

IMPROVING RESILIENCY

12.1 ISO 17025 ACCREDITED LABORATORY SERVICES ASSURING WATER QUALITY

Four (4) modern ISO/IEC 17025 accredited laboratories make up the entity's Laboratory Services. These are Chemistry, Microbiology, Hydrobiology and Soil Chemistry Testing, all with a long established reputation of meeting international standards. Highly skilled and dedicated scientists, technicians, and laboratory support staff, utilising modern analytical techniques, enable this facility to provide a world-class service, 365 days a year.

During the year, the laboratory supported core business activities through:

- Providing assurance that the entity produces potable water that complies with drinking water standards;
- Assuring that treated effluent complies with wastewater and effluent discharge limits;
- Assuring, via the above, public health protection from water-borne diseases and water related health impacts;
- Undertaking research and development and generation of scientific data for new infrastructure developments;
- Supporting/auditing water treatment for process selection and optimisation;
- Undertaking catchment and river health monitoring to assess the status of water resources and quality of raw water supply; and
- Immediate provision of early warnings and alerts to stakeholders when a breach of quality standards is detected. An incident management protocol is followed, to contain and remedy the breach.

Water samples from the entire supply system (catchment to consumer) are collected by a team of dedicated sampling officers on a daily basis throughout Umgeni Water's operational area, and are assessed in terms of its physical, chemical and microbiological characteristics.

The analytical results are produced within specified times that forms part of a Service Level Agreement with end users. Supported by LabWare Laboratory Information Management System (LIMS), water quality results are captured, validated, stored and reported. The laboratory generates 20 000 to 30 000 analytical results per month. Direct access to the results is also provided to external users via the Electronic Water Quality Management System (EWQMS), the IRIS Blue Drop System (BDS) and the IRIS Green Drop System (GDS).

In addition to assuring the quality of bulk water produced, the Laboratory Services provides water testing and sampling services to municipalities and various private sector clients. This valuable service supports and assists municipalities to improve their IRIS Blue and Green Drop compliance.

During this financial year, the Resource Quality Information Services (RQIS) of the Department of Water and Sanitation contracted Laboratory Services to identify and enumerate algal samples from the National Eutrophication Monitoring Programme (NEMP), owing to their expertise in this complex area.

Many South African impoundments exhibit high nutrient enrichment with consequent eutrophication related problems, including toxic algal blooms. However, many impoundments do not have regular eutrophication monitoring programmes, and the main aim of the NEMP is to fulfil this

requirement for the more than eighty (80) impoundments in South Africa. Umgeni Water Laboratory Services received approximately 1 500 samples from these impoundments through DWS.

12.2 RESEARCH, DEVELOPMENT AND INNOVATION

Umgeni Water recognises the importance of investing in Research, Development, and Innovation. The key objectives of its research programme include:

- Addressing challenges of the water sector, including supporting economic growth and improving the quality of life;
- Creating new water knowledge and finding technical solutions for better planning and water management, leading to sustainable development;
- Optimising operational processes and reducing costs;
- Investigating new technology and improving water quality compliance;
- Reducing demand through innovation;
- Increasing water availability from exploring non-traditional sources of supply and re-use;
- Protecting ecological infrastructure and biodiversity from the harmful effects of pollution;
- Adapting to climate change;
- Increasing competitiveness;
- Protecting water resources, and reducing non-revenue water;
- Providing research training and intellectual capital development; and
- Aligning research programmes with the broader national policies and plans.



260 000

analytical results generated from the entity's laboratory in 2017/2018



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The entity has established links and collaborates with academic institutions and researchers, both nationally and internationally. Locally, research is undertaken with local sector partners including the University of KwaZulu-Natal (UKZN) and the Water Research Commission (WRC).

