

Asset management information system for water and sanitation in the iLembe District Municipality

iLembe District Municipality has acquired an asset management information system for water and sanitation to identify shortcomings and continuously improve the status in the field for better control of the bulk operations and distribution to end users writes **Nicolas Savva, Asset Management Expert, EDAMS Technology, a division of Hydro-Comp.**

The iLembe District Municipality is the designated Water Services Authority (WSA) and is also a Water Services Provider (WSP) for areas not served by the water concession in the district (see article on page 2 concerning the Siza Water concession).

Having a customer base of more than 60 000 households of various income levels and serving a large, varied geographic area, proves challenging for the district.

The main challenges faced by iLembe District Municipality in the water and sanitation sector have been identified as follows:

- Ageing Infrastructure and related funding requirements.
- High non-revenue water (NRW) levels resulting in additional production and distribution costs as well as lost revenues.
- Low productivity in terms of its operations and maintenance.

An appropriate, accurate Infrastructure asset register which is spatially enabled, where the data can be updated and maintained, was identified as key to addressing these challenges.

Project objectives

The iLembe District Municipality identified the need to improve systems, processes and operations to improve asset management in water and sanitation services and sourced assistance from the Vuthela iLembe LED Support Programme which developed terms of reference for procurement of an asset management information system during 2022.

The budget allowed for a system that would assist in operations, maintenance and planning for maintenance activities; facilitate job card management; and assist in addressing NRW management. The system must also have capacity for the use of mobile technologies to assist field workers with data management instead of relying on hard copies and manual data entries.

The EDAMS System

<https://edams.com/products>

The EDAMS System is a comprehensive Utility Enterprise Management system covering all commercial and technical functions. It is integrated with the organisation's financial, GIS, fixed asset management and Supervisory Control and Data Acquisition (SCADA) systems and provides a coherent enterprise system solution for the modern utility.

The EDAMS data model is structured in such a way that it constitutes the organisation's technical (fixed) asset register and can further be used for all relevant applications such as mapping, maintenance, engineering analysis (modelling), demand management (e.g., NRW), asset valuation, rehabilitation planning and customer care, and provide summarised input to the financial asset register. It can also be used for the financial billing and revenue management of a utility.

Project implementation

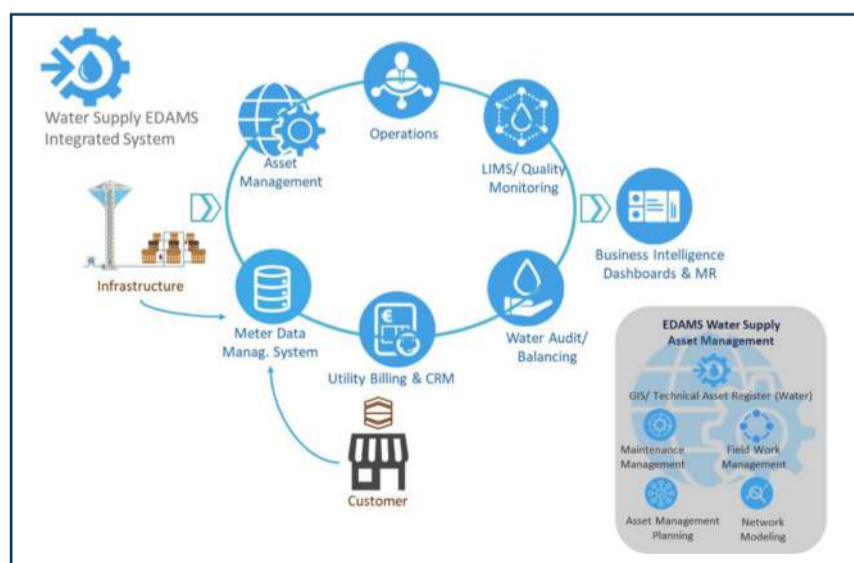
The project will be implemented in five months and the software will be licensed and supported for a further 24 months. Work involves infrastructure data conversion and evaluation which includes a gap analysis and recommendations for improvement, system setup and configuration, and extensive training through workshops and formalised training courses. A proven methodology for success is followed by Hydro-Comp, ensuring quick and effective deployment with the client, in this case the iLembe District Municipality and its sector departments.

Data management

Data conversion: EDAMS' powerful data conversion and structuring facilities make it easy to convert data from various sources and attach engineering intelligence to network data to improve engineering integrity. The EDAMS software includes extensive data models and element libraries for all the water and sanitation infrastructure assets and also has built-in hierarchical structures to allow for inheritance and functional dependencies.

Network data analysis and evaluation: Data cleaning is streamlined and automated, with missing attribute data, connectivity or topological violations and suspect engineering zones highlighted as exceptions. The system ensures that the exceptions are classified intelligently to allow the user to focus on investigating critical problems.

