, say, its cemeteries' function.

REQUIREMENTS FOR THE AM SYSTEM STRATEGY

The AM system strategy should:

- Document the processes, practices, conventions, models and decision-making criteria and information systems comprising the AM system.
- Profile the current level of maturity (sophistication) of practice.
- Establish desired or targeted level of practice.
- Present a phased plan for the improvement of the AM system.

SYSTEM DOCUMENTATION

Cities are advised to:

- Document all approaches, methodologies, systems, processes and standard operating procedures within the scope of the AM system.
- Document how these approaches, methodologies, systems, processes and procedures relate to other functions in the city.
- With respect to approaches, methodologies and conventions, cities are specifically advised to pay attention to the content of **Table 2.9**.
- Note roles and responsibilities relating to the above.

CONVENTIONS AND SYSTEMS	GUIDANCE
<p>Risk management system – see Module 2</p>	<p>Two options are available:</p> <ol style="list-style-type: none"> 1. When a city does not have a formal risk management system: <ul style="list-style-type: none"> • Workshop with Council and senior management, and calibrate to city operating environment as appropriate • Specifically focus on value ranges in relation to the materiality limit established for the city, and its risk tolerance • Document the risk management system in the AM strategy • Where specific resources are required to assist in modification or calibration of the model, record an improvement activity in the improvement plan 2. When a city has a formal risk management system, but it does not cater for asset failure modes: <ul style="list-style-type: none"> • Document the risk management system in place in the AM strategy, and note the gap • Record the improvement activity necessary to expand the risk management system to accommodate asset failure modes
<p>Asset data model – see Module 3</p>	<ol style="list-style-type: none"> 1. Calibrate to city conditions as appropriate 2. Focus specifically on the range of assets, depreciation methods, useful life calibration, and adoption of spatial segmentation rules 3. Establish unit rates, and document both the approach and methodology used in establishing unit rates, as well as source data 4. Ensure alignment with the asset accounting policy 5. Where cities have electronic AM systems on which they host asset registers, ensure the necessary database reconfiguration
<p>Customer segmentation system – see Module 4</p>	<ol style="list-style-type: none"> 1. Adopt as a corporate convention, from which one city customer profile is made available to all planning departments (strategic planning, urban planning, engineering services planning, community services planning and housing) 2. Document the customer segmentation system in the AM strategy



CONVENTIONS AND SYSTEMS	GUIDANCE
Spatial segmentation system for AM planning and reporting – see Module 4	<ol style="list-style-type: none"> 1. Align with spatial development framework and mSCOA as appropriate 2. Document the spatial segmentation system adopted in the AM strategy
Type and structure of asset management plans and city integrated infrastructure plan – see Modules 7 and 12	<ol style="list-style-type: none"> 1. Decide the grouping of AM plans to be prepared, reviewed and updated over time (taking account of amongst other organisational functions, responsibilities and budget allocations) 2. Decide the formats for AM plans and the strategic asset management plan 3. Decide the frequencies and trigger events for review and updating of these plans, taking into account city planning and budgeting cycles 4. Decide and allocate responsibilities for the preparation, approval, review, updating and communication of these plans 5. Document the above in the AM strategy
Decision-making criteria (multi-criteria analysis system) – see Module 8	<p>Three options are available:</p> <ol style="list-style-type: none"> 1. A city already has a decision-making criteria system in place. If so, check for consistency and alignment with the strategic AM policy described in this Module 2 and the AM objectives articulated in the asset management strategy. If alignment exists, document the decision-making criteria system. Where alignment is required, the system is still documented, and a system improvement activity is recorded in the improvement plan 2. The decision-making criteria system presented in Module 8 is fit-for-use without modification, and is documented in the AM system strategy. Do not simply assume fit-for-use, first workshop with Council and senior management, and obtain formal approval 3. Present and workshop the decision-making criteria system with Council and senior management, modify or calibrate as necessary, and document in the AM strategy if no specific improvement project is necessary. Otherwise document the system provided, and record an improvement activity in the improvement plan

TABLE 2.9: Conventions and systems for inclusion in the AM system strategy that are detailed in this CIDMS Toolkit

Guidance on assessing current AM practice and developing a strategy for improvement in AM practice is provided in **Section 12.2.8**.





2.4.4 Service delivery strategies

Service delivery strategies comprise (1) customer service levels, (2) asset service levels and (3) service delivery models. The stakeholder requirements analysis will have identified what customers and other stakeholders require in terms of service.


Module 4 demonstrates that customers are concerned not only with receiving a “core” service, such as potable water supply connected to households, but also with service attributes such as water pressure, the quality of the commodity itself (clear water, no discernible taste) and minimum disruption. Cities should however only commit to provide the services that they are able to offer. The alternative is well founded community distrust when Council does not keep its promises that may in turn lead to community resistance expressed in a number of ways, including public protest action, non-payment or even violent or destructive behaviour. Service delivery models are discussed in **Module 12, Section 12.2.5**, and contracting methods in **Module 11**.

STATE OF ASSETS REPORT

A good starting point for any service delivery strategy is the presentation of a “State of Assets” Report. Assets provide the means with which to deliver services, whereas infrastructure capacity limits and factors such as condition and performance present constraints as to what the city can deliver. A good state of assets report will provide insight into:

			
<p>The scope of asset systems and operations.</p>	<p>Extent and value of assets. Items for inclusion include asset extent, asset age profiles, replacement cost value, depreciated replacement cost value and accumulated depreciation, for each asset class and for the city as a whole.</p>	<p>The geographic reach of the City’s assets. Where can it provide services, and where not? Do capacity constraints hamper service delivery capabilities in particular areas?</p>	<p>The state of assets, with specific reference to condition. Are assets still able to deliver now, and will they be able to deliver into the future?</p>



	<p>Techniques for asset profiling are presented in Module 3: Asset Data Model and Infrastructure Profiling.</p>
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With respect to the requirement to describe the asset system or portfolio: A graphical example of the description of a potable water supply system is provided in Figure 2.14.

Note the following about this graphical presentation of a potable water supply system:

- It presents the water supply system in an easy-to-follow manner suitable for sharing with non-technical stakeholders such as politicians and communities.
- It packs a fair bit of information. It demonstrates the potable water supply chain, inclusive of sources of supply and treatment arrangements. It also shows that if demand is to increase, the capacities of the water treatment works will become constrained.
- It also presents a high-level water balance.

Considering the above, a presentation of this nature is a valuable communication instrument. Examples of asset profiles are provided in Module 3.4. When preparing the State of Assets Report, be sure to provide a helicopter view of the main issues that would be of interest to decision-makers and stakeholders. Is there sufficient bulk? Is there sufficient capacity, or are assets being over-utilised?



What is the condition profile of assets in general, and critical assets in specific? Are assets generally in acceptable condition, or are they being sweated with a major wave of renewals looming? Having provided the high-level view, also specifically address known major issues that can threaten service delivery, such as aging electricity sub-stations that feed the CBD with major risks of outages.

