eBOOK

SMART WATER FOR SMART CITIES

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INFRASTRUCTURE MANAGEMENT SOLUTIONS.

IMQS is a specialised software solutions company. We have provided proven Infrastructure Asset Management (IAM) Solutions & Services to over 100 government and private organisations in South Africa and Internationally for more than a decade.

FOREWORD

This E-book sets out to contribute to discussions on, and offer practical solutions to, challenges related to water infrastructure asset management in the African context. These selected articles by no means offer a complete picture of the complex domain of water infrastructure asset management. Rather, each article serves to tackle a particular topic in the South African context, where IMQS has played an active role in conceptualising and operationalising solutions to problems by means of technology enabled, geospatial infrastructure asset management. We hope the experiences in this book will help organisations who work in, or around, topics such as infrastructure asset management, water demand management, geographic information systems and smart technologies, to find a common thread and learn from IMQS's experiences and approach. The end goal is to contribute to a better understanding of water infrastructure asset management, what the challenges are in developing countries, and how smart solutions can enable authorities to become successful and service driven organisations.

Rob Knight, CEO
IMQS Software

INTRODUCTION

In 2011, while the Eastern and Western Cape were threatened by drought, flooding associated with El Niño affected 24 municipalities across all other major provinces of South Africa. According to the National Disaster Management Centre, 40 people had lost their lives and 6000 were displaced. Costs associated with infrastructure repair, such as loose pumps and motors, as well as the flooding of pump stations, exceeded R20 million. In the Limpopo Province, water borne diseases such as cholera have historically followed in the wake of such flooding. The recent floods in Tshwane and Johannesburg in 2016/2017, not mention the long-term drought in the Western Province has again displayed the strategic challenge water poses to South African municipalities.

Climate change has the potential to increase the frequency and severity of floods and droughts. Population growth, commercialisation and industrialisation place further pressures on authorities to meet growing demand in water scarce regions. Smarter, more effective management of water in relation to the urban water cycle can contribute to more effective Water Services Planning and Water Demand Management. Municipalities are the custodians of community infrastructure. The maintenance and management of physical infrastructure assets - infrastructure asset management - are therefore the cornerstone of delivering public goods and services. The municipalities whose solutions are resilient and scalable have the most opportunities to become Smart Cities.

In South Africa, the management of water resources and infrastructure accentuates the need for municipalities hard-hit by extreme weather patterns to change-step in their infrastructure asset management approach. In 2013 the Water Research Commission found that almost 40% (36.8%) of the total municipal water supplied in South Africa is lost before it reaches municipal customers, from industry to household. Although South Africa's water losses are in tune with the global average, South African municipalities are in crisis management mode, with the lack of information available on water loss furthermore indicating a general lack of awareness of a problem on their part.

A Smart City uses digital technologies to enhance performance and well-being, to reduce costs and resource consumption, and to engage more effectively and actively with its citizens. Smart Cities are those that have overcome the limited nature of their infrastructure. Another key term is resilience. By harnessing smart technologies, Smart Cities can become resilient to population growth, climate change and man-made disasters, among other things. Moreover, in order to engineer social upliftment in complex development-centred contexts, systematic, holistic and integrated approaches to the maintenance and management of public assets are imperative.

This E-book sets out to contribute to discussions on, and offer practical solutions to, challenges related to water infrastructure asset management in the African context. We hope the experiences in this book will help organisations who work in similar domains, such as infrastructure management, water management, GIS and smart technologies to find a common thread and learn from IMQS's experiences and approach. The end goal is to contribute to a better understanding of water infrastructure asset management, what the challenges are in developing countries, and how smart solutions can enable authorities to become successful and service driven organisations.

Contents.

OVERCOMING URBAN GROWTH CHALLENGES WITH DIGITAL INFRASTRUCTURE ASSET MANAGEMENT.

Cities in developing economies must become sustainable, smart and resilient if they are going to manage future challenges associated with rapid urbanisation. The need for robust, intelligent and integrated infrastructure asset management practices has never been this dire. How can digital infrastructure asset management contribute to building the sustainable cities of the future?

CITIES MUST OVERCOME URBAN GROWTH CHALLENGES.

Cities are central nodes in the development of human geographies. They are spaces where the flows of goods, capital and people converge. They rely on the management and good governance of public infrastructure for sustainable growth and stability, and to safeguard their populations against natural and man-made disasters.