In 2011, the Umgeni Water Chair for Water Resources Management was established at UKZN to expand and complement internal research initiatives. Specific aims of the Chair are to:

- Establish mutually beneficial projects in teaching, research and technical services;
- Building on existing projects and implementing new ones;
- Making use of complementary skills and pursuing opportunities of a strategic nature locally, nationally, and internationally;

- Explore beneficial opportunities to provide research projects to postgraduate students;
- Supervise research projects;
- Develop project proposals and research programmes; and
- Seek ways in which there can be closer collaboration in research and development on technological and socio-economic projects.

The partnership with UKZN has proven hugely successful. Postgraduate students undertaking studies in water resources management and related fields were the main beneficiaries. During the reporting year, eight (8) students graduated with research degrees (four (4) PhD degrees, and four (4) MSc degrees) through the Chair for Water Resources Management.

These include studies in water quality and land-use management, hydrology, community water services, water quality monitoring, wetlands, pollution control, alien plant management, water and wastewater treatment processes, sludge management and ecology.

A large component of research is undertaken by subject matter specialists internally within the entity. These studies are expected to yield both economic and non-economic benefits with significant gains in intellectual capital, improved water security, improved water quality, and a better life for society. Steady progress has been noted on a number of high priority projects as per **Table 12.1**.

Table 12.1: Research Projects Undertaken Internally Within Umgeni Water

Research Title	Objective
Determination of Residual Polymeric Coagulants in Potable Water using gold nanoparticles	To develop and validate a novel method for detecting low levels of polymers in water.
Zeolite Desalination	The synthesis and use of zeolites in the desalination of sea water.
Development of an ELISA method for determination of endocrine-disrupting compounds in wastewater	To develop and validate a novel method for the detection and quantification of endocrine-disrupting compounds in wastewater.
Darvill Process Investigations and Modelling	To optimise the simulation model for Darvill, which will assist in the monitoring of the process, prediction of process performance and in the upgrade of the plant.
Laboratory based co-digestion of Fats, Oils and Grease (FOGs) with primary sludge	To investigate the digestibility of fats, oils and grease with primary sludge under laboratory conditions. To develop a feeding regime guideline to inform optimal FOGs loading rates for Darvill digesters.
Floating Treatment Wetlands	To construct pilot floating wetlands at Wastewater Treatment Works as a mechanism to enhance the treated water quality, using different wetland plant species.
Development of a flood Early Warning System in the UMDM pilot areas	The objective of the project is to develop a Flood Forecasting and Early Warning System for the Umgungundlovu DM pilot area. The system will be used to monitor impending flood within the pilot areas and issue early warnings to UMDM in the event of an impending flood.
Umgeni Water Climate Change Impact Study	To investigate the potential climate change impacts on relevant water resources in the Umgeni Water and surrounding catchments, using outputs of recent Global Climate Models as inputs to appropriate hydrological models.

12.3 INFORMATION AND COMMUNICATIONS TECHNOLOGY

Umgeni Water is faced with unprecedented growth opportunities. These include; regionalisation and geographical expansion, as well as integration across the water value-chain. Embracing technology and remaining well-connected is vital for the entity to be efficient in its operations.

The entity has extended its wireless communications infrastructure in its operational area to reach newly acquired water and wastewater treatment works in the uThukela District Municipality to deliver data, video and voice connectivity.

Benefits of this project are to provide high performance and affordable connectivity throughout the entity's area of operation. The organisation is also improving communication, connectivity and mobility in the way employees can work, through embracing the Future of Connectivity concept.

The ICT project completed in the reporting year included the installation of video conferencing systems in Umgeni Water boardrooms. This has improved connectivity by allowing anyone from anywhere to dial into the meeting from almost any device. This includes Skype for business, video conference systems, computers, laptops, tablets, smartphones and VC phones. In addition, the facilities allow meeting attendees to make presentations through wireless connectivity.

12.4 RISK MANAGEMENT

Risk Management at Umgeni Water is guided by an Integrated Risk Management Framework, which is aligned to strategy, thereby ensuring a focused and directed process of Risk Management in the entity. The risk appetite and tolerance framework is reviewed and approved on an annual basis.

The entity's strategic risks are shown in **Table 12.2** and show the link to strategic

perspectives, objectives and outcomes and the risk cause, context and treatment.

