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CAN NATIONAL GOVERNMENT HOLD MUNICIPALITIES ACCOUNTABLE?



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Inspiring passion for water

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- Anaerobic Sludge Processes
- Industrial Water
- International Water Association-Southern Africa (IWA-SA)
- Innovation for Water Supply & Sanitation
- Mine Water Lead
- Process Controllers
- Small Wastewater Treatment Works
- Water Distribution
- Water Reuse Division
- Modelling and Data Division

EMPOWERMENT PLATFORMS

- Women In Water
- Young Water Professionals



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My SONA highlight

One of the most beautifully awkward moments of South African humour came when the national military brass band launched into *Water* by Tyla just before President Cyril arrived at the Cape Town City Hall for his State of the Nation Address.

Only in South Africa could a full military brass band enthusiastically belt out a global smash titled *Water*, while viewers at home are discreetly refreshing three municipal WhatsApp groups to ask, "Has it come back in Blairgowrie yet?"

Some are checking if Virgin Active has water before committing to leg day. Others are standing in the queue at a water tank, live-updating the neighbourhood group like frontline correspondents. A few brave souls are on Facebook, politely tagging their ward councillor for the third time that day: "Hi Councillor, any update on the update?"

The band crescendos. The conductor beams. And across the country, thousands pause mid-refresh thinking, "Wait... is that the sound of pressure in the pipes, or just the trumpets?"

When does a crisis stop being a crisis?

A crisis, by definition, is acute. It is unexpected. It triggers urgent intervention.

But Johannesburg's water instability is no longer acute. It is cyclical. It follows a pattern: high demand, infrastructure strain, pump station failure, power interruptions, reservoir recovery delays, public outcry, political statements, temporary stabilisation, repeat.

The underlying structural issues are well known. None of these are new. None are surprising.

And that is precisely the problem.

Normalisation is dangerous

When communities begin adapting permanently to failure, the system has effectively shifted the burden from the utility to the user.

Instead of asking why the network cannot provide consistent pressure, residents

invest in storage. Instead of demanding asset renewal programmes, businesses build water resilience into their cost structures. Instead of treating interruptions as abnormal, we design around them.

Yes, that is resilience. But that is also institutionalised dysfunction.

But adaptation is a privilege. For low-income households, there is no spare capital for JoJo tanks, booster pumps or backup supply. There is no option to drill a borehole or install filtration systems. When pressure drops, it is not an inconvenience; it is lost income, missed school, closed spaza shops and hours spent queuing at communal tanks. Informal settlements and densely populated areas feel the impact first and recover last.

In this way, water instability quietly widens inequality. Those with means buy resilience. Those without means absorb the disruption. And when a system depends on private coping mechanisms to function, it is not truly functioning at all.

The encouraging truth, however, is that dysfunction is not destiny. The same country that can laugh at the irony of a brass band playing *Water* in the middle of a supply crisis also has the engineering talent, regulatory frameworks and financial tools to fix it. The solutions are not mysterious. They require disciplined maintenance, ring-fenced infrastructure funding, competent management and transparent accountability.

Water security is not a punchline. It is achievable. ●



Kirsten



COVER OPPORTUNITY

In each issue, **Water & Sanitation Africa** offers companies the opportunity to get to the front of the line by placing a company, product or service on the front cover of the magazine. Buying this position will afford the advertiser the cover story and maximum exposure. For more information, contact Sindi Moni on +27 (0)82 212 4574, or email sindi@infrastructurenews.co.za.

You said it in WASA

The opinions and statements shared by thought leaders in the water industry to **Water&Sanitation Africa**.



“Working directly with original equipment manufacturers (OEMs) such as APE Pumps reduces corruption risk for power utilities by cutting out middlemen. OEM engagement brings transparent pricing and clear accountability for design, materials and workmanship, all aligned to original specifications. This makes it far harder to inflate costs and helps ensure that maintenance and refurbishment decisions are driven by actual asset condition and engineering requirements, rather than by commercial opportunism. In short, power utilities can save huge amounts of money through dealing directly with an OEM.” **John Montgomery, GM of APE Pumps and Mather + Platt**

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“WISA calls on its members to act. Not in abstract, but in practice: to mentor, to publish, to present, to guide. Every member carries within them a piece of the sector’s collective memory, and it is only by sharing that memory that we can build resilience. The charge required in the water sector is not only technical; it is ethical, collaborative, and professional. We must be willing to stand together, to professionalise together, and to transform together.” **Dr Lester Goldman, CEO, WISA**

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“Knowledge sharing without governance is noise. WISA’s authority rests on its compliance with the Companies Act, King IV principles, and ISO 9001. These frameworks are not bureaucratic hurdles; they are the scaffolding that ensures integrity, accountability, and quality. Compliance transforms knowledge sharing from informal exchange into authoritative guidance. It mitigates reputational risk, strengthens stakeholder confidence, and ensures that professional bodies remain trusted voices in their sectors.” **Dr Harrison Pienaar, chairman, WISA**

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“CEOs need to think about water holistically across the entire water cycle of their operations. Rather than managing dewatering, treatment or discharge in isolation, water should be viewed as an integrated system – and critically, as a strategic resource rather than a business risk.” **Chetan Mistry, strategy and marketing leader: Water Solutions and Services, Xylem (Africa, Middle East, Turkey, India)**

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“The idea that the past is a window to the future is particularly relevant in the context of South Africa’s water crisis. Repeated droughts, infrastructure failures and near-misses like Cape Town’s Day Zero have shown how quickly water security can unravel — yet these lessons are often forgotten as soon as supply is restored. People and businesses revert back to old habits. When the tap starts running again, urgency fades, restrictions are relaxed and long-term planning is deferred, even though the underlying risks remain unchanged. This cycle of crisis, response and complacency leaves the country perpetually unprepared for the next shock. Unless past water shortages are treated as warnings rather than isolated events, South Africa will continue to repeat the same mistakes, facing increasingly severe and costly water disruptions in the future.” **Carl Haycock, CEO Talbot**

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“Maintenance, theft and vandalism is the weak link with cathodic protection. Equipment is frequently installed in remote areas and becomes a target for vandalism and theft. Transformers, copper cables and even power supplies are stripped. Without functioning cathodic protection, corrosion accelerates rapidly. The extent of theft and vandalism of cathodic protection systems is horrendous. We are almost at a point where it is becoming nearly impossible to maintain cathodic protection because components are stolen almost immediately after installation.” **Neil Webb, consulting engineer and past president of the Corrosion Institute of Southern Africa**

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“Many public sector corrosion protection specifications are outdated, sometimes copied and pasted from decades old documents. In some cases, obsolete materials (like red lead) are still referenced. Rather than placing the responsibility on the manufacturer or applicator to assess the operating conditions and recommend the most suitable system, specifications are often rigidly prequalified. There should be a greater focus on the required performance outcome rather than specifying an exact product type or coating thickness.”