Procedures will be put in place for properly maintaining the technical asset register and in interfacing with the financial asset register. Users will be trained on how to both convert data to the EDAMS software and maintain it, whether changes arise from in-house field work or contractor works.



Maintenance management

Maintenance activities and resources deployed (human resources, vehicles and equipment, stores) will be defined and configured in the system. The system will enable complaints management (in the form of a call centre); scheduling, workflows, and business processes; work order management; scheduling of preventative, proactive and routine maintenance programmes; and analysis and management of maintenance records.



Nicolas Savva, Asset Management Expert, EDAMS Technology, a division of Hydro-Comp



Operations and NRW management

The EDAMS operations module will provide users with the ability to manage readings/ instantaneous measurements and/or period logs taken from any asset. Instantaneous or period logs/ readings can be kept for assets in any fixed installation, i.e. bulk meters, pump station, treatment plant, etc. The collected data can include counter readings, operating times, energy consumption and user definable indicators such as temperature and pressure.

Amongst others, the system will enable the efficient monitoring and control of bulk meter operation for prompt response to problems; evaluation and verification of bulk meter readings; and flexible estimation of problematic meter readings. All the metering and financial billing information can then be used to provide the water balance in the International Water Association (IWA) format which is also the format adopted and required by the Department of Water and Sanitation from Water Services Authorities, such as the iLembe District Municipality.

The EDAMS NRW management module will manage water demand zones/ district metered areas (DMA) to reduce inefficiencies; ensure proper service delivery (water quantity and pressure); formulate water conservation plans with the main objective of reducing NRW; and ensure

procedures and required reporting for compliance with regulations. Its main functions include real-time leak detection; water balancing per DMA; water audit per DMA and overall water scheme; and detailed leakage analysis.

The effectiveness of the system largely depends on the current zoning and bulk metering in the system. Utilities usually use the system to identify their shortcomings and continuously improve the status in the field for better control of the bulk operations and distribution to end users.

Water concessions seminar

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Financial model needs review

Mbola said the financial model should be reviewed and the profit generated by the concession should be shared equally between Siza Water and the iLembe District Municipality. The Vuthela Programme is currently supporting the municipality with a review of this financial model.

A representative of the Dolphin Coast Residents and Ratepayers' Association, Stephan Marais, said the PPP's strengths included good maintenance of infrastructure, a simple price structure, cost savings due to efficiencies and the honouring of service level agreements.

The lack of new infrastructure development, illegal connections and non-paying customers posed the main threats. There were opportunities to renegotiate contributions for new infrastructure in the form of developers charges and to expand the reach and scope of services, said Marais.

With many municipalities facing pressure to expand basic services with diminishing resources, new options for service delivery will need to be considered.

Standardised national programmes

The national Department of Water and Sanitation has established an office in partnership with the Development Bank of Southern Africa and the South African Local Government Association to improve the participation of the private sector in providing water services.

The Water Partnerships Office (WPO) is developing standardised national programmes that will make it easier, quicker and cheaper for municipalities to enter into partnerships with the private sector to provide services.

The WPO will support municipalities to prepare bankable projects, undertake feasibility studies and seek funding.

Johann Lubbe, head of the WPO, told the seminar that many municipalities faced financial and technical constraints. But South Africa's private sector had substantial expertise, and that furthermore banks and

pension funds were now eager to invest in public water and sanitation infrastructure.

"The project must be bankable," said Lubbe.

"There must be a focus on projects with sufficiently large and sustainable revenue streams. The larger the revenue stream in relation to the investment and the more sustainable the revenue stream, the greater the likelihood that the project will be bankable."

The KwaZulu-Natal government is also poised to assist municipalities to form PPPs to provide water services.

The Acting Chief Director of the PPP Unit in the KwaZulu-Natal Provincial Treasury, Kirsch Bezuidenhout, told the seminar that South Africa faced a "brewing crisis" over water services.

The PPP contract between the iLembe District Municipality and Siza Water was a ground-breaking agreement that demonstrated how collaboration between the public and private sectors could provide basic water services and waste management to communities.

"It remains a shining example of how a well-managed PPP agreement should be, in spite of the difficulties arising along the way, as with any relationship," said Bezuidenhout.

"This contract has generally been managed quite well and performed at levels that have ensured exceptional services to households within the concession area.

Siza Water PPP a blueprint

"This PPP agreement could serve as a blueprint for water and sanitation services across the country and it is a contract that KwaZulu-Natal should take pride in," said Bezuidenhout.

While the private sector was better placed to provide services efficiently, the municipality cannot divorce itself from the management of the contract.

"Public-Private Partnerships remain a cogent vehicle to ensure that government at all levels is able to achieve the development required in our country.

"In more recent times, South Africa, generally, has



Seminar participants

seen an economic downturn, which has meant that the financial resources available to government are evermore dwindling.

