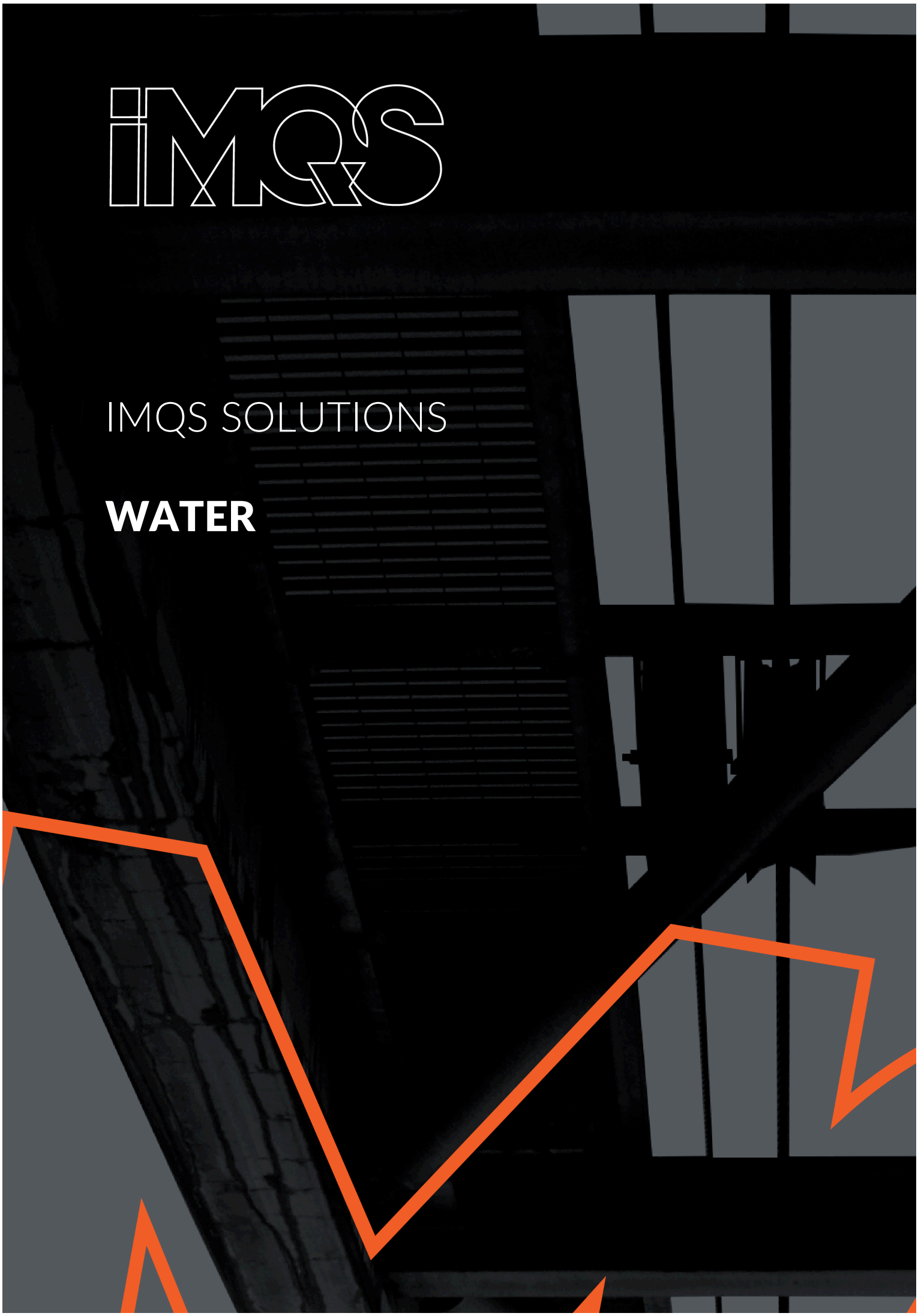

IMQS

IMQS SOLUTIONS

WATER

OVERVIEW

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. 'Demand Management' 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, reuse of wastewater and creation of awareness.