Richard Collins, Johannesburg branch manager, Corrocoat

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“Our water and waste division was established out of necessity. Rising transport costs and municipal discharge tariffs, coupled with distant disposal sites, led us to build three wastewater treatment plants in Steelpoort, Secunda and Witbank to manage portable toilet waste more efficiently. What began as an internal solution has since evolved into a decentralised, mobile and modular treatment offering serving clients in the industrial, mining and food processing sectors.”

Robert Erasmus, MD, Sanitech

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“There is a common misconception that a single type of activated carbon can remove all contaminants. In reality, different carbons have distinct pore structures, surface chemistries, grades and activity levels. Each is optimised for specific contaminants, water qualities and operating conditions, and effective treatment depends on selecting the right carbon for the right application.”

Richard Oldnall, business development manager, Rotocarb

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“Around 80% of South African municipalities use groundwater in some form. In many rural areas, it is the primary or sole source of drinking water. In urban centres, it supplements surface supply or serves as emergency backup during outages. Yet very few municipalities employ dedicated hydrogeologists. Monitoring networks are sparse. And routine water-quality testing remains focused largely on conventional parameters designed decades ago. At the same time, our contamination profile has changed dramatically.”

Yazeed van Wyk, research manager, Water Research Commission

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“While inability to pay is often the dominant factor, there is also a culture of non-payment and sporadic misuse of metering that harms service provision and municipal finances. This resistance to systems like prepayment and metering often stems from a complex mix of affordability challenges, mistrust of billing systems, and illegal connections.”

Jimmy Callander, operations manager: WDM, Johannesburg Water

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“Ecological infrastructure can support and, in some instances, complement built or engineered infrastructure, saving costs associated with its maintenance. Healthy wetlands upstream of dams, for example, trap sediment and pollutants before they reach water treatment facilities, lowering purification costs and extending infrastructure lifespan. These systems are also critical for disaster risk reduction. “Ecological infrastructure can decrease the vulnerability of people and built infrastructure to damage during extreme events like floods and droughts. Buffer zones of intact ecosystems slow water flows, reduce flood peaks and protect downstream communities.”

Dr Nontuzelo Pearl Gola, director of biodiversity mainstreaming, South African National Biodiversity Institute (SANBI)

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“Disciplinary action against water and sanitation officials in a municipality can only be implemented by the municipality itself. In addition, neither the President nor any minister in the national government can fire a mayor. There are separate local government elections which result in the election of the political leaders of local government, and the only people with the authority to remove that leadership are the local electorate.”

Dr Sean Phillips, director general, Department of Water and Sanitation (DWS)

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OEM partnerships are reshaping **POWER UTILITY ASSET MANAGEMENT IN AFRICA**

Over the past five years, South African original equipment manufacturer (OEM) – APE Pumps – has quadrupled its turnover. Contracts with various power-utility clients across the African continent have played an important role in supporting this growth.



“Entities responsible for generating, transmitting and distributing electricity to homes, businesses and industry are critical to any country’s economy. They operate under a unique set of pressures, and as a result it is common for critical pumping infrastructure to be run until failure – turning what could have been routine maintenance interventions into system-wide emergencies.



This trend is now reversing, largely as power utilities recognise the value of partnering directly with original equipment manufacturers such as APE Pumps, whose deep asset knowledge and long-term involvement support a shift from reactive, failure-driven responses to planned, preventative maintenance,” explains John Montgomery, General Manager of APE Pumps and Mather + Platt (the Group).

The operational pressures that undermine preventative maintenance

Power utilities are under constant pressure to maintain generation and grid stability. Electricity demand is continuous and largely inflexible, and any unplanned outage has immediate, system-wide consequences. Shutting down a pump for planned maintenance

can mean reducing load, or taking an entire system offline. In many cases, operators perceive the risk of planned downtime as greater than the risk of running equipment harder for longer, even when deterioration is evident.

Many power stations and associated water systems were designed decades ago with defined maintenance cycles that assumed stable funding, skilled maintenance teams and readily available spares. As budgets tightened, capital replacement has been deferred and maintenance shifted from preventative to reactive. Pumps that should have been overhauled or replaced are kept in service because there is no approved funding or schedule for intervention.

Furthermore, preventative maintenance requires forward planning, long-lead spares, framework contracts and

John Montgomery, General Manager of APE Pumps and Mather + Platt



engineering sign-off. In highly regulated or public-sector environments, this can be slow and bureaucratic. By contrast, catastrophic failures frequently trigger emergency procurement pathways, allowing faster approvals and spending. This unintentionally incentivises a run-to-failure approach.

The movement back to OEMs

“Fortunately, power utilities are shifting away from crisis response towards structured maintenance planning. The result is a more resilient operating environment: fewer catastrophic failures, shorter outages and improved lifecycle

cost performance. As power utilities across Africa reassess how best to maintain ageing infrastructure, OEM-led service, skills transfer and digital integration are becoming essential components of sustainable operations,” states Montgomery.

“Working directly with OEMs such as APE Pumps reduces corruption risk for power utilities by cutting out middlemen. OEM engagement brings transparent pricing and clear accountability for design, materials and workmanship, all aligned to original specifications. This makes it far harder to inflate costs and helps ensure that maintenance and refurbishment decisions are driven by actual asset condition and engineering requirements, rather than by commercial opportunism. In short, power utilities can save huge amounts of money through dealing directly with an OEM,” he adds.

In service level agreements, APE Pumps is increasingly requested to stock strategic spares, particularly for long lead-time components, enabling faster response (and reducing downtime) when failures occur.

“Power utilities require partners that can provide end-to-end technical support and have a rapid response capability. Rather than operating purely as a remote supplier, we provide embedded technical teams

at power stations, supported by long-term service contracts. These teams consist of qualified artisans with deep pump expertise, capable of diagnosing, maintaining and refurbishing equipment on site,” states Montgomery.

Skills development

A critical element needed by power utilities is skills development. As institutional knowledge within utilities has declined over time, OEMs are increasingly expected to fill capability gaps.

Through certain contracts with power utilities, APE Pumps have structured training and apprenticeship programmes where people are drawn from communities around power stations and sent to colleges, where they attain a qualification, are trained onsite by APE Pumps and then integrated into site operations with formal artisanal skills.

This approach strengthens local capacity while ensuring equipment is maintained by personnel who understand OEM specifications and performance requirements.

“APE Pumps is often asked to establish satellite workshops at power stations, equipped with lathes, milling machines and tooling that allow day-to-day repairs to be completed without removing equipment from site. Only



Across Africa’s power sector, partnering directly with OEMs is replacing crisis-driven pump failures with planned maintenance, transparent governance and long-term asset resilience.”



By restoring equipment to original design intent and embedding OEM expertise on site, power utilities are shifting from costly emergency breakdowns to disciplined, lifecycle-driven asset management.”

major components requiring specialised facilities are returned to the APE Pumps' workshop, significantly reducing turnaround times and logistics delays.