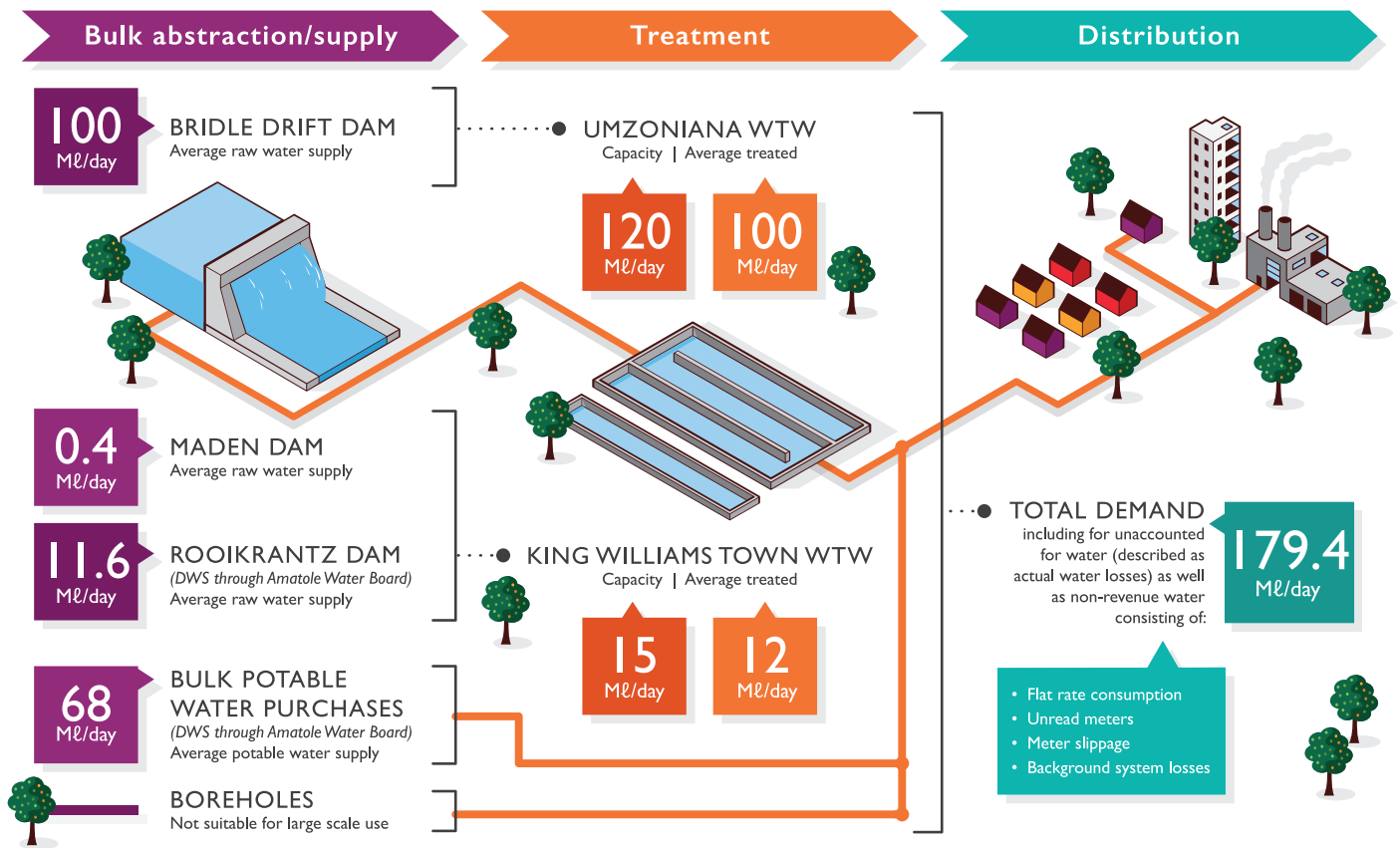


FIGURE 2.14: Graphical illustration of asset system (potable water supply, Buffalo City) Toolkit

Graphical presentations of asset systems or asset portfolios can be prepared for various asset portfolios, not just potable water – consider the following example of a solid waste management system:

CUSTOMER AND SERVICE PROFILING

Since services are delivered to customers, it is necessary to know who they are, how many of them there are, and where.

Customers are not homogenous, the needs of industrial customers, for example, differ to those of residential customers. So it is also necessary to differentiate between different types of customers.

“ ...it is also necessary to differentiate between different types of customers.”



Techniques for customer identification, classification, measurement and spatial recognition are provided in Module 4: Customer and Services Profiling. Module 4 also provides level of service options for each standard type of municipal service, and a standardised service attribute structure applicable to all municipal services.

Examples of customer and service profiles are provided in Module 4.2.5 (customer profiles) and Module 4.3.4.

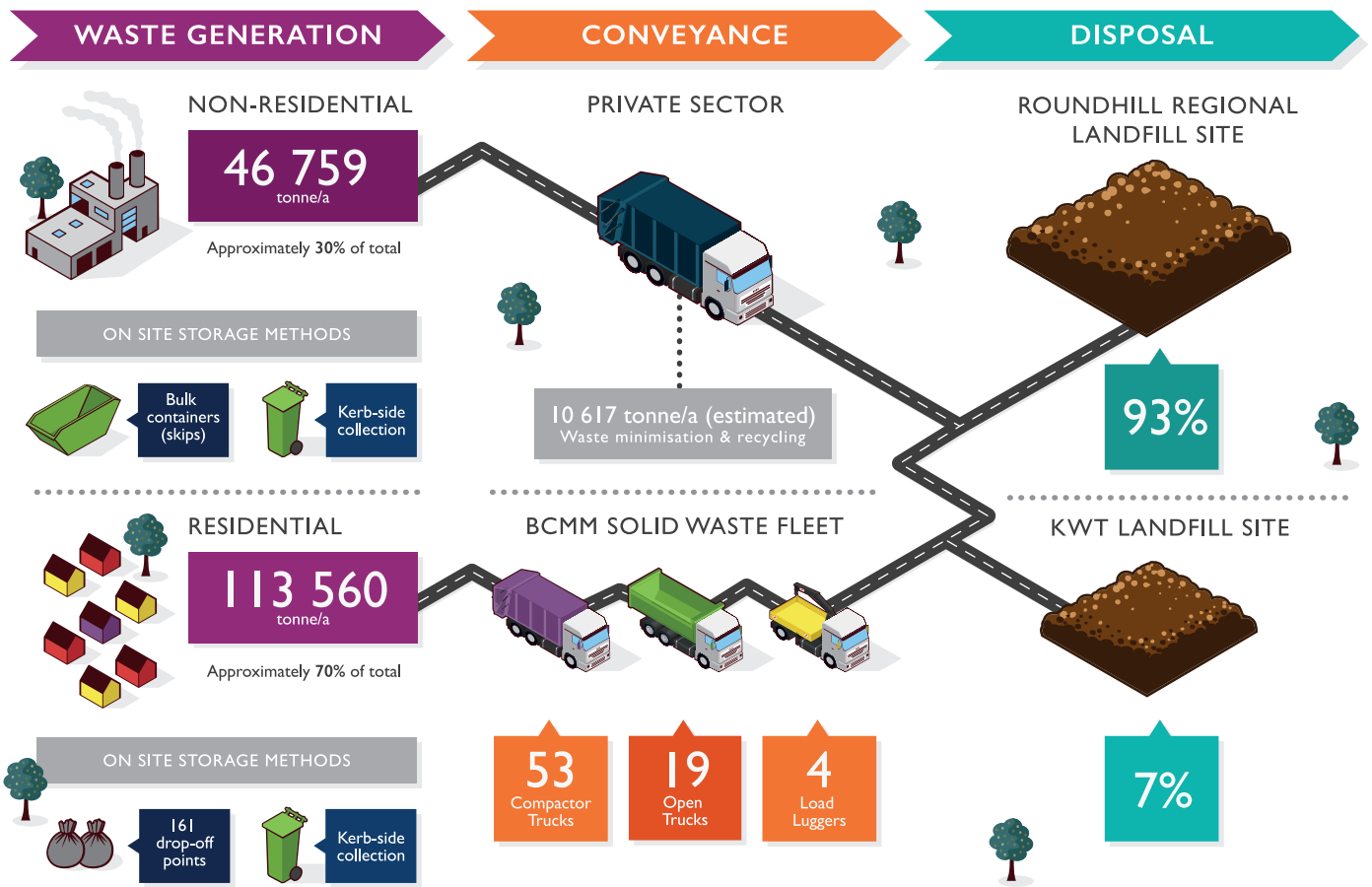


FIGURE 2.15: Graphical illustration of a solid waste system (Buffalo City)