Of a total of seven (7) strategic risks, all are outside appetite but within tolerance levels.

Six (6) strategic risks (86%) have been managed to a level equal to or above reasonable (> 55%) response effectiveness.

Figure 12.1: Overall Response Effectiveness

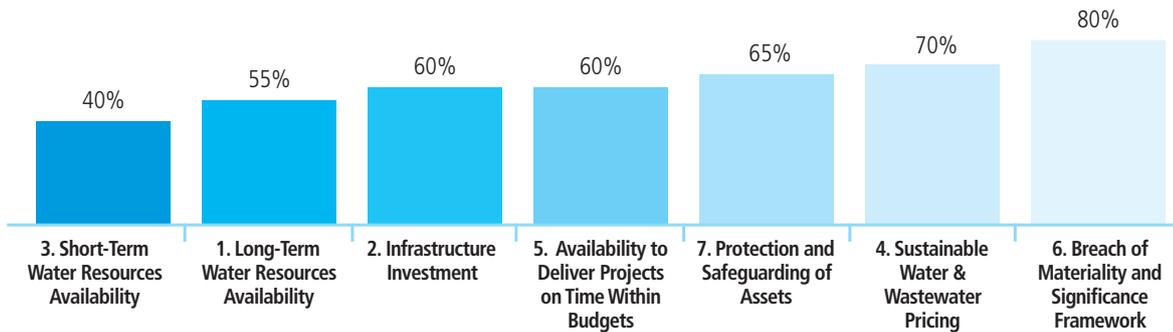


Table 12.2: Strategic Risks as at 30 June 2018

Risk #	Risk Name, Score and Status	Cause, Context and Treatment	Main Strategic, Perspective, Objectives and Outcomes Impacted
1	<p>Long-term Water Resources Availability</p> <ul style="list-style-type: none"> Overall Response Effectiveness: Reasonable 55% Severity: Moderate-High: 40 Probability: 50% fairly poor and/or could occur within 2 years Risk Owner: Executive: Engineering & Scientific Services <p>SCORE 20 • LOW</p> <p>Risk Appetite and Tolerance</p> <ul style="list-style-type: none"> Outside Appetite Within Tolerance 	<p>Cause & Context: Customers will not be guaranteed 99% assurance of supply in the Mgeni System and 98% assurance of supply in the South Coast System as required, due to demand being higher than the yield within the next 5 years. Delay in the implementation of the uMkhomazi Water Project to increase the yield in the Mgeni System increases the risk of non-supply and the need for restrictions.</p> <p>Treatment Approach: <i>Integrated planning and implementation for medium and long-term augmentation of systems with stakeholders. Review of water resources mix including reuse, other water conservation and demand management initiatives and desalination.</i></p> <p><i>Timely completion of target water resources projects including: Mgeni system - uMkhomazi Water Project and South Coast system - Lower uMkhomazi BWSS.</i></p>	<p>Organisational Efficiency and Effectiveness Perspective: SO2: Increase bulk infrastructure access, customers and services</p> <p>Reliability of Supply</p> <p>Outcomes: Water Resources Adequacy; Customer Satisfaction; Stakeholder Understanding and Support; and Community and Environmental Sustainability.</p>

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Table 12.2: Strategic Risks as at 30 June 2018 (continued)