Movement away from pirated/non OEM specified parts

Montgomery adds that when refurbishing pumps, there are often instances where a pump has been retrofitted with pirated parts. "Counterfeit component fabrication is an ongoing concern. Those who succumb to the temptation of perceived short-term savings due to 'cheaper' prices will initially experience pump inefficiency and ultimately pump failure."

This is why power utilities are turning back to OEM's. From a supply-chain perspective, OEM involvement mitigates

risk associated with non-original or poorly refurbished components.

"Power utilities have experienced repeated failures where equipment was reportedly serviced but not dismantled or inspected correctly. OEM refurbishment restores equipment to original design intent, using specified materials and tolerances, extending asset life and improving energy efficiency," explains Montgomery.

Recent projects

APE Pumps is recently servicing seven power utility contracts across the continent. Recently, they have been awarded a contract for maintenance, refurbishment and repair on the cooling water and the demin (demineralised) water transfer pumps of a power station.

In another contract, APE Pumps employed 3D scanning on the client's Archimedes screw pump installations to accurately price the job based on a detailed method statement.

Taken together, these developments reflect a broader shift in how power utilities across Africa are approaching asset management and risk. APE Pumps' growth in this space is underpinned by its ability to combine deep OEM knowledge, in-house engineering and fabrication capability, on-site technical support, skills development and digital tools such as 3D scanning into a single, integrated offering. By restoring equipment to original design intent, rebuilding lost skills, improving maintenance planning and reducing supply-chain risk, APE Pumps is helping power utilities stabilise ageing infrastructure and move away from crisis-driven operations. As the energy sector faces increasing pressure to improve reliability, efficiency and governance, partnerships with OEMs that understand both the equipment and the operating environment are becoming central to long-term sustainability. ●



Mather+Platt

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www.matherandplatt.com



THE ETHICS OF WATER: GOVERNANCE, ACCOUNTABILITY AND SHARED RESPONSIBILITY



Water is not failing South Africa. Systems are. Behind the headlines of shortages and restrictions lies a deeper challenge of skills, governance and accountability.

By Dr Lester Goldman, CEO, WISA

South Africa's water sector is at a turning point. We are a country defined by scarcity, with average rainfall less than half the global norm, and yet our challenges are not only natural – they are systemic. Infrastructure is ageing, governance is uneven, and non revenue water losses hover around 41%, far above international benchmarks. These are not just statistics; they are signals of a sector under strain, and they demand a deliberate, professional response.

This is where WISA must step forward – not as a passive observer, but as the strategic backbone of transformation. Our role is not simply to convene conferences or publish papers. It is to professionalise the sector, to embed governance literacy where decisions are made, and to ensure that technical expertise is not confined to laboratories but is present in council chambers and municipal offices. Councillors and municipal staff are the frontline of service delivery, yet too often they are

asked to make decisions without the grounding to understand the technical and legal implications. We intend to change that. Training programmes tailored to their realities – covering governance obligations, operational management, and the fundamentals of water systems – are not optional; they are essential.

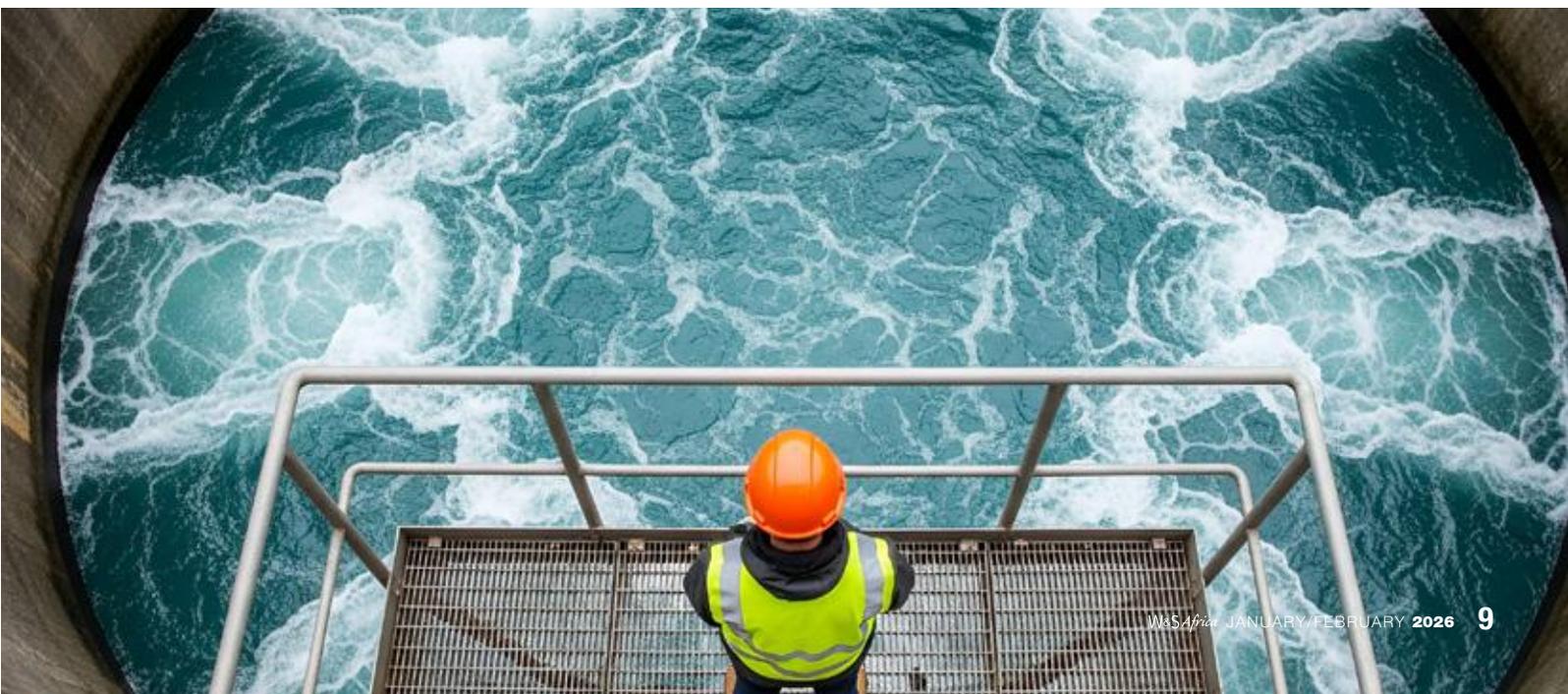
A call to action for every water professional

But training alone is not enough. The sector needs more professionals, and it needs them urgently. Engineers, scientists, process controllers and technicians must be drawn into the fold, accredited, and held to standards that ensure accountability. At the same time, we must recognise that experience is as valuable as formal qualifications. Knowledge transfer – passing on lessons learned in the field, sharing the scars and successes of decades of practice – is the lifeblood of sustainability. If we fail to capture and share that wisdom, we

risk repeating mistakes and losing hard won insights.

This is why WISA calls on its members to act. Not in abstract, but in practice: to mentor, to publish, to present, to guide. Every member carries within them a piece of the sector's collective memory, and it is only by sharing that memory that we can build resilience. The charge required in the water sector is not only technical; it is ethical, collaborative, and professional. We must be willing to stand together, to professionalise together, and to transform together.