Having profiled customers, it is also necessary to profile the state of service provision. This is a critical departure point for the following:

<p>Determining who has access to services where, the nature of the service provided, and the ongoing requirements for delivering services.</p>	<p>Are the services provided appropriate, or must they be upgraded? e.g. from gravel roads to paved roads.</p>	<p>Who does not receive services, and where? Should they be provided with services? If so, what types of service, and at what cost?</p>

ESTABLISH LEVELS OF SERVICE OBJECTIVES

These may already exist, whether formally and documented (preferably in a customer services charter) or informally as the undocumented de facto approach to service provision.

CUSTOMER CATEGORY	DENSITY CATEGORY	NODES					MOVEMENT NETWORKS				ZONES				
		CBD/ anchor node	Primary node	Secondary node	Special function nodes/precincts	Neighbourhood/ local nodes	Freeways/mass transit corridors	Arterials/collectors/ activity corridors	High street	Local street	Urban zone	General urban (transition) zone	Suburban zone	Natural zone	Rural zone
Formal residential: High income	High	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
	Medium	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
	Low	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
Formal residential: Medium income	High	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
	Medium	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
	Low	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
Formal residential: Low income	High	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
	Medium	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
	Low	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
Formal residential: Poor	High	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
	Medium	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
	Low	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
Informal residential		Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
Backyard shacks		Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
Business		Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
Commercial & industrial		Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
Public sector infrastructure		Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	

SERVICE PROVISION OPTIONS	
Case-by-case assessment	15 - 25 mm connection to building (multiple taps)
Communal standpipe less than 200m distance	40 - 100 mm consumer connection
Yard tap connection (single tap)	150 mm or larger consumer connection

FIGURE 2.16: Service provision objectives matched to the city spatial structure (potable water supply)



A rudimentary approach to determining levels of service objectives is to establish levels of service for each customer type. An example of such an approach is to determine that indigents will receive RDP levels of service, such as water at communal standpipes, VIP toilets, and gravel roads. Paying customers will then normally receive water pipes to their residences, flush toilets connected to the sewer system, and tarred roads. The benefit of such an approach is its simplicity. But there are shortcomings. The provision of rudimentary services may not always be feasible in high density settings, or in each terrain, such as in marshlands. Likewise, it may not be feasible to connect high income residential estates outside the urban edge to the municipal sewer system in the short to medium term. With respect to public amenities, the idea that all residents have access to these within walking distance may not be financially feasible, and it may be more desirable to cluster such facilities to support the strengthening of nodes.

A more advanced approach is to state levels of service objectives per customer type, per spatial region and/or spatial structuring element. An example of such an approach is provided in **Figure 2.16** which establishes levels of service objectives at the service function level, matching customers, areas and types of service.

When establishing such a level of service decision instrument, care should be taken to align it to the Municipal Spatial Development Framework and the spatial segmentation system adopted for the asset management system. Do not divorce decision-making here from the state of asset reports' report. Infrastructure capacities may vary in different regions, and therefore nuanced levels of service may need to be adopted, even for customers of the same type.

Also note that level of service objectives are not just about which types of services are provided, but also about the standards of services provided, such as response times to failures such as pipe bursts, electrical outages and potholes.







PREPARE A CORPORATE CUSTOMER GROWTH FORECAST

A corporate customer growth forecast should be prepared and adopted for the city as a whole. The asset management system should specify the following:



The demand forecasting horizon. This CIDMS Toolkit recommends a 30-year horizon.



Responsibility for preparing the forecast. It is proposed that the corporate asset management committee appoints a standing task team to prepare, and annually review and update the corporate customer growth forecast.



All assumptions made in preparing the corporate customer growth forecast must be documented.



Each department that undertakes forward planning on the basis of customer growth or decline is bound to use the forecast, but has the flexibility to interpret this forecast in the context of its sector.



Guidance on preparing customer growth forecasts is offered in Module 5: Future Demand, and an example of a customer growth forecast is presented in Box 5.2.

Note that it is not sufficient to prepare a customer growth forecast. Where that growth materialises in future may have a great impact, depending on the availability and capacity of infrastructure, which tends not to be distributed evenly over the city space. A key task of the standing committee on demand is to project where such growth will materialise over time (guidance provided in Module 4).

ESTABLISH LEVELS OF SERVICE TARGETS FOR CURRENT AND FUTURE CUSTOMERS

Having established what services are offered to current customers, and the expected growth in customers over the forecast period, the following will likely emerge:



Table 2.10 demonstrates how these can be profiled, and targets established that specifically indicate the desired level of service per customer group that are time-bound.

CUSTOMER TYPE	LAND DENSITY & LAND STATUS	DEVELOPER BULK SERVICES	DEVELOPER RETICULATED SERVICES	NR OF CUSTOMERS	UNSERVICED (LOS 0)	UN- & UNDER SERVICED	% OF BACKLOGS	TARGET LOS NEW GROWTH	TARGET LOS CURRENT CU'S	DURATION (YEARS)
Medium income	Proc - high	Entity	Private Sector	2 078	0	2 078	1,3%	4	4	4
	Proc - Med	Entity	Private Sector	1 167	0	1 167	0,7%	4	4	5
	Proc - low	Entity	Private Sector	589	0	589	0,4%	4	4	1
	UnProc - high	Entity	Private Sector	0	0	0	0,0%	4	4	0
	UnProc - Med	Entity	Private Sector	14	0	14	0,0%	4	4	1
	UnProc - low	Entity	Private Sector	4 121	0	3 798	2,4%	4	4	2
Low income	Proc - high	Council	Council	376	0	376	0,2%	4	4	1
	Proc - Med	Council	Council	132	0	132	0,1%	4	4	1
	Proc - low	Council	Council	268	0	268	0,2%	4	4	1
	UnProc - high	Council	Council	230	0	230	0,1%	4	4	1
	UnProc - Med	Council	Council	434	0	434	0,3%	4	4	1
	UnProc - low	Council	Council	1 302	0	1 302	0,8%	4	4	2
Poor	Proc - high	Council	Council	26 562	0	26 562	16,9%	4	4	15
	Proc - Med	Council	Council	15 650	0	15 650	10,0%	4	4	6
	Proc - low	Council	Council	15 707	0	15 707	10,0%	4	4	5
	UnProc - high	Council	Council	17 125	0	17 125	10,9%	4	4	5

Having established target levels of service for both current and future customers and a phased programme of achieving these targets, a picture will emerge as demonstrated in Figure 2.17(a). This indicates progressively how service access backlogs are eradicated, how many customers are upgraded, and how new growth is addressed.