Risk #	Risk Name, Score and Status	Cause, Context and Treatment	Main Strategic, Perspective, Objectives and Outcomes Impacted
2	<p>Infrastructure Investment</p> <ul style="list-style-type: none"> Overall Response Effectiveness: Reasonable 60% Severity: Moderate-Low: 20 Probability: 80% likely &/or could occur within 1 year Risk Owner: Chief Financial Officer  <p>Risk Appetite and Tolerance</p> <ul style="list-style-type: none"> Outside Appetite Within Tolerance 	<p>Cause & Context: Alignment, prioritisation and implementation of the infrastructure plan between Umgeni Water and customers. Delays in decision-making relating to new infrastructure. Inadequate return on infrastructure investment due to unaffordability by rural customers. Mismatch between volume in customer's original request and actual off-take, the latter being either larger or smaller volumes.</p> <p>Treatment Approach: <i>Critical supply infrastructure is annually identified, aligned, prioritised, funded and implemented as part of the entity's capital infrastructure programme linked to strategy.</i></p> <p><i>Details of major infrastructure initiatives and progress with these are outlined in the Bulk Potable Water Supply and Wastewater Treatment and Disposal Plans.</i></p>	<p>Financial Performance Perspective: SO5: Improve financial sustainability and enhance socio-economic development</p> <p>Capital Expenditure Programme</p> <p>Manage costs within Approved Budgets</p> <p>Outcomes: Financial Viability; Infrastructure Stability; and Community and Environmental Sustainability.</p>
3	<p>Short-Term Water Resources Availability</p> <ul style="list-style-type: none"> Overall Response Effectiveness: Poor 40% Severity: Moderate-Low: 20 Probability: 80% likely &/or could occur within 1 year Risk Owner: Executive: Engineering & Scientific Services  <p>Risk Appetite and Tolerance</p> <ul style="list-style-type: none"> Outside Appetite Within Tolerance 	<p>Cause & Context: Dam levels are such that there is a threat of non-supply if mitigation measures are not put in place (restrictions, emergency schemes).</p> <p>Treatment Approach: <i>On-going short-term demand management initiatives. Implementation of appropriate operating rules. Water rationing implemented as per the target percentage for applicable systems.</i></p> <p><i>Collaboration and partnerships to pool efforts, such as Joint Operating Committees. Implementation of the emergency scheme to transfer water from the Lovu River to the Amanzimtoti Water Works to support the supply from the Mgeni system.</i></p>	<p>Organisational Efficiency and Effectiveness Perspective: SO2: Increase bulk infrastructure access, customers and services</p> <p>Reliability of Supply</p> <p>Outcomes: Water Resources Adequacy; Customer Satisfaction; Stakeholder Understanding and Support; and Community and Environmental Sustainability</p>
4	<p>Sustainable Water & Wastewater Pricing</p> <ul style="list-style-type: none"> Overall Response Effectiveness: Good 70% Severity: Moderate-Low: 20 Probability: 65% even probability &/or could occur within 1- 2 years Risk Owner: Chief Financial Officer  <p>Risk Appetite and Tolerance</p> <ul style="list-style-type: none"> Outside Appetite Within Tolerance 	<p>Cause & Context: Constraints on ability to charge a tariff that will ensure financial viability of Umgeni Water and protection of cash flows in view of the operating environment. Major cost-drivers are fixed. Wastewater business model needs review.</p> <p>Treatment Approach: <i>Strategic customer engagement on underlying assumptions for annual tariff review including the annual capital programme. Scenario planning using the tariff model to simulate scenarios (CAPEX acceleration, increase in cost and lower sales volumes, non-receipt of grant funding as per base case assumptions) and the effect on the tariff increase, operating cash flows, optimal debt level and covenants. Improvement of wastewater business model.</i></p>	<p>Financial Performance Perspective: SO5: Improve financial sustainability and enhance socio-economic development</p> <p>Manage costs within approved budget</p> <p>Outcomes: Financial Viability; Customer Satisfaction; and Community and Environmental Sustainability.</p>

Table 12.2: Strategic Risks as at 30 June 2018 (continued)