The water crisis is not waiting for us to catch up. It is here, and it is pressing. But with WISA's leadership, and with the commitment of our members, we can ensure that South Africa's water future is not defined by scarcity alone, but by professionalism, governance, and shared expertise. That is the vision we must pursue, and it is the responsibility we cannot ignore. ●



THE ROLE OF WISA IN KNOWLEDGE SHARING AND GOVERNANCE

By Dr Harrison Pienaar

Professional bodies in South Africa are not simply convenors of expertise; they are custodians of credibility and drivers of professionalisation. The Water Institute of Southern Africa (WISA) exemplifies this mandate, ensuring that knowledge is shared, managed, and embedded within a framework of compliance and governance.

Knowledge sharing and management

- **Events and conferences:** WISA hosts structured gatherings where practitioners, policymakers, and academics engage in dialogue. These are not casual exchanges, they are platforms for benchmarking, innovation, and alignment across the sector.
- **Training and capacity building:** Accredited training programmes ensure that professionals remain competent and compliant with evolving standards. This is the backbone of professionalisation and sector resilience.
- **Webinars and digital platforms:** Knowledge dissemination must be agile. Webinars and online engagements allow WISA to reach dispersed audiences, ensuring that best practice and emerging research are accessible across provinces and beyond.

- **Knowledge management systems:** Professional bodies curate institutional memory – guidelines, case studies, and sectoral data – so that decision-making is evidence-based and defensible. This is how continuity and resilience are built.

Governance and compliance

Knowledge sharing without governance is noise. WISA's authority rests on its compliance with the Companies Act, King IV principles, and ISO 9001. These frameworks are not bureaucratic hurdles; they are the scaffolding that ensures integrity, accountability, and quality.

- **Companies Act:** Guarantees transparency, stakeholder accountability, and lawful operation.
- **King IV:** Embeds ethical leadership, sustainability, and inclusivity into every initiative, ensuring that knowledge sharing creates long-term societal value.
- **ISO 9001:** Certifies that WISA's processes – whether training, events, or publications – are quality-driven, consistent, and subject to continuous improvement.

Why compliance matters

Compliance transforms knowledge sharing from informal exchange into authoritative guidance. It mitigates reputational risk, strengthens stakeholder



confidence, and ensures that professional bodies remain trusted voices in their sectors. For WISA, this dual focus (knowledge and governance) positions it as both a technical authority and the ethical heartbeat of the water sector.

Conclusion

WISA's role is not simply to convene or to train. It is to professionalise, to safeguard, and to lead. By embedding knowledge sharing within a compliant governance framework, WISA ensures that its outputs are defensible, its processes are robust, and its impact is lasting. This is the standard to which all South African professional bodies should aspire.

The upcoming WISA 2026 Biennial Conference & Exhibition, themed "Rethink Amanzi – Securing Our Future," and scheduled for 22–24 July 2026 at the Cape Town International Convention Centre, provides a practical expression of this mandate. By convening leaders, innovators and practitioners for three days of technical exchange, workshops, dialogue and collaboration, the conference reinforces the link between knowledge, governance and professional accountability. It is not merely an event on the calendar, but a platform where ideas are tested, standards are strengthened and the sector's collective responsibility to secure Southern Africa's water future is actively advanced. ●





RETHINKING AMANZI

securing our future



Water Institute of Southern Africa

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WATER, MINING

AND THE FUTURE OF INDUSTRIAL TREATMENT

For mining and industrial operations, water is no longer just an operational input or compliance issue – it is fast becoming a strategic asset that must be managed holistically across the entire water cycle. **WASA** talks to **Chetan Mistry** – Xylem's strategy and marketing leader for water solutions – on the future of water.

Can you give us an overview of what Xylem supplies to the mining and industrial water sector?

Xylem provides water solutions across the full water cycle – from abstraction and treatment to distribution, monitoring, discharge and reuse. Rather than solving isolated problems, our large basket of tools delivers integrated, end-to-end water solutions that address the full lifecycle of water within an operation.

Our water solutions and services division in particular focuses on three critical areas:

1 Dewatering: Xylem's dewatering offering is primarily focused on Africa, where water needs to be removed from mines, as well as in construction and municipal applications. An example would be

creating a bypass for a municipality that moves water out as quickly as possible to allow for repair or maintenance. That said, 85% of this business is through mining.

2 Services: It includes (but is not limited to) repairs, services, and warranties as well as preventative maintenance agreements, energy audits and ensuring the correct asset management system is in place. Xylem and our partners also provide rental options for temporary and ad-hoc use cases, which include skilled operators and help companies avoid ownership and maintenance costs.

3 Industrial treatment: This part of the business focuses on

treating industrial water, particularly wastewater, for reuse or responsible discharge. Xylem approaches each challenge holistically, recognising that a wastewater issue affects the entire water value chain. Our solutions are focused on finding the right technology for an organisation. While Xylem has technologies that meet the majority of requirements, we sometimes look at additional technologies outside of Xylem to create a solution that meets the required key performance indicators (KPIs) from a water discharge point

of view. We have the capabilities to build, own and operate these solutions, allowing industrial clients to offload non-core water management activities,



Chetan Mistry, strategy and marketing leader: Water Solutions and Services, Xylem (Africa, Middle East, Turkey, India)

freeing them to focus on their primary business while maintaining compliance and operational reliability. Xylem's industrial treatment offering has been strengthened through strategic acquisitions such as the Evoqua Water Technologies Corp – that is focused on advanced treatment technologies such as filtration, membranes, disinfection, biological treatment and water-as-a-service models.

What are the biggest challenges facing mining and industrial water management?

In terms of mining and dewatering, one of the biggest challenges we face is the seasonality of water. Rainfall is beyond our control and can significantly disrupt mining operations and the dewatering systems that support them. Increasing mine depths present another challenge, as deeper operations introduce more complex technical and operational demands for effective water management. These increasing depths sometimes result in equipment that can be forgotten or damaged.

Energy and water are tightly interlinked, making energy one of the most significant challenges in water management.

Abstracting, pumping, treating and reusing water are all energy-intensive processes, and as mines and industrial operations grow deeper, more complex and more remote, energy demand increases sharply. In many African contexts, unreliable power supply, rising electricity costs and the need for backup generation place additional pressure on water systems.

Another challenge is the treatment of contaminants in both mine and industrial water. There is a wide range of these contaminants and an increased focus on new regulations on water discharge and responsible water management. A food beverage manufacturing plant will have its own contaminants and compliance requirements, while a mine has a completely different set of contaminants and compliance requirements. There is no 'one size fits all' solution. However, the benefits of wastewater treatment are applicable to most industries. Water reuse is a major advantage as access to water becomes a greater operational risk and water scarcity leads to rising costs. Water quality is another area where sites gain more control through wastewater treatment.