TABLE 2.10: Establishing time-bound customer level of service targets for customers that are currently underserved and for future customers (limited to informal residential customers)



SERVICE DELIVERY: CU'S SERVICED

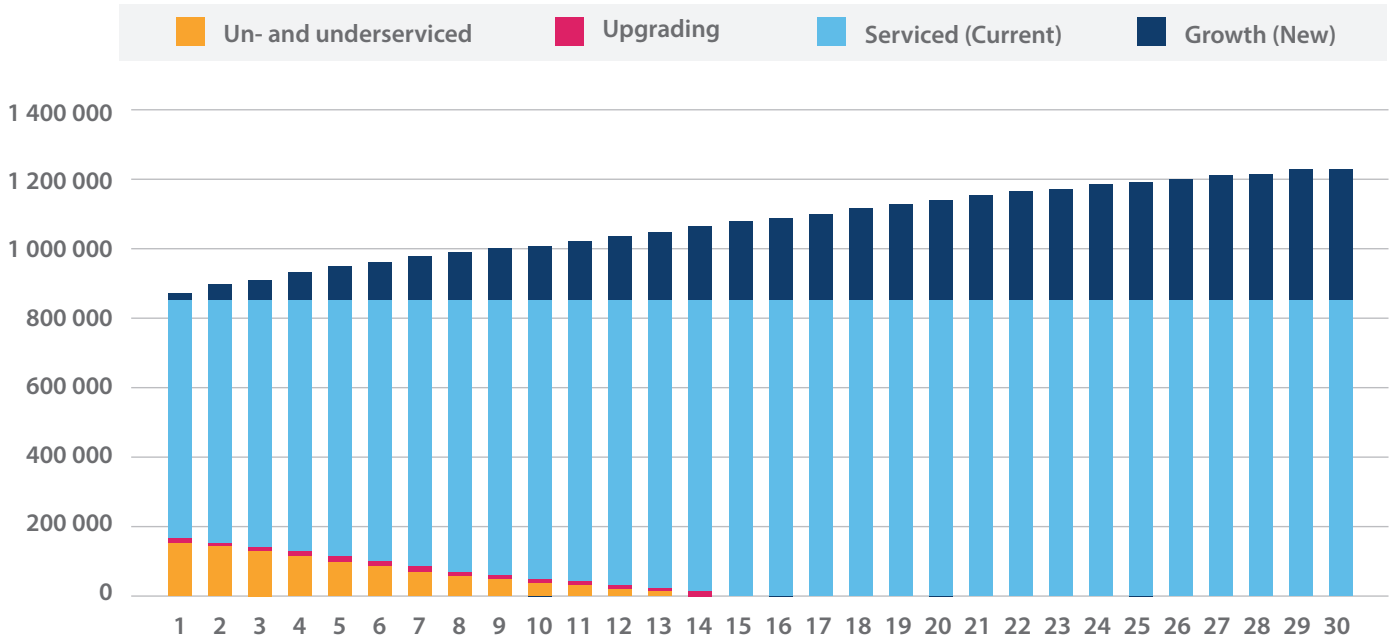


FIGURE 2.17(A): Customer LOS strategy (all customer categories – potable water)

All of this naturally comes at a cost, and it is necessary to quantify this cost to determine whether the proposed programme is affordable. Figure 2.17(b) provides an example of an expenditure profile to meet service level targets.

LEVEL OF CAPEX (R'MILLION)

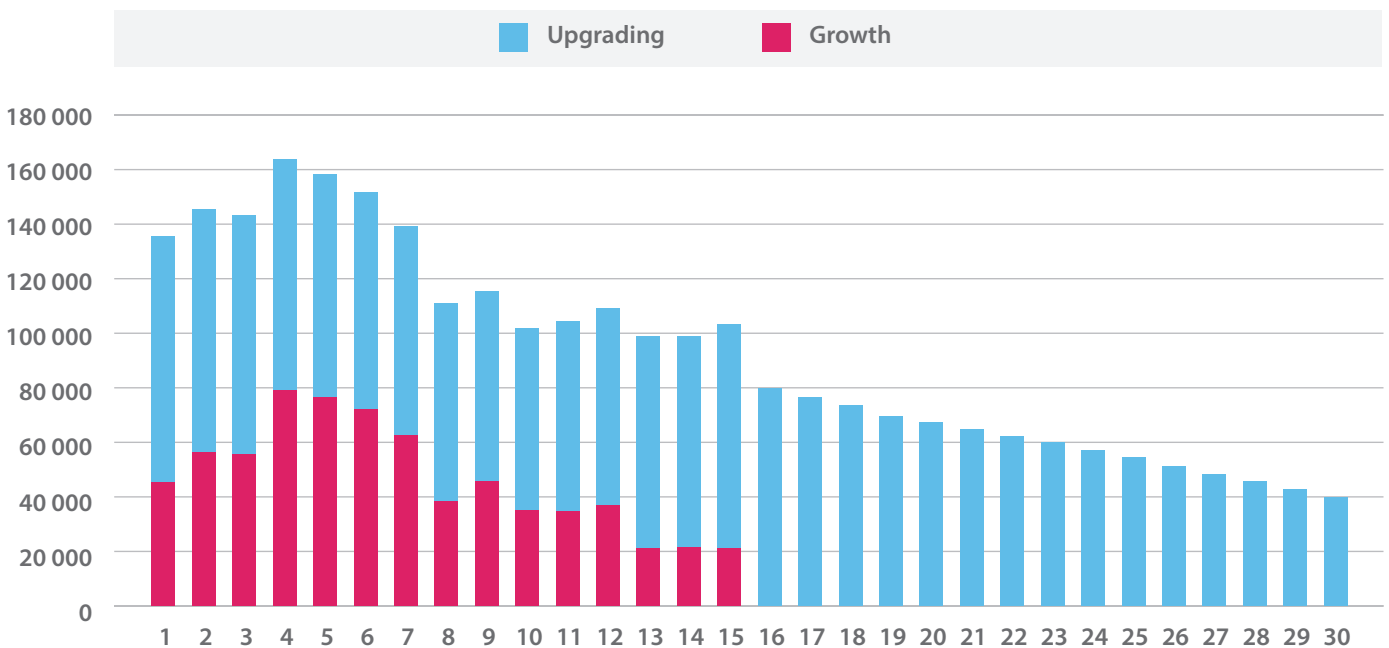


FIGURE 2.17(B): Costing LOS strategy (all customer categories – potable water)

SELECTION OF SERVICE DELIVERY MODELS

Having decided what services are to be provided, to whom, and having defined and costed level of service objectives, the asset management strategy should assess available service delivery models and select from these the most appropriate for implementation.

A range of service delivery options are available, including:

- In-house service delivery
- Contracted goods and services
- Partnerships, whether public-public partnerships or public-private partnerships
- Municipal entities
- Outsourcing



Guidance on selection of the most suitable service delivery models is presented in Module 12: Enablers.

The AM strategy should specify which service delivery models have been selected for which functions, as well as the decision-making criteria applied in selecting these models.