Risk #	Risk Name, Score and Status	Cause, Context and Treatment	Main Strategic, Perspective, Objectives and Outcomes Impacted
5	<p>Ability to Deliver Projects on Time and Within Budget</p> <ul style="list-style-type: none"> Overall Response Effectiveness: Reasonable 60% Severity: Moderate-Low: 20 Probability: 50% fairly poor and/or could possibly occur within 2 years Risk Owner: Executive: Engineering & Scientific Services  <p>Risk Appetite and Tolerance</p> <ul style="list-style-type: none"> Outside Appetite Within Tolerance 	<p>Cause & Context: Actual cost and delivery time of projects may significantly differ from approved plans. The variation may lead to undesirable impacts such as reputational damage and financial costs. Delays due to appeals, re-appeals and finalisation of contracts with requisite CPG targets. Increase in the risk of social disruption. Unclear/ill-defined scopes of work. Lack of adherence to the internal PLP protocols, procurement and contractual shortcomings.</p> <p>Treatment Approach: <i>Continued effective engineering, procurement and construction management (EPCM) process alignment within the specified time-frames. Communities/ stakeholder engagement at design phase.</i></p>	<p>Financial Performance Perspective: SO5: Improve financial sustainability and enhance socio-economic development</p> <p>Manage costs within approved budget</p> <p>Organisational Efficiency and Effectiveness Perspective: SO2: Increase bulk infrastructure access, customers and services</p> <p>Increase access to services</p> <p>Outcomes: Financial Viability; and Community and Environmental Sustainability.</p>
6	<p>Breach of Materiality and Significance Framework</p> <ul style="list-style-type: none"> Overall Response Effectiveness: Good 80% Severity: Minor-Low: 5 Probability: 80% likely &/or could occur within 1 year Risk Owner: Chief Financial Officer  <p>Risk Appetite and Tolerance</p> <ul style="list-style-type: none"> Outside Appetite Within Tolerance 	<p>Cause & Context: Incurring fruitless, wasteful, irregular and unauthorised (over-budget) expenditure as a result of lack of understanding and adherence to policies and procedures. Misstatements of financial statements.</p> <p>Treatment Approach: <i>Policies, delegation of authority framework and procedures in place. Strategic oversight and assurance of compliance through on-going assessment of control effectiveness.</i></p>	<p>Financial Performance Perspective: SO5: Improve financial systems and key financial ratios</p> <p>Financial Reporting Compliance</p> <p>General Compliance (Risk, Audit and Governance) Perspective: SO6: Improve governance, risk and compliance systems</p> <p>Effective Internal Controls, Compliance and Risk Management</p> <p>Outcomes: Financial Viability; Operational resiliency; and Stakeholder Understanding and Support.</p>
7	<p>Protection and Safeguarding of Assets</p> <ul style="list-style-type: none"> Overall Response Effectiveness: Reasonable 65% Severity: Minor-Low: 5 Probability: 65 % even probability &/or could occur within 1- 2 years Risk Owner: Executive: Corporate Services  <p>Risk Appetite and Tolerance</p> <ul style="list-style-type: none"> Outside Appetite Within Tolerance 	<p>Cause & Context: Illegal settlements and unauthorised construction on properties and servitudes. Potential land claims on registered servitudes and new servitudes to be acquired. Umgeni Water's right of access limited. General encroachment and impact on assets.</p> <p>Remote locations are difficult to secure or monitor, resulting in an increase in theft and vandalism with damage to third party property and injury to staff.</p> <p>Treatment Approach: <i>Implementation of servitude management policy and procedure. Safety and security measures to protect staff and public. Community awareness campaigns on potential life-threatening consequences of encroachment innovative solutions implemented for reduction in theft and vandalism of infrastructure and improvement in the internal control environment for ICT-related assets. Properties and servitudes maintained and monitored. Disposal of property no longer in use.</i></p>	<p>General Compliance (Risk, Audit and Governance)</p> <p>Effective Internal Controls, Compliance and Risk Management</p> <p>Outcomes: Financial Viability; Operational resiliency; and Community and Environmental Sustainability.</p>

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Financial risks are detailed in the Annual Financial Statement section of this Annual Report.

MITIGATED RISKS

Mitigated Risks refer to risks that have been treated to an acceptable level with continual monitoring by Internal Audit to ensure the controls in place are still effective and efficient. There were no strategic risks mitigated.

EMERGING RISKS

The entity regularly reviews the internal and external landscapes with a view to identifying emerging risks. Climate change remains on the radar as an emerging strategic risk and divisional emerging risks are constantly monitored.



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PUMPSTATION



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