Ageing infrastructure and legacy equipment also remain key issues,

requiring both modernisation and the adoption of smart technologies such as real-time monitoring and necessitating new skills development.

What technologies are proving most transformative?

Digital monitoring and management have become a major focus for mines, particularly because they can deliver quick gains through greater operational visibility. Some even call this the Internet of Mining Water, a combination of Internet of Things systems and the many variations of mining water. Applications range from monitoring water flow, levels, and quality, to predicting acid mine drainage and tracking the stability of tailings dams, to automated dewatering systems that drain areas and reduce exposure of personnel and equipment.

Handling solids and debris is also improving with technology. The abrasive nature of mining environments, coupled with the high solids content in water, makes reliability and long-term durability critical requirements for these pumping systems. We are also engaged in perpetual research and development, coming up with new solutions such





as abrasion-resistant impellers within our pumps. Xylem designs and manufactures equipment that can be accessed, maintained and returned to operation quickly.

Another key consideration is modularity, ensuring systems can be easily expanded as operational needs evolve. This includes the ability to increase storage capacity, add additional pumps or introduce extra pumping stages as mines and plants develop and expand. A modular approach also allows equipment to be reconfigured or relocated, making it easier to move pumps between sites and adapt systems quickly to changing conditions.

On the treatment side, Xylem is seeing the emergence of new membrane systems, along with more refined and efficient treatment design approaches. Advanced oxidation and disinfection technologies are also gaining traction, with ozone and ultraviolet (UV) being used more frequently. In addition, processes such as dissolved air flotation are increasingly applied as enhanced pre-treatment steps, helping to reduce downstream treatment loads and improve overall plant performance. However, what may work very well with one process or site isn't guaranteed to work elsewhere. The effectiveness of these systems depends on outcome-based systems design that suits a site's conditions and requirements.

At the same time, there is a clear move towards package and mobile treatment plants. This shift is driven by their rapid deployment, more flexible capital

expenditure requirements, and their suitability for short-term or demand-driven treatment needs at site level.

Remote monitoring and predictive analytics are helping operators improve uptime, reduce unnecessary site visits and optimise maintenance schedules. Sensors that track vibration, temperature, flow and water quality provide real-time visibility into system performance, allowing issues to be addressed before they escalate into failures.

Digital twins are also playing an increasing role in planning and modernisation, enabling operators to model future scenarios – such as increased flows or tighter discharge standards – before investing in physical infrastructure.

From your experience, what are the critical factors that determine whether a digital water solution delivers real operational impact – or fails to gain traction?

There is often a tendency to view digital solutions as a quick fix, by simply layering technology onto an existing problem. Xylem takes a different approach. Digital adoption must be deliberate and strategic, starting with a clear understanding of the objective – what problem are we trying to solve through a digital lens?

For example, if the goal is to reduce the need for technicians constantly travelling to site to manage pump systems, remote monitoring becomes a practical solution. It allows us to dispatch teams only when required and to do so more intelligently.

We can identify multiple assets that need attention at the same time and consolidate maintenance activities, rather than responding reactively with repeated site visits. This is where digital delivers real operational value.

From Xylem's perspective, organisations must approach digital as a strategy and engage original equipment manufacturers (OEMs) early in that process. At Xylem, we understand our equipment in depth and how digital tools can be applied to solve real-world operational challenges.

The second critical aspect is data. Digital systems generate large volumes of sensor data, but data on its own has little value without interpretation. Crucially, data only delivers value when it is translated into actionable insight. Having water-specific expertise to interpret operational data is therefore essential to ensuring digital solutions deliver meaningful outcomes. At Xylem, particularly on the digital side, we combine water expertise with data analytics to translate operational data into meaningful water and wastewater solutions.

Additionally, smart technologies enable real-time, on-site adjustments. This includes applications such as smart dosing, where chemical dosing adapts automatically to changes in water quality, as well as optimisation of aeration and energy use. There is significant potential in the digital space, and when applied strategically, it becomes a powerful enabler of more resilient, efficient and sustainable water systems.



How is environmental social governance (ESG) changing how water systems are designed?

The reality is that in South Africa, we do have stringent regulations, but we believe the starting point has to be an organisational mindset. It is not only about complying with regulations; as organisations, we need to take responsibility and aim to go beyond minimum requirements wherever possible. When we adopt that mindset, real opportunity emerges.

If we approach water purely as a compliance risk, the focus is often on treating and discharging water to meet regulatory limits. However, when we view water as a resource, the dynamic changes. Instead of simply discharging, we ask how that water can be repurposed or reused. In a mining context, for example, water can be reused for dust suppression or treated further to enable higher-value applications. This shift opens up opportunities rather than positioning ESG as a constraint on operations.

An ESG-led approach also encourages greater transparency. We are seeing growing awareness of greenwashing, alongside changing consumer behaviour, where stakeholders increasingly support organisations that demonstrate genuine responsibility and purpose. Using ESG principles to guide strategy, therefore, strengthens both operational decision-making and organisational credibility.

From a systems perspective, this mindset influences how we design and operate infrastructure. It encourages planning for the future, implementing

the right reuse protocols, capturing every possible drop, and optimising systems to minimise wastage. These are practical outcomes of embedding ESG into decision-making, rather than treating it as a regulatory checkbox.

There are also broader ESG considerations, particularly as water and wastewater treatment plants are increasingly located near urban areas. Issues such as odour control, noise pollution and community impact become more prominent.

Where is the biggest growth coming from?

We are seeing increasing demand for more robust, higher-head pumping solutions as mines deepen and expand. From a dewatering perspective, the focus is not only on removing excess water, but on what we do with it afterwards. Rather than simply disposing of it, we see a growing opportunity to reuse and repurpose that water.

Climate change is also driving greater variability, with more frequent rainfall that many mines were not designed to handle. This is increasing demand for flexible solutions, such as supplementary or rental pumping capacity, to support existing fixed systems during peak events.

We also expect continued growth in digital solutions, driven by skills shortages and the need for more efficient operations. Remote monitoring, optimised system management and predictive maintenance are becoming essential parts of modern mine water management.

While mining executives generally understand the importance of water, it is still often viewed as a cost or compliance issue. At Xylem, we believe water should be seen as a value driver—one that, when managed strategically, supports operational resilience, efficiency and long-term sustainability.

As you reflect on your role, what is the one message you want CEOs in mining and industry to understand about water?

CEOs need to think about water holistically across the entire water cycle of their operations. Rather than managing dewatering, treatment or discharge in isolation, water should be viewed as an integrated system – and critically, as a strategic resource rather than a business risk.

With this mindset, meaningful opportunities emerge to reduce costs, improve efficiency, conserve resources and repurpose water in ways that create long-term value. When water is managed strategically across operations, it delivers measurable benefits not only to the business, but to employees, communities and regulators alike.

By integrating dewatering, treatment, reuse and digital management into a single water strategy, mining and industrial operators can develop systems that are compliant and reliable, while also being resilient to climate variability, regulatory change and increasing water scarcity.