2.4.5 SAMP planning horizon and template

The SAMP is prepared for a rolling 30 year period, updated annually. The structure and content of the SAMP is provided below.

TABLE 2.11: SAMP template

SECTION		DESCRIPTION OF PURPOSE AND CONTENTS
Plan cover page		<ul style="list-style-type: none"> • Document title • Name of city and city logo • Date • Planning period • Version number
Approval and change history		<ul style="list-style-type: none"> • Plan approval date and Council resolution reference • Planning period, stating effective start and end dates • Document version number • Change history details
Executive summary		<ul style="list-style-type: none"> • Presents key issues, decisions and actions
Section 1: Stakeholder expectations and city strategic objectives	Purpose	This section states the purpose of the plan. It presents an environmental analysis and identifies the city strategic objectives and stakeholder requirements that asset management, infrastructure investment, assets and lifecycle delivery actions must respond to.
	Contents	<ul style="list-style-type: none"> • Purpose of the plan • City context (environmental analysis) • Stakeholders and their expectations – internal and external stakeholders, notable expectations and ranking thereof • City strategic objectives and future vision, inclusive of spatial vision and structure • How this plan supports city vision, strategic objectives and future spatial vision and structure • Status of this plan
Section 2: State of city assets	Purpose	This section describes the capabilities, limitations and risks associated with asset portfolios to provide services, now and in the future.
	Contents	<ul style="list-style-type: none"> • Scope of asset systems/portfolios and operations • Extent and value of assets – asset extent and age profiles, replacement cost values, depreciated replacement cost values and accumulated depreciation, for each asset class and for the city as a whole • Geographic profile of assets. Which areas are serviced, and which are not? • The state of assets, presented in terms of failure mode analysis and risk exposure. • Highlight known key risks that impact on city strategic and spatial objectives
Section 3: Customer profile and growth expectations	Purpose	This section profiles existing customers by type and spatially, as a basis for determining current demand, access to service provision, current revenue potential for the city as well as expenditure requirements. It furthermore presents a customer growth forecast for the city, to be interpreted by various services or sector departments when undertaking future demand planning.
	Contents	<ul style="list-style-type: none"> • Current customer profile, segmented and spatially presented • Customer growth forecast for the next 30 years – present the customer growth forecast in tabular and graphical formats, and provide a narrative, and be sure to note key assumptions • Future spatial apportionment of customers – indicate where future customer growth is expected to materialise, considering current housing projects, pending and approved development applications and land use management dictates such as the urban edge, densification requirements etc. • Identification of key risks and opportunities, and responses to these

SECTION		DESCRIPTION OF PURPOSE AND CONTENTS
Section 4: Service delivery strategies	Purpose	This section articulates AM objectives related to levels and standards of service, for each service, by type of customer and spatial segment or spatial structuring element, as appropriate. It profiles the current state of service provision, and quantifies current backlogs and future service requirements. This section also articulates the city’s approach to the selection of appropriate service delivery models, and presents the cash flow impacts of meeting levels and standards of service targets.
	Contents	<ul style="list-style-type: none"> • Levels and standards of services adopted – per type of customer and spatially, for each infrastructure or community service • Current state of services provision and existing service access backlogs – per type of customer and spatially, for each infrastructure or community service, and for the city as a whole. Also present service accessibility maps • City approach/directives to selection of suitable service delivery models • Lifecycle delivery plan, per sector and for the city as a whole • Cash flow impacts of delivering on levels and standards of service for each infrastructure and community service, for current and future customers • Identification of key risks and opportunities, and responses to these
Section 5: Infrastructure investment strategy	Purpose	This section presents the infrastructure investment strategy to meet city strategic objectives and level and standard of service targets as they relate to infrastructure and community facilities. This section demonstrates the affordability of the service delivery strategy to both the city and its customers, and presents the strategy for the funding of fixed capital investments, inclusive of fund sourcing, revenue strategy and timing of investments. It also states financial and investment objectives and how the proposed service delivery strategy will impact on these objectives.
	Contents	<ul style="list-style-type: none"> • Key service delivery, financial and investment objectives • Modelling of cash flows (revenue and expenditure) per service/asset portfolio and for the city as a whole • Funding strategy • City affordability • Customer affordability • Identification of key risks and opportunities, and responses to these





SECTION		DESCRIPTION OF PURPOSE AND CONTENTS
Section 6: AM capability	Purpose	This section establishes the scope of the AM system and states its objectives. It profiles the current state of practices within the AM system, and sets an improvement plan to meet its objective. This section also contains a change management strategy to ensure acceptance of the AM system and to create an AM-focused culture intent on delivering value from assets.
	Contents	<ul style="list-style-type: none"> • System scope and objectives • Stated conditions for a value-centric organisation employing an AM system • Description of sub-systems and practices, inclusive of the following: <ul style="list-style-type: none"> • Risk management system • Asset data model • Customer segmentation system • Spatial segmentation system • Type and structure of asset management plans • Decision-making criteria • Practice and process interfaces, noting input and output requirements, as well as alignment needs • AM organisational requirements and arrangements • Competency requirements, current capabilities and skills development plan • Practices improvement plan • Identification of stakeholders and desired behaviour • Stakeholder management plan • Identification of key risks and opportunities, and responses to these
Section 7: Risk management	Purpose	This section presents an overall asset management risk profile, encompassing risks associated with growth/decline (customer and economic growth/decline), assets, service delivery, financial, management and technical risks. It describes the overall gross exposure of the city to risks associated with both assets and the AM system, how this plan reduces risks and what residual risks remain following implementation of this plan.
	Contents	<ul style="list-style-type: none"> • Profiling of risks associated with assets and the asset management system, inclusive of a city risk exposure profile quantifying gross risk exposure – to be presented by type of risk, per service and spatially using tabular, graphical, spatial and narrative means of explanation • Risk mitigation actions to be implemented through this plan, and residual risks remaining thereafter
Section 5: Infrastructure investment strategy	Purpose	This section ensures technical, spatial and budgeting alignment between sector plans, programmes and actions, provides annual directives for sectoral compliance, and presents an integrated set of performance metrics for AM objectives to be tracked over time.
	Contents	<ul style="list-style-type: none"> • Directives relating to technical, spatial and budgeting alignment, e.g. priority to be given to development in particular regions/precincts, and/or targets for job creation, SMME development or conversion to green technologies • Programme and project alignment • Integrated set of AM performance metrics, both in terms of AM objectives established and the tracking of performance against these metrics over time
Section 9: Recommendations	Presents key recommendations where explicit approvals are required.	
Appendices	Include additional documentation or detail as necessary in appendices to ensure a tight focus in the main document, and to keep the main body of the document concise and reader-friendly.	

Processes for preparing and updating of the SAMP are described in Module 7.

2.4.6 Preparation, approval and updating of the SAMP

The following arrangements apply:

APPROVAL

The SAMP should be approved by way of Council resolution.

SAMP REVIEW

The SAMP should be reviewed and updated annually. Additionally, the SAMP should be reviewed when:

1. Changes occur in the regulatory environment (e.g. new national policy or legislation);
2. When changes occur in the operating environment of the city;
3. The city adopts a new overarching strategy (e.g. a new IDP or city growth and development strategy), or amends its overarching strategy; or
4. The strategic asset management component of the AM policy is amended.