International organisations such as the United Nations (UN) emphasise how rapid urbanisation across every major region of the globe will bring a variety of urban management challenges. According to the UN Department of Economic and Social Affairs (UNDESA)[1]:

- Global urban population grew from 746 million in 1950 to 3,9 billion in 2014
- 54% of the world's population was urbanised in 2014
- 66% - 70% should be urbanised by 2050
- 90% of this growth is estimated to take place in Asia and Africa

City governments need to nurture and expand their infrastructure ecosystems. Developing economies will struggle to provide housing, infrastructure, transportation, energy, employment and basic services. In Africa in particular, populations crammed into informal settlements and low-cost housing are most vulnerable to the effects of natural disasters, conflict and climate change[2].

City governments need a forward-looking systematic approach to urban growth in order to secure sustainable socio-economic development and ensure resilience in the face of disaster.

KEY GOVERNANCE POINTS INCLUDE:

- Access to and efficiency in the use of public services
- Reducing ecological footprints and financial fragility
- Ensuring resilience to natural and man-made hazards

Planning, building, operating and assessing public infrastructure becomes a fundamental part of this process.

HOW DOES DIGITAL INFRASTRUCTURE ASSET MANAGEMENT CONTRIBUTE TO SUSTAINABLE CITIES?

RAPID URBANISATION ACCENTUATES THE FOLLOWING CHALLENGES MUNICIPALITIES FACE:

- Tight financial controls
- Services delivery backlogs and failures
- Intelligent use of massive volumes of data generated from different asset classes
- Compliance to legislation and standards
- Data and management tools spread across disparate systems and processes

Digital Infrastructure Asset Management (IAM) makes use of advances in information technologies (such as sensors, remote monitoring tools, Cloud Computing and Internet of Things) to create integrated and holistic software solutions for key infrastructure management domains. A digital IAM strategy integrates data collection, verification and integration with financial, project management and maintenance components in order to manage the full life cycle of an asset digitally.

A service provider such as IMQS builds software products across a range of domains – Asset Management, Project Management, Sewer Management, Road Management, Electricity and Water. Our goal is to offer a client end-to-end, centralised, web-based and spatially enabled solutions for holistic and systematic management of all infrastructure assets.

The full range of products and services developed by IMQS in conjunction with its clients – such as the City of Tshwane and the municipalities of Ekurhuleni and Rustenburg – offer proven benefits in the following areas:

- Improved governance and accountability
- Enhanced service management and customer satisfaction
- Improved risk management
- Improved financial efficiency (cost savings)
- Informed decisions, and sustainable solutions

BUILDING INFRASTRUCTURE MANAGEMENT SOLUTIONS FROM THE BOTTOM UP.

In IMQS's experience, cities are diverse ecosystems. They each have their own fingerprint, breath and heartbeat. They are shaped in specific economic, cultural, political and geographic contexts. There is rarely a one-size-fits-all solution for the challenges they face.

According to UNDESA nearly half of the world's urban inhabitants live in smaller settlements of less than 500 000 people. Only one eighth reside in mega-cities of more than 10 million[3]. In Africa, poor populations are cramming into towns and cities characterised by limited, weak and often under-resourced infrastructure.

Larger cities may take the center stage in debates on global urbanisation and gain attention from major IAM service providers. From IMQS's perspective, smaller and medium-sized municipalities in resource scarce environments will need to be the focus for new cost-effective solutions that tackle real world challenges.

IMQS believes that it is never too late to start building your digital IAM system. As context is important, we focus on building solutions with our clients. This makes us excited! We have seen, first hand, how building digital IAM systems from the bottom up can reap rewards quickly.

IMQS has first-hand experience in building solutions where resources may be lacking, and therefore use a variety flexible and configurable technologies to develop software products that can easily integrate with existing systems.

Rapid urbanisation is a growing challenge. Small to medium size cities in resource scare environments will be the playing field where new solutions are tested against real-world challenges. IMQS and its partners will be developing exciting products to support municipalities of every size as they attempt to become sustainable, resilient and smart.

By working together today we can better secure the sustainable future of our urban tomorrow!

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THE VALUE OF WATER DEMAND MANAGEMENT SOLUTIONS.

With the extreme weather conditions South Africa currently faces, the value for efficient water management can not be emphasised enough. How can the implementation of Water Demand Management solutions aid in times of drought?

The traditional approach to water supply and storm water infrastructure focuses on the development of more supply, based on a presumed need for new infrastructure. New infrastructure includes the construction of new dams, reservoirs, tanks, reticulation systems and major water transfer schemes. These engineering solutions have been effective for a period of time. However, the need has arisen for an alternative approach, as supply-sided solutions only postpone the inevitable.