"There is a growing need for government to turn to the private sector and leverage its borrowing power to fund the large-scale developmental projects needed to provide real change in the life of the communities we serve, and to jump start the economy."

The KZN Provincial Treasury provides technical, legal and financial advice on PPPs to municipalities.

The seminar identified issues which required urgent interaction between Siza Water and the iLembe District Municipality, and stakeholders acknowledged the need to start preparing immediately for the end of the contract in six years.

Vuthela is summarising the presentations, perspectives and discussions at the seminar into a case study, which will be available to all stakeholders and other municipalities.

The seminar and the case study, along with the overall support which Vuthela offers the iLembe District Municipality, will help to ensure that the secure delivery of water services will continue to underpin economic development in this region.

The perspectives of stakeholders and the learnings derived from the PPP over the past 24 years will also serve as a valuable guide for other municipalities who are seeking effective solutions to the challenges of delivering water services efficiently.



Asset management information system

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Asset valuation and rehabilitation planning

Three main functions are basically enabled as follows:

- The EDAMS condition assessment module handles various assets differently: (a) assets such as treatment plants and pump stations are inspected individually and evaluated on a regular basis; (b) network above ground assets such as hydrants, isolating valves and manholes are inspected individually and evaluated only if their age exceeds a certain number of years; and (c) water and sewer pipes are evaluated on a range of parameters, such as failure frequency, material, age, soil conditions and other.

- The EDAMS asset valuation module (a) determines the current price and maintenance (total cost) of ownership; (b) evaluates the remaining useful life of assets; and (c) evaluates the actual cost performance of the assets. In addition, the EDAMS asset valuation module exports summarised asset valuation information according to the utility's accounting system requirements (following the Municipal Standard Chart of Accounts and National Treasury regulations in this case).

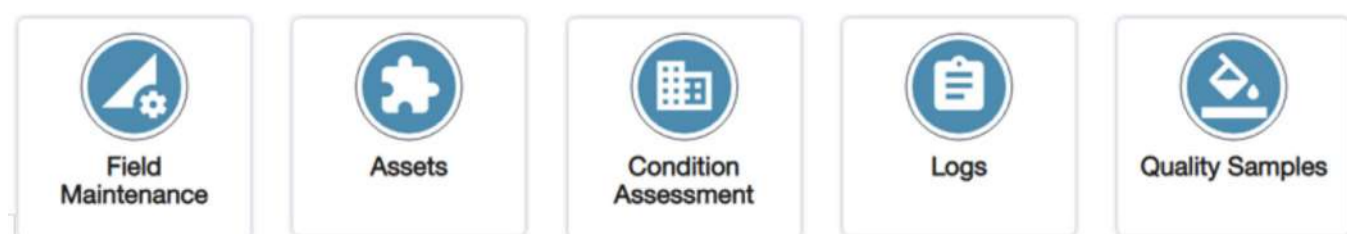
- The EDAMS rehabilitation planning model is a decision support tool for establishing infrastructure rehabilitation

and investment plans. Functionality includes (a) importance and risk assessment; (b) asset categorisation; (c) assessment of useful lives; (d) rating and ranking assets; and (e) budgeting. The main output of the model is a preventive maintenance plan and a rehabilitation plan based on available budgets.

For the system to be fully effective, financial data must be provided regarding the purchase/ replacement value of assets, and condition assessment criteria and environmental data must be set up. Appropriate training and worked examples will be presented so that users can improve the results from the system as such data becomes available.

Field work management

The EDAMS field work management software can be deployed in the future by the iLembe District Municipality to further improve productivity. The software utilises industry-specific predefined templates to assist mobile field workers carry out (a) data capture, (b) asset condition assessment, (c) maintenance, and (d) recording of readings/ logs/ events. An illustration of the field work management various modules is shown below:



Hydro-Comp's experience in asset management for water and sanitation

The EDAMS system is developed by EDAMS Technology, a division of Hydro-Comp. Hydro-Comp, though an international company active in over 20 countries, has its roots in South Africa, where it keeps offices in Sandton and Port Elizabeth. Hydro-Comp has extensive experience in implementing asset management solutions in the water and sanitation industry. Funding for projects carried out varies from simple internal funding to funding by donors, such as USAID, World Bank and GIZ (German). Currently there are more than 50 organisations using the EDAMS asset management software for water and sanitation with more than 1 000 users. In South Africa, Nelson Mandela Bay Municipality, Silulumanzi and Siza Water make extensive use of the software.

Benefits realised include:

- An accurate technical asset register, well maintained and interfaced with the financial asset register.
- More effective emergency and crisis management.
- Effective proactive and preventive maintenance.
- Improved productivity and efficiency in operations and maintenance.
- Increased asset effective life.
- Improved service delivery (pressures, quality, less breakdown time, response);
- Reduction of losses.
- Higher organisation creditworthiness.
- Enhanced compliance and transparency.