When managed intelligently, water is no longer a constraint on operations. It becomes a shared resource that strengthens operational performance, sustainability outcomes and long-term business resilience. ●

WATER SECURITY RESHAPING INDUSTRIAL STRATEGY



As water security rises to the top of South Africa's industrial risk agenda, companies are being forced to rethink how they source, treat and reuse water, a shift that has shaped Talbot's evolution. **Kirsten Kelly** speaks to Talbot's CEO, **Carl Haycock**, about water security, African operations and the company's latest developments.

Talbot was founded in 1989. How has the water sector changed over these years? And how has Talbot adapted to these changes?

While the business has its origins in wastewater treatment, there has been a clear shift towards water security. Most of our recent projects focus on recovering water from highly challenging wastewater streams, reflecting a broader transition from treating effluent purely for discharge compliance to recovering and reusing water as a critical production input.

Treating water to potable or high-quality industrial reuse standards is significantly more complex than treating for discharge, requiring advanced process design, rigorous quality control and deep operational expertise – capabilities Talbot has developed and applied across its project portfolio. We were one of the first companies in South Africa to implement an industrial water

recovery plant that fed treated water back into the production process.

Globally, the water sector is working towards incremental improvements in water discharge quality. However, in South Africa, water security is a far bigger focus. This is, to a large extent (particularly in Gauteng) is a self-inflicted challenge driven by ageing infrastructure, poor maintenance and operational failures.

Corporates want a reliable supply of water for their industrial processes at the correct quality, while mitigating exposure to rapid and often unpredictable increases in water costs. For example, bulk water tariffs from Rand Water have increased by more than 170% since 2014. Talbot has largely positioned our offering around these needs.

Talbot were one of the first companies in South Africa to implement an industrial water recovery plant that fed treated water back into the production process

While Talbot's origins lie in heavy industry, our work during the 2000s was concentrated in the fast-moving consumer goods (FMCG) sector. We have subsequently successfully diversified into other industries like the pulp and paper, energy, agriculture, automotive and mining sectors.

What should organisations be doing today to prepare for a more uncertain water future?

Organisations should first understand how water risk and security directly affect their

Carl Haycock, CEO, Talbot



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The art of water



business operations. Water security is aligned with business continuity. When there are interruptions in water supply, some businesses stand to lose millions of rands in lost production.

Businesses need to develop a plan, assess their own water use, and optimise it accordingly. Talbot encourages our industrial clients to look beyond end-of-pipe treatment and focus on both intraprocess and interprocess opportunities for savings and reuse. Intraprocess optimisation means reducing water use within a specific unit of operation – for example, cutting the volume needed in a digester or wash step. Interprocess optimisation looks at the flows between process steps, identifying where relatively clean or recoverable streams (such as from a bleach plant or rinsing stage) can be treated and looped back into earlier stages of production instead of being discharged. Targeting these smaller, higher value streams is often more cost effective than treating the entire effluent in a single large plant, and it frequently unlocks product recovery as well as water savings, since wastewater almost always contains some lost raw materials or product.

If you could shift one mindset in the South African water sector, what would it be?

The idea that *the past is a window to the future* is particularly relevant in the context of South Africa's water crisis. Repeated droughts, infrastructure failures and near-misses like Cape Town's Day Zero have shown how quickly water security can unravel – yet these lessons are often forgotten as soon as supply is restored. People and businesses revert back to old habits. When the tap starts running again, urgency fades, restrictions are relaxed and long-term planning is deferred, even though the underlying risks remain unchanged. This cycle of crisis, response

and complacency leaves the country perpetually unprepared for the next shock. Unless past water shortages are treated as warnings rather than isolated events, South Africa will continue to repeat the same mistakes, facing increasingly severe and costly water disruptions in the future.

South Africans should not forget about Cape Town's 'Day Zero', or Gqeberha's drought or when parts of Gauteng had no water for days on end. These events will continue to reoccur. Already this year, Cape Town is experiencing water supply stress again, there are continued water cuts in Gauteng while Knysna and Plettenburg Bay have critically low dam levels.

Our country needs to proactively solve ahead of time for problems that we know will reoccur. With continuously growing demand, water scarcity will not disappear.

What role does cross-border work play in Talbot's business?

Even in its early years, Talbot was already operating beyond South Africa's borders, delivering projects in countries such as Uganda, Tanzania, Swaziland and Mozambique. In fact, by 2015, the majority of Talbot's work was coming from outside South Africa.

Experience in managing logistics, handling samples, navigating regulatory requirements and building strong local partnerships has been critical to successfully delivering cross-border projects.

Talbot's success in Africa is rooted in its industrial focus and practical understanding of risk. Working in markets in the last year alone including

As an intellectual property-driven business, Talbot places strong emphasis on skills development, continuous learning and retaining deep knowledge across chemical, mechanical and process engineering field

Nigeria, Tanzania, Uganda, Botswana, Mozambique, Ethiopia and Eswatini amongst others, we have learned that technical capability alone is not enough. By combining consulting, design, build, laboratory services and long-term operational support, we are able to back our solutions with data, diagnostics

Most of Talbot's recent projects focus on recovering water from highly challenging wastewater streams





and on-the-ground expertise. This is particularly valuable in jurisdictions where access to accredited testing, specialist skills or replacement components can be limited.

Rather than chasing opportunistic projects, we have always focused on long-term partnerships with blue-chip multinational and regional clients.

Operating across borders has also shaped Talbot's approach at home. Exposure to diverse regulatory regimes, water qualities and operational constraints has strengthened our ability to design resilient, fit-for-purpose solutions for South African industry.

Talbot works across municipalities, industries and consulting firms. What makes partnerships successful, and where do collaborations tend to break down?

Three words – communication, transparency and commitment.

Over-promising and under-delivering is a real problem in the water sector. Talbot won't commit to performance targets that aren't achievable in practice.

What are some of the standout developments at Talbot right now?

A massive highlight has been the formation of our new headquarters in La Mercy, KwaZulu-Natal, to meet growing client demand, while maintaining uninterrupted operations across our various service lines.

This location has also allowed us to establish an Industrial Water Security Hub, which takes a holistic approach to water security.

Talbot operates one of South Africa's most advanced accredited water laboratories, a broad range of accredited tests and direct access to markets across the continent. Our 17025 SANAS accreditation provides confidence that test results are accurate, traceable and internationally recognised, allowing clients to rely on the data for



Talbot works in a number of industries like fast moving consumer goods, pulp and paper, energy, agriculture, automotive and mining

regulatory compliance, operational decisions and risk management.

As part of Talbot's expansion, we are opening a new laboratory at Dube Trade Port while continuing full operations at our existing facility. This ensures our complete suite of accredited tests remains fully available while the new laboratory obtains accreditation and safeguards reliable testing for our clients throughout the transition.

We have always maintained a strong presence in KwaZulu-Natal and wanted to stay close to our regional base while serving clients across South Africa, the wider African continent and Europe. Close proximity to major air-freight routes was therefore essential, with samples routinely flown in from across the continent. Our new location supports good sample turnaround times, traceability and chain of custody, which are critical for accredited testing.