Water Demand Management (WDM) is an alternative approach where the fundamental outcome is to reduce the need for new supply infrastructure through a range of measures including:

- Conservation-based tariff structures
- Effective water loss management
- Recycling wastewater
- Creating awareness

While municipalities across the globe increasingly apply systematic approaches to water management through WDM, a key obstacle in the WDM process remains data. In order to optimise efficient and effective delivery of water to consumers at an affordable cost, accurate information (data) about water distribution and consumption is critical.

PROBLEMS RELATED TO CAPTURING AND CONSOLIDATING DATA IN THE WDM PROCESS CAN RESULT IN:

- Poor infrastructural planning
- Inadequate service delivery
- Poor management of water infrastructure and resources
- Inefficient utilisation of water

DATA-RELATED OBSTACLES IN THE WATER DEMAND MANAGEMENT PROCESS.

The first phase in the WDM process involves the collection and verification of data. This may include bulk meter readings within distribution systems, wastewater flows, rainfall figures, information from previous leakages, system daily flow patterns and identifying information gaps .

In IMQS's experience treasury systems are not designed to produce information and statistical reports required by managerial and operational staff responsible for WDM. Furthermore, data is generally not spatially referenced, which would allow links to cadastral database applications in GIS. Obtaining relevant information therefore tends to involve an inefficient process of firstly extracting information from databases and secondly using additional tools to manipulate data and perform statistical calculations. Although the calculations needed to produce the information are theoretically simple, the volume of data that is involved makes it difficult to use spreadsheets. Even in relatively small towns, where there are less than 15 000 stands, it has been found that spreadsheets become prohibitively inefficient and clumsy.

Strategies based on inaccurate consumption and financial information ultimately become a key risk for developing sustainable and holistic WDM plans.

CAN SOFTWARE SOLUTIONS HELP?

The last two decades have seen rapid advances in technology and information exchange. This has progressively facilitated data collection. The value of this data, however, depends on how it is managed. Carefully managed information is power and can provide actionable information for utilities to strategise and improve performance. In order to reap the benefits of data collection, information must therefore be organised and integrated.

Various software solutions have been developed to optimise efficient and effective delivery of water to consumers at an affordable cost. The fundamental information required to analyse water demand and consumption comes from Municipal Treasury Databases (or similar sources of data) where monthly meter readings are stored along with stand-related information.

By using **WDM software solutions**[1], public and private organisations are empowered to consistently improve service delivery to their clients. When the right people are equipped with the relevant information, planning and operational processes can function at optimal levels.

The spatial integration of data allows for a better understanding of the distribution and location of various factors pertaining to water demand and consumption within municipal boundaries. Software solutions therefore enable municipalities to start building a strategic pro-active approach to Water Demand Management and thereby start playing a more responsible role in the management of water as a scarce resource.

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MOVING TOWARDS COMPREHENSIVE WATER DEMAND MANAGEMENT.

Water scarcity has become an issue of global concern. Water Demand Management (WDM) is one approach to sustainable management of water, but it relies on the right operational and financial information being made accessible to the right people at the right time. Find out more about how IMQS's Water Demand Module helps water utilities with comprehensive WDM efforts.

WATER SECURITY A GLOBAL ISSUE.

Globally, growing changes in water demand and supply are exacerbating water scarcity. According to a recent World Bank[1] report, the world will face a 40% shortfall between forecast demand and available supply of water by 2030. By 2025, about 1.8 billion people will be living in regions or countries with absolute water scarcity.

FACTORS INFLUENCING WATER SCARCITY:

- Population growth
- Changes in lifestyle
- Demographic structure
- Climate change
- Rapid development
- Urbanisation
- Rising standards of living

At the 12th Meeting of the International Consortium for Water Resource Economics in September 2016, water security was a central theme. The message that emerged was that, unless action is taken soon to address water issues more comprehensively, challenges surrounding water could cost some regions up to 6% of their GDP by 2050[2].

Water utilities will therefore play a pivotal role in mitigating the threats associated with hydro-security, especially in water-scarce regions of the world.

WATER DEMAND MANAGEMENT.

There are typically two potential approaches to managing water:

- Supply-side management - relates to meeting demand with new resources.
- Demand-side management - relates to postponing or avoiding the need to develop new resources by dealing with demand.