2.5 CONCLUSION

Each city should develop and implement an AM system comprising the people, policies, plans and information to deliver value from assets. Value is determined by stakeholders and the overarching objectives of the city as articulated in its overall strategy, and the starting point in establishing an AM system is to identify stakeholders and analyse their requirements.

The following are critical requirements for an AM system:

- Clear alignment to city strategic objectives
- Responsiveness to stakeholder requirements, and the design of an AM system that meets stakeholder expectations
- The establishment of a hierarchy of policies and plans, with clear line of sight throughout the organisation
- System documentation
- Strong leadership at all levels, and the fostering of an outcomes-based AM culture embedded in a self-learning system
- Commitment to continuous improvement

Modules 3 to 11 provide techniques for implementing specific aspects of the AM system. Module 12 describes AM enablers, such as AM roles and organisation structuring arrangements, competencies, an electronic AM system, and selection of service delivery models.

“ Each city should develop and implement an AM system comprising the people, policies, plans and information to deliver value from assets.”



APPENDIX 2.A: AM PERFORMANCE MEASURES RELATING TO ASSET CARE



The following asset care performance measurement system is derived from the Monitoring and Evaluation Protocol prepared by the Department of Public Works and the CIDB in support of the National Immovable Asset Maintenance Management Standard:

2.A.1 Asset health checks

The following suite of measures assesses the health status of asset portfolios and the adequacy of spending on maintenance and renewal to ensure the ongoing functioning of assets within agreed performance parameters. These measures are applied at the level of asset portfolios e.g. potable water supply system, electricity distribution network or sports and recreation facilities. Two measures are applied at this level, these being the asset consumption ratio and asset portfolio health grade.

2.A.1 ASSET HEALTH CHECKS

Purpose

The asset consumption ratio measures the extent of consumption (accumulated wear and tear) of an asset portfolio, which is indicative of the overall health and ability of the asset portfolio to continue to provide service delivery and/or economic benefits, and the extent of asset renewal required.

Formula and source data

The asset consumption ratio is calculated as follows:

$$\frac{DRC - RV}{CRC - RV} \times 100$$

Data on depreciated replacement cost (DRC), current replacement cost (CRC) and residual value (RV) are sourced from the city's asset register.

Norm and interpretation

There is no one single norm for all asset portfolios that indicates the point beyond which an asset portfolio requires significant investment in renewal. That "point" is instead determined by the performance standards adopted in the entity's asset management strategy for each asset portfolio and, where appropriate, for asset sub-group types and critical assets. However, performance standards will in general range between 60% - 40% of CRC, depending on the nature and criticality of assets. In instances where specific performance standards have not been specified for individual asset portfolios, the norm of 50% should apply. The following table provides a general indication of how to interpret the outcome of the asset consumption ratio.

GRADE	DESCRIPTION	(DRC-RV)(CRC-RV)
1	Very Good	65% or more
2	Good	52.3% to 65%
3	Fair	46.7% to 52.3%
4	Poor	40% to 46.7%
5	Very Poor	40% or less

TABLE 2.A.1: General interpretation of asset consumption ratio



In some conditions the asset consumption ratio masks an emerging renewals backlog (consider scenario 2 and scenario 4a in the figure below). This especially tends to happen during periods of high levels of investment in new asset creation. Cities should therefore also report on the portfolio health grade as per **Table 2.A.1** above.

FIGURE 2.A.1: Illustrative condition distribution for various asset portfolio health grades





Interpretation of asset portfolio health grades:

- **Scenario 1 (Very good):** Overall, the asset portfolio is in very good condition. This situation tends to manifest in instances where initially there was limited demand or limited investment into the asset portfolio, with major expansion in the asset portfolio in recent times, which accounts for the high percentage of assets in very good condition and good condition. This situation can also exist when the nature of assets are critical, and cared for to a high standard (e.g. for operating theatres).
- **Scenario 2 (Good):** This represents a scenario where the entity's investment programme is skewed towards the creation of new assets, with little investment in renewals. The high levels of investment in new asset creation masks an emerging renewals backlog.
- **Scenario 2A (Good):** This represents the typical condition profile of a well-managed asset portfolio with a relatively small percentage of assets rated as critical, under conditions of financial constraints. The largest share of replacement value of assets are found in the condition range "Good" to "Poor". The renewals backlog, represented by assets in "Very poor" condition, requires attention but is in proportion to the overall asset portfolio, and manageable. Investment in new asset creation does not receive priority over investment in renewals.



- **Scenario 3 (Fair):** The overall condition of the asset portfolio becomes a matter of concern. Relatively high levels of investment in new asset creation takes precedence over investment in renewals.
- **Scenario 3A (Fair):** In this scenario, there is significant investment in new asset creation, evidenced by the large percentage of assets in very good and good condition. Simultaneously, a large proportion of assets are in fair to very poor condition, suggesting insufficient investment in asset renewal and future productive capacity concerns.
- **Scenario 4 (Poor):** This scenario presents the case of an aging and neglected asset portfolio. Renewals are under-funded, and there is little asset creation activity. Urgent attention is required to avoid large scale asset and service failures.
- **Scenario 4A (Poor):** This situation commonly occurs at the end of life of first generation assets constructed at scale and over a relatively short space of time, coupled with a recent and sustained programme of new asset creation. This scenario is indicative of the inability to care for large and expanding asset portfolios. Urgent, multi-year structured renewal programmes are required to avoid systemic asset and service failures. In such a situation a structured renewals programme alone is not sufficient – an optimised asset lifecycle plan is required that also considers portfolio optimisation (addressing over-design, redundancy etc.)
- **Scenario 5 (Very poor):** Asset portfolios are beyond the point where they are functionally fit for service, and service delivery collapse is imminent.

2.A.2 Maintenance

2.A.2.1 REPAIRS AND MAINTENANCE AS A PERCENTAGE OF CRC

Purpose

This ratio has two applications. Applied to budgeting, it gives an indication of the adequacy of budgeted expenditure for repairs and maintenance of assets. Applied to actual expenditure, it tests whether the city spent adequately on repairs and maintenance.

Formula and source data

The repairs and maintenance as a percentage of CRC ratio is calculated as follows:

$$\frac{\text{REPAIRS \& MAINTENANCE}}{\text{CRC OF IMMOVABLE ASSETS}} \times 100$$

The current replacement cost (CRC) of immovable assets can be obtained from the asset register. When the formula is applied for planning purposes, the amount for repairs and maintenance can be sourced from the asset management plan(s) or from the operating budget. When applied to assess actual expenditure, data on repairs and maintenance can be sourced from the Statement of Financial Performance.



Norm and interpretation

Provisional norms are between 1.8% - 2.2% for civil structures, and upto 4.5% per annum for electrical infrastructure. These norms should be reviewed once the current replacement costs of all asset portfolios have been established on a consistent basis, performance standards have been developed, asset lifecycle strategies developed and costed, and asset management plans prepared. Possible reasons for specific outcomes include:

Repairs and maintenance expenditure exceeds the norm:

- An increasing expenditure trend may be indicative of high asset-usage levels.
- The entity has a deteriorating asset base requiring high levels of major reactive maintenance.
- Renewals expenditure is incorrectly classified as repairs and maintenance expenditure thus artificially inflating reported repairs and maintenance expenditure.
- New assets are purchased and incorrectly classified as repairs and maintenance expenditure, also artificially inflating reported repairs and maintenance expenditure.
- There are high levels of inefficiency in the maintenance management function.
- Amounts calculated for either repairs and maintenance or CRC are incorrect.
- Norms established for this ratio require review and possible calibration.