This expansion represents a significant investment, with Talbot's new 3 500 m² facility enabling the business to hold critical spare parts – including membranes, cartridge filters and chemicals – in stock for customers. This substantially reduces the lead times many clients typically face when sourcing essential components.

Beyond infrastructure and equipment, investment in people remains central. As an intellectual property-driven business, Talbot places strong emphasis on skills development, continuous learning and retaining deep knowledge across chemical, mechanical and process engineering fields. This, together with growing use of data analytics and AI-enabled optimisation tools, allows the company to move beyond plant delivery to ensure continuous performance

support and efficiency in industrial operations.

The same long-term mindset underpins Talbot's finance solutions. Talbot offers flexible funding models that can be tailored to a customer's operational needs and risk profile. These may include build-own-operate or build-operate-transfer arrangements, phased investments, or performance-linked commercial models that tie repayment to plant output or water recovery performance, providing clients with options alongside traditional upfront capital investment approaches.

What do you value most about Talbot's culture and way of working?

At its core, Talbot is driven by a positive growth and solutions-orientated mindset. Rather than stopping at problem identification, the business actively shifts engineering thinking towards delivering practical, implementable solutions that address real operational challenges. This approach goes beyond the design and delivery of infrastructure alone, placing strong emphasis on long-term customer relationships and ongoing support. By investing in its clients' success and business continuity, Talbot moves past a transactional model into a partnership-led approach that ensures solutions continue to perform and deliver value well beyond commissioning. ●

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The CORROSION CRISIS *eating away at* WATER SECURITY

From buried steel pipelines to harbour and port structures, from sluice gates at dams to chemical dosing tanks and flocculation bridges in treatment plants, steel remains fundamental to water infrastructure. And wherever steel is exposed to soil, seawater, water or treated effluent, corrosion is inevitable. **By Kirsten Kelly**

This is reiterated by Neil Webb, consulting engineer and past president of the Corrosion Institute of Southern Africa. "Corrosion is an inherent risk for all steel infrastructure. When steel is placed in the ground, deterioration is inevitable unless it is properly protected. Steel is simply reverting to its natural oxide state."

Steel pipelines

Steel pipelines are vulnerable to corrosion from both external soil conditions and the internal water they convey. "While corrosion is not the only issue surrounding water pipelines, it is a significant contributing factor to their collapse," adds Webb.

Steel pipes can corrode internally because water itself can be corrosive by nature. When water has low alkalinity, low hardness, high dissolved oxygen or elevated chloride and sulphate levels, it can actively promote corrosion.

External corrosion is typically driven by three main external mechanisms:

1 General soil corrosion
In average soils, steel may corrode at roughly 0.1 mm per year. That may sound slow, but for a pipeline designed to last 50 to 100 years, that steady loss can gradually erode the wall thickness to the point where its structural integrity is compromised long before its intended service life ends. Long cell action caused by differential soil conditions can accelerate corrosion by a factor of 10 or more.

2 Bacterial corrosion
Sulphate-reducing bacteria (*Desulfovibrio*, *Desulfobacter*, *Desulfotomaculum*, *Desulfobulbus*, and *Desulfomicrobium*) are found in certain soils, particularly in mining-affected regions. This can accelerate corrosion dramatically. These organisms generate by-products that are highly aggressive to steel. Corrosion rates of 1 mm to 2 mm



Neil Webb, consulting engineer and past president of the Corrosion Institute of Southern Africa

per year are possible in extreme cases. Given that most steel pipelines have a wall thickness of just 6 mm to 12 mm, losing 1 mm to 2 mm each year amounts to a substantial reduction in structural integrity over a relatively short timeframe.

3 Stray current corrosion
One of the most destructive corrosion forms arises from electrical interference, especially near direct current (DC) railway systems. Stray currents enter the soil and use pipelines as alternative return paths. Where the current discharges, catastrophic corrosion can occur. "A new pipeline can perforate in a matter of months

External corrosion on an old bitumen coated pipe (Credit: Isinyithi)





Pitting corrosion on a dam sluice-gate (Credit: Isinyithi)



Leak due to corrosion (Credit: Isinyithi)

under severe stray current conditions," Webb warns.

The problem with cathodic protection is used to counteract stray current corrosion. This is the application of external current to protect metallic structures by creating cathodic conditions on the surface.

"Cathodic protection works together with external coatings and wrappings and can also be used to counteract general soil and bacterial corrosion. Cathodic protection is a specialist field and expert advice should be sought for the design, installation, supervision and commissioning of cathodic protection systems. It needs to be properly designed and maintained," adds Webb.

Maintenance, theft and vandalism is the weak link with cathodic protection. Equipment is frequently installed in remote areas and becomes a target for vandalism and theft. Transformers, copper cables and even power supplies are stripped. Without functioning cathodic protection, corrosion accelerates rapidly. "The extent of theft and vandalism of cathodic protection systems is horrendous. We are almost

at a point where it is becoming nearly impossible to maintain cathodic protection because components are stolen almost immediately after installation," says Webb.

Internally, water pipelines are protected by linings, most commonly cement mortar or epoxy-resin based systems. Spun-bitumen linings, widely used decades ago, are no longer applied. These internal linings are the only barrier between the steel and the water. Their performance is therefore critical.

"Even when HDPE (High-Density Polyethylene) or PVC (polyvinyl chloride) pipelines are used, there is almost always a steel component somewhere along the line that requires protection. A pipeline is only as strong as its weakest link. If that fitting corrodes, it can compromise joint integrity, trigger leaks, reduce system pressure and ultimately result in premature failure and service disruption," explains Webb.

Other challenges

"Most municipalities are under-resourced in qualified personnel and funds. One of the most damaging patterns in municipal

maintenance is reactive repair. Crews are under pressure to restore water supply quickly. Therefore, the quickest, easiest way to patch a leak is to insert a plastic section into a steel line and add a sealant. Or the leak is simply patched without reinstating the coating. The water flows again, but the corrosion control system is compromised, especially if the pipe has a cathodic protection system. Ultimately there will be more degradation and more leaks as the repair was, at best, temporary," says Webb.

He explains that another major obstacle is the municipality's limited capacity to determine the root cause of a leak. "Without the necessary in-house skills, they are unable to assess failures properly or implement long-term corrective measures. It is extremely difficult to fix a problem effectively if you do not first understand why it exists in the first place."

New technologies

Encouragingly, technology has evolved. Electrical survey techniques can assess the corrosion status of steel pipelines without excavation. Active corrosion



External stray current corrosion with a wooden plug temporary fix (Credit: Isinyithi)



Emergency repairs in progress (Credit: Isinyithi)

status can also be identified through estimating metal loss. Trenchless technologies allow old steel pipelines to be rehabilitated by cleaning and inserting new plastic liners, avoiding large-scale excavation. These methods can be cost-effective compared to full replacement, particularly in dense urban environments. However, they require upfront investment and technical capacity, both of which are in short supply.