Worldwide, emphasis has shifted to demand-side solutions. Water demand management involves the adoption of policies or investments by a water utility to achieve efficient water use by all members of the community and optimise the use of available water resources and infrastructure.

DEMAND MANAGEMENT MEASURES:

- Cost-reflective pricing
- Universal customer metering
- Reticulation leakage detection and repair programmes and pressure reduction
- A communication strategy, including a community education campaign
- Reduction of water use by the water utility
- Use of reclaimed water (e.g. waste water/grey water) to reduce the need for fresh water supplies
- Water use restrictions, either on a temporary or permanent basis

Strategic planning in both areas of operations and finance is a key aspect of a successful WDM strategy.

OPERATIONAL ISSUES:

- Understanding constraints
- Establishing how much water is used
- Determining potential reduction through implementing new equipment
- Developing programmes to achieve improvements

FINANCIAL ISSUES:

- Evaluating WDM measures to ensure they are cost-effective
- Determining the sequences in which measures are implemented. For example, establishing a fair and efficient pricing system for water is only possible when all customers are metered

THE IMQS WATER DEMAND SOLUTION.

The above, interlinked aspects of WDM rely on the consolidation and distribution of operational and financial information about the water demand cycle. Moreover, information needs to be made accessible across departments, as well as geographically linked for stakeholders to better understand where all relevant water assets are located in space.

IMQS's integrated software solution that supports the effective fulfilment of WDM is based on the specialist software package called SWIFT. The Water Demand module solves a variety of WDM problems by equipping the right people with relevant information at the right time. Practical information is presented in a number of categories that can be put to use almost immediately by managers and operational staff.

THE WATER DEMAND MODULE OFFERS CUSTOMISABLE VIEWS ON THE FOLLOWING AREAS:

- Water Demand and Consumption
- Unaccounted for Water
- Statistical Reports
- Stand-related Information
- Financial Information
- Spatial Geographic Information

As with other modules such as the **IMQS Electricity Demand Management (ELIFT)**[3] module , the primary capability of the Water Demand module delivers practical results is the rich and customisable reporting features. The Water Demand module allows municipalities (and other organisations responsible for WDM) to customise a range of settings, so that analyses can be performed of any treasury database and reports can be delivered in a variety of ways that are relevant to different roles.

For more information on IMQS's Water Demand module, download our **White Paper**[4] or see our latest **Infographic**[5].

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INFOGRAPHIC: THE 4 PILLARS OF WATER DEMAND MANAGEMENT.

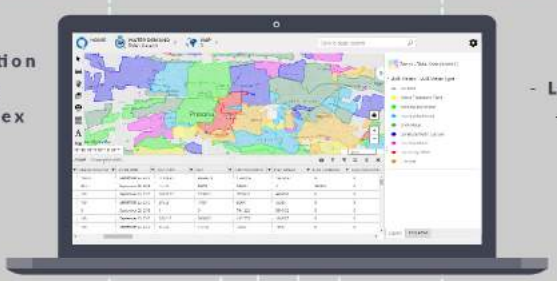
How does IMQS's Water Demand Management Module support the Four Pillars of Water Conservation and Demand Management?

THE 4 PILLARS OF WATER DEMAND MANAGEMENT

How does IMQS's Water Demand Management Module support the Four Pillars of Water Conservation and Demand Management?

ANALYSE
- Actual & modeled consumption
- Hydraulic model linking
- Infrastructure leakage index

QUERY
- Consumer profiles
- Land use



DETECT
- Irregular usage
- Large Water Consumers
- Non-revenue water

VISUALISE
- GIS
- Reports

1 FINANCIAL

2 TECHNICAL

3 SOCIAL

4 LEGISLATIVE

EFFECTIVE TARIFF BENCHMARKING

MINIMALISE LOSSES

PERFORMANCE MONITORING

INCREASE COST RECOVERY

PUBLIC AWARENESS & EDUCATION

SERVICE LEVEL AGREEMENT

OPTIMISED OPERATIONS AND MAINTENANCE TO CURB WATER-INSECURITY AT RUSTENBURG.

On 30 January 2017, Rustenburg Local Municipality officially launched IMQS's Maintenance Management system as part of a broader drive to manage its water-insecurity. Find out how IMQS has helped to opitimise Rustenburg's operations and maintenance in the area of water.

WATER-INSECURITY AT RUSTENBURG.

Effective operations and maintenance (O&M)[1] supports the provision of services and bolsters sustainable economic development. In order for this to take place, authorities need to make the most of their existing asset base to increase asset productivity and longevity.