Repairs and maintenance expenditure below the norm:

- A ratio below the norm indicates that insufficient monies are being spent on repairs and maintenance to the extent that it could increase impairment of useful assets.
- If an increasing expenditure trend suddenly drops to lower levels without an increase in the fixed asset value, this may be indicative of challenges in spending patterns. This may be the result of lack of planning, funding constraints or delivery capacity.



2.A.2.2 DEFERRED MAINTENANCE

Purpose

This metric quantifies the portion of planned maintenance work necessary to maintain the service potential of an asset that has not been undertaken in the period in which such work was scheduled to be undertaken.

Formula and source data

Deferred maintenance is calculated as follows:

$$\frac{\text{VALUE OF PLANNED MAINTENANCE FOR THE FINANCIAL PERIOD} - \text{ACTUAL EXPENDITURE ON MAINTENANCE}}{\text{VALUE OF PLANNED MAINTENANCE FOR THE FINANCIAL PERIOD}}$$

Data on planned maintenance can be sourced from the asset management plan(s), and data on actual expenditure on maintenance and repairs from the Statement of Financial Performance.

Norm and interpretation

The norm is 8% or less, which equates to one (1) month of delayed expenditure on repairs and maintenance, assuming an equal spread of maintenance expenditure across the year. Spending below this level is indicative of inefficiencies in the planning regime, funding constraints or delivery capacity. Sustained levels of deferred maintenance may lead to asset impairment.



2.A.3 Asset impairment

Purpose of this ratio

An impairment loss is the amount by which the carrying amount of an asset exceeds its recoverable amount. This can happen as a result of many factors, such as sustained poor care of assets, damage caused by operator error, structural failure due to poor design and/or construction, vandalism, damage caused by natural events such as flooding, or as a result of obsolescence – this is not an extensive list. This ratio measures the value of assets impaired compared to the carrying value of property, plant and equipment (PPE) and intangible assets for a financial period.

Formula and source data

This ratio is calculated as follows:

$$\frac{\text{IMPAIRMENT ON PPE AND INTANGIBLE ASSETS}}{\text{CARRYING VALUE OF PPE AND INTANGIBLE ASSETS}} \times 100$$

Data on the carrying value of PPE and intangible assets can be sourced from either the asset register or from the Statement of Financial Position, and data on impairment can be sourced from the asset register.

Norm and interpretation

The generally accepted norm is 0%. This is however a target, not necessarily reflective of reality. Where no impairment losses are reported, it may be necessary to review impairment testing practices.



2.A.4 Renewal

2.A.4.1 ASSET SUSTAINABILITY RATIO

Purpose

The asset sustainability ratio determines the extent to which an entity replaces the asset value consumed during a period of review in order to maintain service delivery capabilities. It is a measure of the extent to which the entity maintains the value of its capital stock or productive capacity.

Formula

The asset sustainability ratio is calculated as follows:

$$\frac{\text{CAPITAL RENEWAL AND REPLACEMENT EXPENDITURE}}{\text{DEPRECIATION EXPENSE}} \times 100$$

Data on the annual depreciation expense is sourced from the Statement of Financial Performance. Sourcing data on capital renewal and replacement expenditure is more tricky. It requires tracking of budgeted expenditure through the transaction process, and pulling data from the general ledger. A counter-check is to sum the value of assets derecognised for renewal and replacement purposes in the financial period.



Norm and interpretation

The norm is 100% under conditions where the demand for the service remains constant, or is growing. The outcome of this ratio can be interpreted as follows:

< 100%:

If the investment in renewal of assets does not at least equal the consumption of those assets, the entity is likely to experience future reduced service delivery capacity, breakdown in assets and significant increase in repairs and maintenance expenditure. The following are possible reasons for a ratio of less than 100%:

- The demand for the service is decreasing, and the entity is deliberately scaling down or phasing out operations – there is limited or no need to invest in asset renewal.
- Forced asset sweating due to financial constraints.
- Detailed plans for maintenance and renewal were not in place that may include (1) insufficient budget requests, (2) lack of detailed implementation plans or (3) a combination of both.
- Insufficient implementation capacity.
- Inefficient planning or management resulting in renewals work not being implemented in full during the period in question.
- Some renewals were deliberately deferred to coincide with a larger renewal or upgrading programme.
- Other reasons e.g. a large renewals contract was awarded to contractor x, and this appointment is disputed in court by contractor y.

> 100%

If more than 100% is spent it could indicate that:

- The entity is addressing a renewal backlog following a period of asset sweating.
- Actual renewals expenditure was higher than estimated expenditure as a result of (1) outdated estimates, (2) sudden and/or unexpected inflation or (3) a combination of these factors.



2.A.4.2 ASSET RENEWAL FUNDING RATIO

Purpose of this ratio

The asset renewal funding ratio measures the extent to which asset renewal is accommodated in the long term financial plan, as identified in the asset management plan. Whereas the asset sustainability measures past renewal activity, the asset renewal funding ratio provides management with a view on future renewal needs, and planned expenditure in relation to future needs.

Formula and source data

The asset renewal funding ratio is calculated as follows:

$$\frac{\text{NPV OF PLANNED CAPITAL RENEWALS OVER 10 YEARS}}{\text{NPV OF REQUIRED CAPITAL EXPENDITURE OVER 10 YEARS}} \times 100$$

Data on required capital renewal and planned capital expenditure is sourced from the asset management plan(s).

Norm and interpretation

The norm is between 90% - 100%. If the target is not materially achieved on an ongoing basis, then a mounting renewals backlog is sure to mount, and adverse impacts on service delivery are likely. Moreover, sustained performance below target over time across the public works' asset portfolios will require future investments in renewals of a magnitude that will likely create national fiscal challenges.



2.A.4.3 GREEN RENEWALS AGENDA RATIO

Purpose of this ratio

The National Immovable Asset Maintenance Standard supports the objective of environmental sustainability as expressed in:

- The National Environmental Management Act;
- The Energy Efficiency Strategy of the Republic of South Africa;
- The National Climate Change Response Paper; and
- The Green Building Policy (draft).

The need for asset renewal offers the opportunity for sustained, incremental greening of asset portfolios through green component and technology replacement. The green renewals agenda ratio provides information on the size of the renewals programme and the percentage of planned expenditure on this programme earmarked for green renewals.

Formula and source data

The green renewals agenda ratio is calculated as follows:

$$\frac{\text{NPV OF PLANNED GREEN RENEWAL EXPENDITURE OVER 10 YEARS}}{\text{NPV OF REQUIRED RENEWAL EXPENDITURE OVER 10 YEARS}} \times 100$$

The asset management plan(s) provides data on planned green renewals expenditure and required renewals expenditure.

Norm and interpretation

No norm exists for this ratio. In developing the asset management strategy and asset management plans, asset planners should assess the scope and feasibility of green renewals, taking into account policy, available green materials and technologies, lifecycle costs, implementation capacity and the outcomes of asset lifecycle plans, and establish an appropriate norm for each asset portfolio.