In order to optimize efficient and effective delivery of water to consumers at an affordable cost, accurate information about water distribution and consumption is critical. IMQS has developed proven software solutions that support the effective fulfilment of the following functions:

- Water Demand Management (WDM). The IMQS module for this requirement is called 'SWIFT'
- Water Services Development Planning (WSDP). This solution is simply called 'WSDP'.
- Storm Water Management

The fundamental information required to analyse water demand & 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 the engineering software, SWIFT can display customisable views on the data and deliver relevant information based on a person's role in the water demand cycle.

PROBLEM(S) / PAIN POINTS

The problems are represented below by category

INFORMATION CATEGORY	EXAMPLES
Water Demand Management	• Typical treasury systems are not designed to produce information and statistical reports required by managerial and operational staff responsible for WDM. • Data is not spatially referenced, which would allow links to cadastral database applications in GIS. • Obtaining relevant information involves 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
Water Services Development Planning (WSDP)	• Accurate and up to date information is not available for producing a compliant Water Services Development Plan • Producing WSDP's consumes considerable time and finances
Storm water management	• Insufficient data for planning storm water infrastructure and managing relevant inventories • Insufficient leveraging of rainfall run-off • Safety of residents from storm water risks is insufficient. • Funding towards storm water management is not being managed properly

The abovementioned problems result in poor infrastructural planning, inadequate service delivery, poor management of water infrastructure & resources and inefficient utilisation of water.

SOLUTION(S)

The SWIFT 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 (explained in the table below) that can be put to use almost immediately by managers and operational staff.

INFORMATION CATEGORY	EXAMPLES
Water demand & consumption	• Swift delivers customisable information about water consumption that can be produced a variety of ways (including geo-spatial data)
Unaccounted for water	• Before unaccounted for water in a system can be determined two things must be known namely (a) the amount of water being supplied to the system and (b) the amount of water that is actually being consumed by the users within the system. • Provided that the above information is available, SWIFT can produce a range of analytical tools and information types that can be used practically to identify unaccounted for water. • The data in Swift includes individual water meter readings for each of the consumers in the system. Swift calculates the total water sold to each user. • Each user is linked in turn to any number of bulk meter zones through a cross-reference table so that the total water sold within each bulk meter zone can be calculated. • Comparing these totals to the total bulk meter input gives the unaccounted for water for the zone

INFORMATION CATEGORY	EXAMPLES
Statistical reports	There are numerous standard statistical calculations that SWIFT performs. These reports are generated for the current as well as several future development scenarios. Standard reports, based on Suburb Category or Bulk Water Meter Zone Category, and generic reports on any user selected field can be produced for: • Total Water consumption (kl/annum) • Annual Average Daily Demand (kl/day) for the meter, stand or user on the stand • Unaccounted for Water • Unit Water Demand per stand or meter (kl/day) • Occupancy rate of stands/stands • The query builder also allows further queries on the data to be performed
Stand related information	SWIFT includes data for every stand and every meter in the study area. Fields in the databases include information on stand related data such as: • The owner • Consumer • Address • Land use • Zoning • Consumption • Tax tariffs of the stand. • The value of the stand • Improvements are also included. • Information related to the meters includes the meter readings, the meter serial numbers and the date of installation.

INFORMATION CATEGORY	EXAMPLES
Financial information	A financial module is included in SWIFT which enables the following capabilities: • Analyses and tracks the income attributable to water sales. • Determines the stepped tariff structure for water sales • Defines the tariff structure against which the water consumption must be billed. • Allows the user to define tariff structures according to different categories / codes. . • Describes the different steps in water consumption and the related charge per kilolitre of water. Fixed monthly charges can also be incorporated into a tariff structure. • Calculates the income through water sales for each of the records based on the assigned tariff structure. • Determines the water consumption, income through water sales and the number of users per step in each tariff structure. • Easy assessment of the effect of changing the water consumption steps and/or the related tariff. • Sewer tariffs can also be billed according to the water consumption. Swift can therefore also be used to calculate the income and tariffs for sewage discharge.
Spatial / Graphical information	• Visual queries can be performed on data by means of either a GIS system or IMQS (Infrastructure Management Query Station). • Spatial queries produce thematic maps of land use, water use or large consumers. The benefits of these visual queries are numerous and provide important information for both the engineer and treasurer.