In South Africa, the management of water resources and infrastructure accentuates the need for South African municipalities hard-hit by drought to change-step in their infrastructure asset management approach. Rustenburg has been no exception. Variable rainfall, intersected by exponential population growth and huge mining operations, makes the North West Province highly water-insecure.

In light of its hydro-vulnerability, Rustenburg identified the need for the improved management of its water and sewer infrastructure and related processes with a focus on improving operations and maintenance. Rustenburg appointed GLS and IMQS, both from the EOH Smart Government division, to establish a smart-water solution that could provide:

- Easy access to infrastructure information
- System performance results
- A plan to accommodate anticipated future growth within the municipal boundaries

DIGITALISING RUSTENBURG'S WATER NETWORK.

A first step towards smart-water management[2] is to establish electronic water and sewer hydraulic models from numerous sources. Models provide a sense of the reliability of the information and help indicate what improvements could be made. GLS was put to the task of digitalising Rustenburg's water-network and developing a water master plan for the municipality.

To load the hydraulic models with real world demands, municipal water billing information was analysed, converted to water consumption, and spatially distributed within the models using GLS' Swift software. A number of projects identified as a result of the analysis are already being implemented, including a major rezoning project, as well as an upgrade to and optimised distribution of the Bospoort WTP. Mid- and long-term projects form the master plan to accommodate a potential doubling of the present water demand over the next 45 years.

VISUAL ASSET INFORMATION MANAGEMENT.

With Rustenburg's entire water system mapped, the IMQS Web platform has become the central node in managing Rustenburg's asset information geographically.

The IMQS Web platform allows for the latest network models and treasury data to be displayed on a number of interactive map layers. A user-friendly environment facilitates rapid access to, and interrogation of, municipal infrastructure and treasury data, at a pipe-by-pipe and stand-by-stand level of detail.

Up-to-date information, as well as the capacity for the platform to host real-time data from the field, allows Rustenburg municipal staff to easily monitor system performance and identify the need for timely interventions. The updated models and master plans are uploaded to IMQS regularly to ensure that current information is always accessible.

IMQS'S MAINTENANCE MANAGEMENT MODULE.

IMQS's Maintenance Management Module, launched on 30 January, was developed as part of a broader drive towards holistic infrastructure lifecycle asset management at Rustenburg. IMQS developed a GRAP 17 compliant Maintenance Management system for Rustenburg built on the back of a fully integrated and living Financial Asset Register.

As an "engineering solution for engineers", all engineering and financial asset information is consolidated on one GIS-centric web platform that assists managers to:

- Determine risk and performance profiles across different asset classes
- Make informed decisions
- Act decisively
- Communicate information across engineering and financial departments

SMART SOLUTIONS, SMART GOVERNMENT.

In addition to increased accountability and improved decision-making, the new system has allowed for more effective resource utilisation, proactive maintenance, and enhanced resilience to crises. One of the project's greatest achievements has been the continuous reduction of overtime from R1,5 million in 2015 to R328,000 in 2016. In terms of water, the IMQS Maintenance Management system has enabled Rustenburg to:

- Reduce water leaks
- Identify problem areas in space and time
- Resolve problems efficiently according to actionable information
- Reduce illegal connections
- Reduce the number of faulty meters

At Rustenburg, technology has become a driver of innovative change to overcome service delivery challenges whilst also satisfying infrastructure-related demand.

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7 INFRASTRUCTURE-RELATED INTERVENTIONS TO REDUCE MUNICIPAL WATER LOSS.

Utilities need to ensure that quality water is provided to all relevant sectors of society. Water loss is a major threat to water security. Drakenstein Municipality, in South Africa's water strapped Western Province, has been successful in bringing down water losses from 34% to an average of 11%, at its lowest, with these 7 infrastructure-related interventions.

WATER SCARCITY.

Water scarcity is a societal issue that, according to the **World Economic Forum's 2015 Global Risk Report**[1], ranked as the number one global risk in terms of expected impact.

In South Africa you don't have to look much further than the City of Cape Town to see how climate variability and rapid urbanization put pressure on depleted water resources in water scarce environments. With **dams at critical levels**[2] and Cape Town at an estimated **"less than 100 days of water"**[3], water security takes on a more personal meaning for all effected citizens.

WATER CONSERVATION[4] CAN BE DEFINED AS:

The minimization of loss or waste, care and protection of water resources and the efficient and effective use of water.