APPENDIX 2.B: EXAMPLE OF AM PRACTICE SPECIFICATIONS/ OBJECTIVES FOR ASSET DATA

Note: Concepts relating to asset data are explained in Module 3: Asset data model

TABLE 2.B.1: Process performance requirements: Asset data

PROCESS PURPOSE	
Process purpose and overarching performance requirements:	<ol style="list-style-type: none"> 1. A single source reference document that contains a record of asset information considered worthy of separate identification for both asset accounting and strategic management purposes including inventory, historical, condition, technical and financial information about each. 2. A credible asset register, certified as such by the Auditor General
PROCESS PERFORMANCE REQUIREMENTS	
PROCESS ATTRIBUTE	PERFORMANCE EXPECTATIONS/AM OBJECTIVES
Process performance	<ol style="list-style-type: none"> 1. The external auditor annually issues an unqualified audit result or expresses a clean audit opinion 2. The asset register reconciles with the general ledger of the accounting system of the city 3. The asset register directly informs the Statement of Financial Position of the city with respect to asset position, and Appendices B & C of the AFS are compiled from asset register information 4. Asset data from the asset register is used for purposes of AM planning and informs budgeting for maintenance and renewal
Performance management	<ol style="list-style-type: none"> 1. Levels of confidence for asset data have been defined (see Table 2.A.1 for an example) 2. An asset data collection and verification plan has been developed to ensure that asset data levels of confidence can be met 3. Responsibilities for maintaining and updating of the asset register have been formally defined, assigned and communicated
Work product management	<ol style="list-style-type: none"> 1. Standard templates and structures for new asset additions, asset verification, impairment, derecognition, the asset register structure, landfill rehabilitation calculations, impairment calculations, working papers and asset register reports have been developed, made available and communicated 2. Standard approval mechanisms are defined and implemented 3. Quality assurance processes are developed 4. An audit trail of all asset movements and transactions are implemented, maintained and updated
Process definition	<ol style="list-style-type: none"> 1. Standard operating procedures for asset verification, impairment testing, asset accounting, and asset safeguarding developed and documented 2. Competency requirements for executing asset data related processes have been determined and documented 3. Roles and responsibilities for executing the required processes have been defined 4. Infrastructure and resources for executing the processes have been defined (e.g. handheld devices, safety clothing and measuring equipment for asset assessment)
Process deployment	<ol style="list-style-type: none"> 1. Roles, responsibilities and delegations for performing asset data and accounting processes have been formally defined, included in approved job descriptions and/or performance contracts, and communicated 2. Personnel performing the asset data and accounting processes are competent based on stated appropriate requirements relating to education, training, certification and experience 3. External service providers appointed for preparing, maintaining and updating the FAR to provide documented proof of ISEA 3402 compliance, and the composition of the service provider's team to reflect the necessary skills, certification and experience to undertake these processes 4. Required infrastructure, resources and an appropriate work environment for executing asset data and accounting processes are available, managed and maintained
Quantitative and qualitative analysis and control – information needs	<p>Process information requirements include (limited examples only):</p> <ol style="list-style-type: none"> 1. Financial reporting <ul style="list-style-type: none"> • FAR financial summary • Appendices B & C to the Annual Financial Statements • Prior period corrections • Reclassification of assets • FAR reports at various levels within the asset hierarchy 2. Strategic asset management <ul style="list-style-type: none"> • CRC/DRC overview and analysis • Asset extent summary • Presentation of risk matrix by failure mode or RUL, at asset group type level, indicating likelihood and risk treatment cost • Spatial presentation of both assets and of critical customers for purposes of both resilience analysis and asset criticality analysis • Production of asset age and renewal profiles, and initial renewals programme • Maintenance budget requirements at asset group type level



PROCESS PURPOSE	
Quantitative and qualitative analysis and control – process performance measures	<p>The following are some examples only for the types of performance measures for the (1) Asset data model, (2) Asset data, (3) Process relationships, (4) Valuation asset register, (5) Financial asset register and (6) Internal audit:</p> <ol style="list-style-type: none"> 1. Asset data model <ul style="list-style-type: none"> • No unverified component types • No unverified descriptors • No duplicate components and descriptors • No superfluous components not used in the VAR and FAR • Unit rates, EULs and RVs calibrated for local conditions • EULs and RVs in line with the AM policy • The approach to grouping/segmentation is indicated for all component types 2. Asset data <ul style="list-style-type: none"> • All assets are annually assessed for impairment • A risk-based (indicator approach) asset verification plan is annually developed and implemented 3. Process relationships and alignment <ul style="list-style-type: none"> • Process relationships, inputs and outputs between asset data and other corporate processes have been defined, and includes budgeting, lifecycle delivery, contract management, property valuation, land management, the issuing of Section 82 certificates, risk and insurance • Process relationships listed in (a) above have been formally documented in the City's approved AM procedures document, which is aligned with other relevant corporate procedures 4. Valuation asset register <ul style="list-style-type: none"> • No empty/null/zero EULs, CRCs, RULs or DRCs • All fields considered "Essential are completed" • No DRCs > CRCs • No DRCs < RVs • Asset IDs allocated for all assets • Appropriate and complete location data for all components • SG codes provided for all land and investment properties • All assets spatially linked 5. Financial asset register <ul style="list-style-type: none"> • Opening balances agree with the previous year's closing balance • No carrying values < RV • Values for project capitalisation and WIP reconcile with the GL • Supporting working papers prepared for all calculations, changes in estimates, provisions and correction of prior period errors • An audit trail is available and maintained for all asset related transactions 6. Assurance <ul style="list-style-type: none"> • An annual internal audit is conducted covering (1) to (5) above • Bi-annual reporting to the Audit Committee covering (1) to (5) above
Process innovation	<ol style="list-style-type: none"> 1. Findings and recommendations of internal and external auditors as well as of AM assessors/auditors are analysed, formal responses prepared, and previous period audit findings are cleared 2. The city actively monitors developments in accounting and AM management standards, directives issued by the Accounting Standards Board, circulars published by the National Treasury as well as in best practice, and prepares action plans relating to these
Process innovation implementation	<ol style="list-style-type: none"> 1. Post implementation reviews of all process innovation/enhancement initiatives are conducted, and reported to senior management and the audit committee

TABLE 2.B.2: AM objectives relating to asset data confidence

DATA DIMENSION	REQUIRED CONFIDENCE GRADE											
	CRITICAL ASSETS						OTHER ASSETS					
	BELOW GROUND			ABOVE GROUND & INTANGIBLES			BELOW GROUND			ABOVE GROUND & INTANGIBLES		
	PHASE 1	PHASE 2	PHASE 3	PHASE 1	PHASE 2	PHASE 3	PHASE 1	PHASE 2	PHASE 3	PHASE 1	PHASE 2	PHASE 3
Extent & location	4	3	2	2	2	2	4	3	3	3	3	2
Age/dominant failure mode	4	3	2	2	2	2	4	3	3	3	3	2
Other failure modes	4	4	3	4	4	3	4	3	3	3	3	2
Nature (type, size, class, and a general descriptor)	4	3	2	2	2	2	4	3	3	3	3	2

Data confidence gradings are defined in Table 3.15. Note AM objectives relating to asset data confidence can (and should) be further refined taking a risk-based approach, but bearing in mind that the GRAP framework requires completeness on the extent of assets.



REFERENCES



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The Global Forum on Maintenance and Asset Management. GFMAM Asset Management Landscape 2014

Construction Industry Development Board. May 2017. Maintenance Monitoring and Evaluation Protocol for immovable assets