INFORMATION CATEGORY	EXAMPLES
Water Services Development Plan	• Water Services Development Plan (WSDP) is a plan to progressively ensure efficient, affordable, economical, and sustainable provision of water and sanitation services. • WSDP is a legal requirement as stipulated in Water Services Act (Sections 12 & 13) and therefore every Water Services Authority must prepare a Water Services Development Plan for its area of jurisdiction. • The WSDP produced by this module has a fixed structure and format which is mandated to be user friendly, understandable, functional and readily available (electronic & hardcopy).
Storm Water Management	The storm water module provides a facility whereby the Storm water Management Service Department would be able to: • Define the storm water infrastructure asset inventory • Minimize disruptions and damage • Ensure residents are safe at all times • Utilizing the benefits of rainfall run-off • Optimise the funding towards storm water management

PRIMARY BENEFITS

- Vastly improved ability to continually improve service delivery to consumers
- Equipping the right people with the adequate information will drive optimisation of planning and operational processes.
- Contributes to assisting municipalities in evolving from a reactive approach to a proactive strategy in executing Water Demand Management
- Allows users to access a multitude of information about water demand, availability and consumption in report, graph or map formats.
- Spatial integration of data allows for a better understanding of the distribution and location of various factors pertaining to water demand & consumption within municipal boundaries.
- Ability to quickly produce compliant WSDP reports

TECHNICAL / FUNCTIONAL / FEATURE INFORMATION

SWIFT (WATER DEMAND MANAGEMENT MODULE)

As with other modules such as ELIFT (Electricity Demand Management module), the primary capability of SWIFT that delivers practical results is the rich and customisable reporting features. SWIFT allows municipalities (and other organisations responsible for WDM) to customize 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. The capabilities have been proven to contribute to the effective execution of the following activities:

- Water Demand Management Initiatives
- Water Audits
- Identifying unaccounted for Water Calculations
- Calculation of Water Tariffs
- Water Consumptions Profiles for User Defined Categories (e.g. Land Use)
- Development of Water and Sewer Master Plans

- Identification of Faulty Meter Readings
- Population of water and sewer models' databases

WATER SERVICES DEVELOPMENT PLANNING MODULE

- This module and competency entails the creation of a centralised database and document compiler which is essential for producing a compliant WSDP.
- IMQS enables the relevant authority to access existing information stored in its data-warehouse and combines this with WSDP specific information to automatically compile and generate a WSDP report.

STORM WATER MODULE

This module provides a web based spatially-enabled Storm Water Management System application that contributes to IMQS's integrated Asset Management and Asset Registering suite of products. Rainfall cannot be managed; it can at best be predicted. Run off can however be managed. Management includes infiltration, attenuation, evaporation and conveyance all of which can be effectively executed by delivering the right information to the right people at the right time. The storm water module provides the following features that contribute to the effective management of run off:

- The storm water infrastructure inventory defined for asset register purposes
- The capacity of the storm water network, run-off peaks and volumes
- The effect of simulated high flows
- The magnitude and locality of problem areas
- The priorities of the different problem areas
- The budget needed to solve the identified problem areas
- The maintenance needs of the storm water infrastructure
- Management systems should therefore also allow the user to define the storm water infrastructure asset inventory that will form the basis of the storm water assets in the authority's asset register.

CLIENT REFERENCES

- Johannesburg Water
- City of Tshwane
- City of Cape Town
- Nelson Mandela Metropolitan Municipality
- 24 Local Municipalities in Western Cape
- Buffalo City Municipality
- Mbombela, Midvaal, Lesedi and Emfuleni Municipality