Although crisis elevates the need for systematic water conservation practices, proactive measures lead to sustainable outcomes.

In this regard, City of Cape Town's neighbour, **Drakenstein Municipality**[5], stands as an example for others. In 1999, Drakenstein's water losses stood at 34% and were increasing. The municipality began prioritising projects and introduced a 20-year project plan that has helped to curb the crisis and save over R700 million.

The following 7 interventions have helped Drakenstein drastically reduce its water loss.

7 INFRASTRUCTURE-RELATED INTERVENTIONS.

FROM AN INFRASTRUCTURAL PERSPECTIVE, ACCORDING TO SOUTH AFRICA'S STRATEGIC FRAMEWORK FOR WATER SERVICES[6], OWNERS OF WATER-SERVICES INFRASTRUCTURE NEED TO:

- Maintain a register of water services infrastructure assets
- Put a system in place to manage this infrastructure in terms of a maintenance and rehabilitation plan
- This plan must be based on the principle of preventative maintenance and must be part of the water services development plan
- Infrastructure assets must be rehabilitated and/or replaced before the end of their actual and estimated useful lives
- Necessary capital funds must be allocated for this purpose

ONE OF THE BIGGEST THREATS TO SUSTAINABLE AND EQUITABLE WATER SERVICES, ACCORDING TO THE STRATEGIC FRAMEWORK, ARE:

- Under-expenditure in maintenance
- Under-investment in rehabilitation

In order to prioritise the rehabilitation and/or replacement of water infrastructure assets before the end of their actual (AUL) and estimated useful lives (EUL), Drakenstein makes use of the IMQS Water Module. IMQS Water Module is a software package that facilitates the management of all water service infrastructure-related information, which, at Drakenstein, is centralised in a self-developed Asset Management System.

IMQS WATER CONSISTS OF SOFTWARE SOLUTIONS FOCUSED ON:

- Water Demand Management (WDM)
- Water Services Development Planning (WSDP)
- Storm Water Management

The fundamental information required to analyse water demand and consumption comes from Municipal Treasury Databases (or similar sources of data) where monthly meter readings are stored along with stand related information. Once the results have been generated by engineering software, the WDM component can display customisable, geographic views on the data and deliver relevant information based on a person's role in the water-demand cycle.

The IMQS Water Module helps to centralise financial and engineering information in a GIS-centric information management system that provides municipal managers with a spatial representation of their water networks. An integrated, digital view of the asset landscape facilitates decision-making for maintenance management and helps managers to locate their assets in space, and understand their assets over time.

SEVEN KEY INTERVENTIONS OVER THE PAST 17 YEARS HAVE HELPED DRAKENSTEIN CURB WATER LOSS:

1. Pipe replacements
2. Bulk and domestic water meters replacement
3. Pressure management
4. Leak detection and repair
5. Stepped water tariffs
6. Public awareness campaigns
7. Upgrade information and management tools

7 INFRASTRUCTURE-RELATED INTERVENTIONS.

By acquiring a one-world-view of its infrastructure asset landscape, Drakenstein has been able to systematically manage its water distribution network over time.

Key infrastructure-related initiatives have brought water losses down to an average of **16% – 11%**[7] at its lowest. Between 1999 and 2014, water loss reduction translated **into R700 million water savings**[8]. In the 2015/2016 financial year, water losses stood at just 13%.

A decreased loss of water has enabled the municipality to delay the construction of reservoirs and large pipelines for several years. Reaction time to attend to burst pipes was also reduced to less than one hour. Finally, there was also a decrease in the occurrence of burst pipes.

For more information on IMQS's Water Module check our Infographic or download our White Paper[9].

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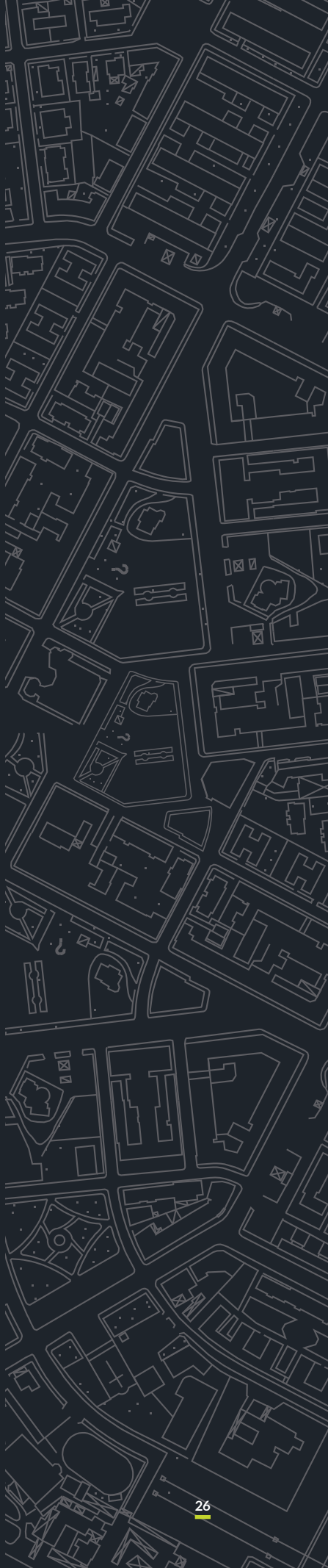
OUR SOLUTIONS.

The consequences of not managing infrastructure assets proactively can lead to unnecessary costs, infrastructure failure as well as health and safety issues.



To address the various problems that Infrastructure Asset Management presents, IMQS offers a modular set of solution operating independently or in an integrated manner.

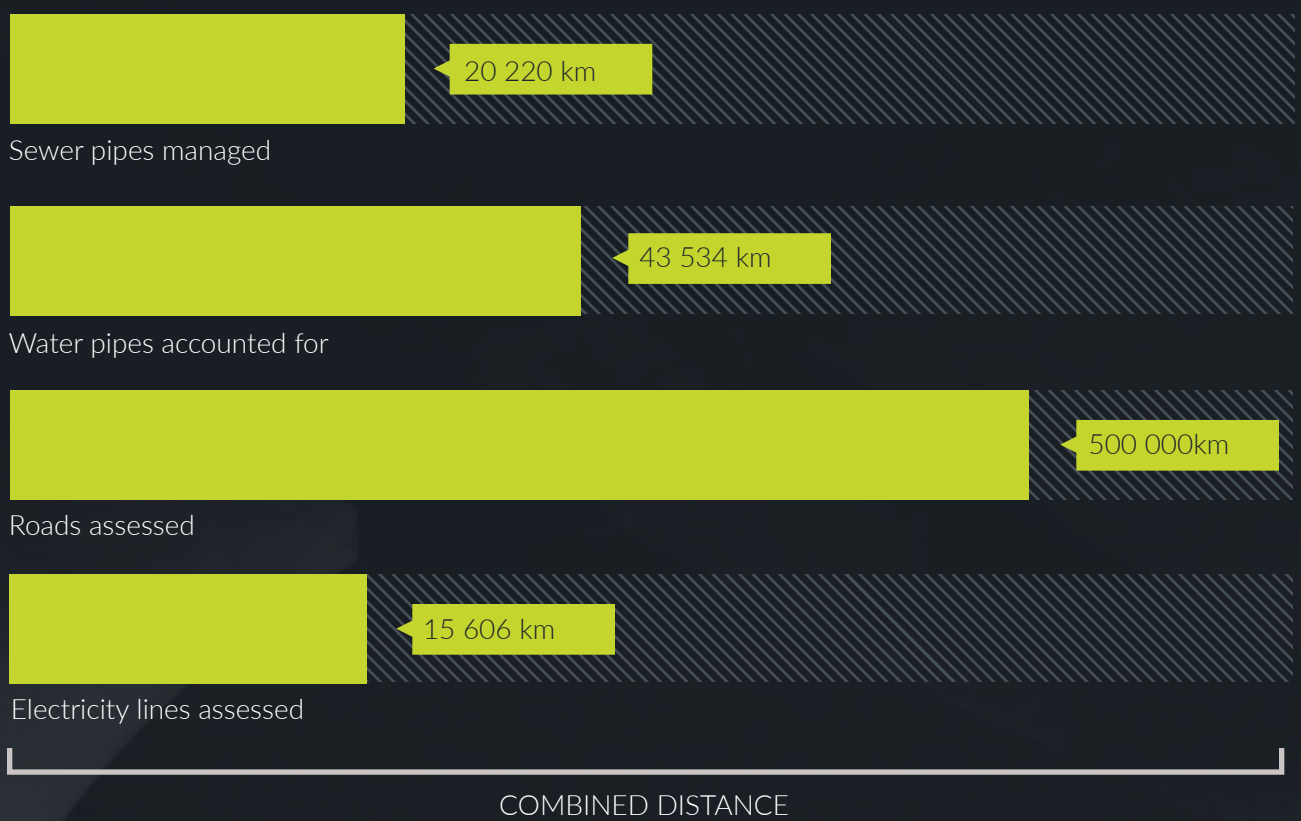
A summary of the various modules, categorised by infrastructure type, are as follows:

INFRASTRUCTURE TYPE	KEY CAPABILITIES & FEATURES
 ENERGY	• Plan more effectively and proactively for existing and future energy demands • Report on results produced during a master planning process • Interfaces with treasury or other meter reading databases • View / present utilisation, revenue, electricity demand / loss data on an area-by area basis
 ROADS	• Web-based, spatially-enabled Pavement Management System • Monitor road networks • Communicate information and maintenance needs • Identify, quantify and prioritise maintenance and rehabilitation needs • Analyse and model the condition of road segments
 WATER	• Transition from a purely supply-based focus to a proactive demand management focus • Improve the ability to reduce expenditure on new infrastructure because demand management initiatives can be effectively implemented • Develop plans to progressively ensure efficient, affordable, economical, and sustainable provision of water and sanitation services

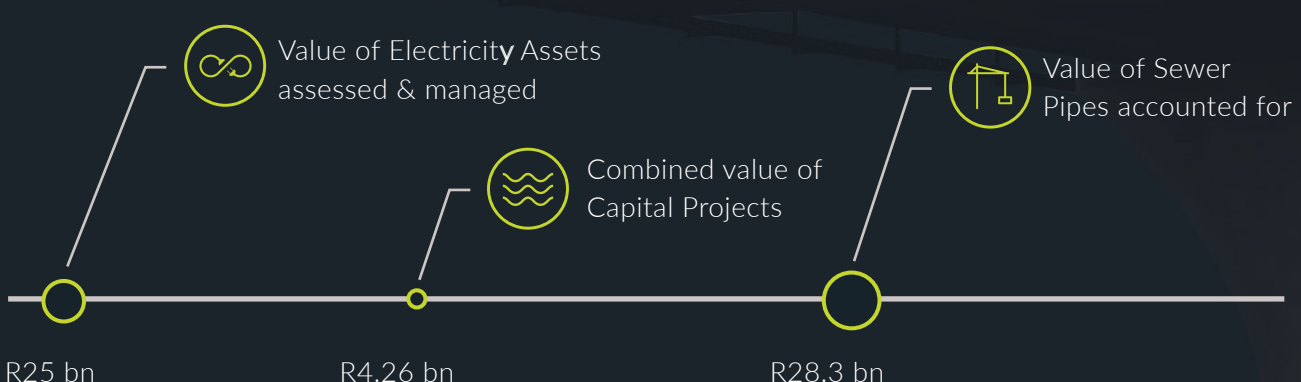
INFRASTRUCTURE TYPE	KEY CAPABILITIES & FEATURES
 SOLID WASTE	• Web-based, spatially-enabled Solid Waste Management Service Infrastructure application • Capture base data related to Solid Waste Management site infrastructure • View fixed assets contained within the Solid Waste Management sites • Document linking, searching and retrieval
 PROPERTY & BUILDINGS	• GIS based viewer and reporting tool • Technical site assessment • Financial modules
 SEWER PLANNING & ADMINISTRATION	• Development of Water and Sewer Master Plans • Population of water and sewer models' databases • Sewer tariffs can also be billed according to water consumption • Calculate the income and tariffs for sewage discharge
 STORM WATER	• Web-based, spatially-enabled Storm Water Management System • Provides data necessary for improving safety and reducing damage • Optimise funding towards storm water management • Prioritise problem areas, risks management and projects

FUNCTION	KEY CAPABILITIES & FEATURES
 ASSET MANAGEMENT	• Provides a structured approach for the development, coordination and control of activities relating to infrastructure assets by an organization over the lifecycle of its assets • Access and integrate asset management data seamlessly • Supports the identification and management of risks throughout the lifecycle of infrastructure assets
 PROJECT CONTROL SYSTEM	• Allows infrastructure projects to be planned and managed with excellence • Provides the following minimum functions: - Project Creation - Program Management - Budget Management - Project Planning - Spatial Representation - Project Reporting • Provide complete control over costs and effective monitoring • Increase real-time visibility into key performance indicators • Ensure compliance with corporate governance, laws and regulations • Provide best of breed ‘construction project’ functionality

IMQS IN NUMBERS



100% GRAP Compliant



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