Through the Corrosion Institute of Southern Africa, Webb and his peers are working to close the skills gap. The Institute offers training for inspectors, technicians and infrastructure owners, focusing on coatings, cathodic protection and corrosion management systems. "South Africa does not lack standards or technical guidance. The frameworks exist. The challenge lies in consistent application, competent oversight and sustained maintenance," he adds.

Maintenance crisis

Webb references the broader infrastructure reality highlighted by

Dr Vishal Haripersad, president of Consulting Engineers South Africa: "What we are facing should be recognised for what it is: a national infrastructure maintenance crisis. Nowhere is the crisis more visible than in the water sector. Earlier this year, Parliament was told that R400 billion is required to rehabilitate South Africa's water and sanitation systems. For many communities, the impact is already clear – not because water does not exist, but because ageing infrastructure can no longer deliver it reliably."

Perhaps the most important message is economic rather than technical. Corrosion protection typically represents around 15% of the capital cost of a large pipeline project "Skimping on that portion to save a few percentage points upfront can halve the asset's life. Procurement driven purely by lowest price, rather than competence and life cycle value, has long-term consequences. There is no silver bullet. Even if funding were made available tomorrow, it would take years of coordinated effort to



Internal epoxy lining application
(Credit: Isinyithi)

restore reliability. We are dealing with more than 20 years of neglect," concludes Webb.

But the path forward is clear: protect assets properly, prioritise long-term value over lowest price, and invest in skills. If those fundamentals are restored, the recovery of the water sector is achievable. ●

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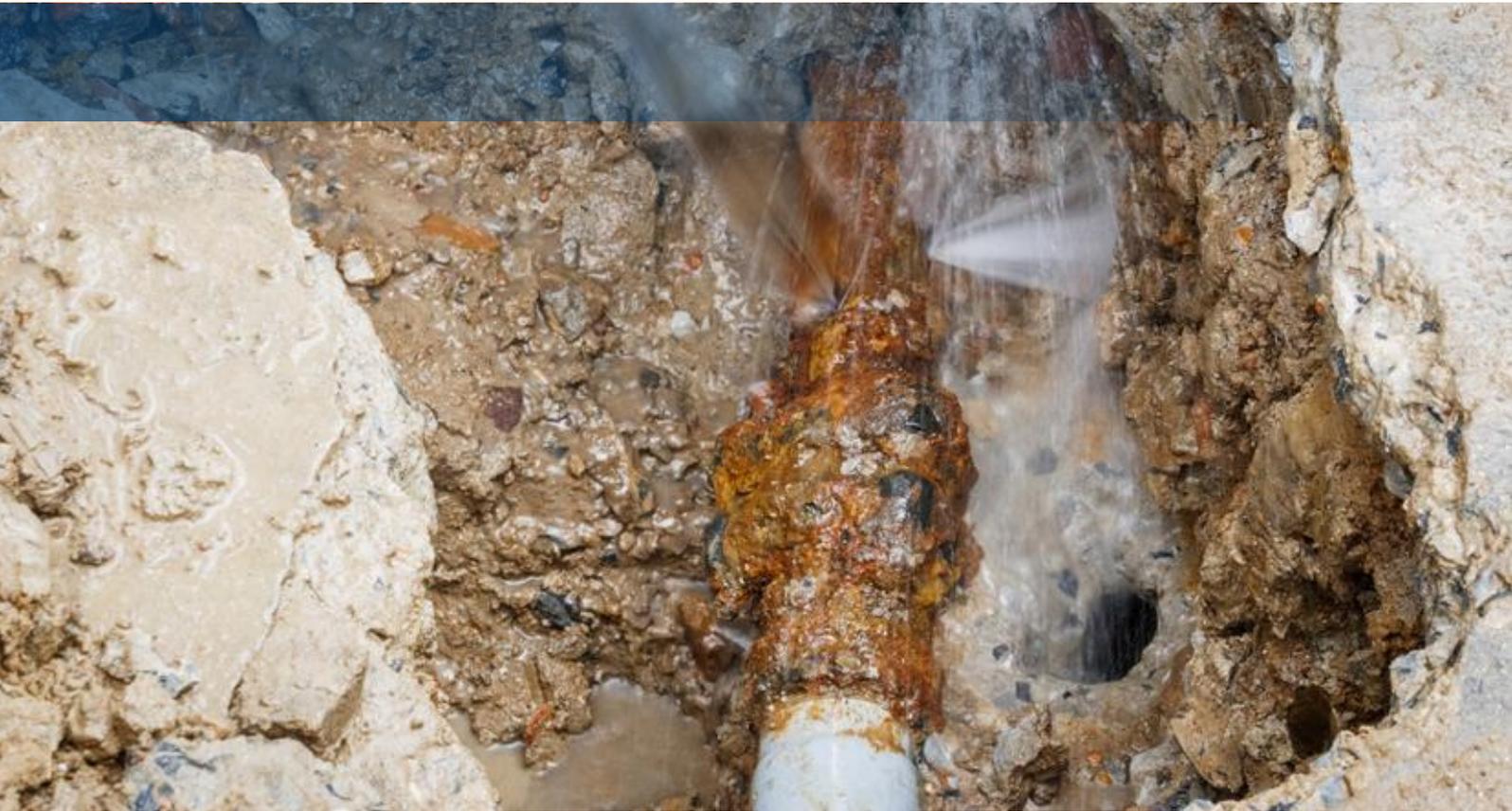
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CORROCOAT SA TACKLES THE SILENT THREAT TO SOUTH AFRICA'S WATER INFRASTRUCTURE

In a country besieged by failing infrastructure, resulting in water interruptions, floods and drought, safeguarding and extending the life of critical water infrastructure is no longer optional. Kirsten Kelly speaks to Corrocoat South Africa about corrosion.



Richard Collins, Johannesburg branch manager, Corrocoat



Louis Pretorius, MD, Corrocoat South Africa

“The current Gauteng water crisis is not due to a lack of water. It is due to a lack of maintained, functioning infrastructure that can reticulate water to the end user,” explains Richard Collins, Johannesburg branch manager, Corrocoat.

He goes on to add that corrosion is a silent killer of water infrastructure. “Corrosion rarely announces itself. It does not arrive as a dramatic flood or a visible structural collapse. Instead, it works slowly and invisibly, weakening pipes, pumps, valves, reservoirs and treatment structures from the inside out until failure becomes inevitable.”

The phrase 'rust never sleeps' is commonly used in engineering, however, it is more accurate to state that one can never fully stop corrosion, it can only be slowed down. Steel begins corroding the moment it is produced. This irreversible process entails entropy generation, intrinsically linked to corrosion-induced material degradation, returning the material to its natural oxide state. The role of corrosion protection and organic coatings is to extend the useable life of materials of construction by slowing down the rate of corrosion and degradation.

Rehabilitation vs replacement

If infrastructure is not rehabilitated or maintained, it will collapse. The good news is that according to Corrocoat South Africa, the wholesale replacement of broken infrastructure is not always necessary. "Due to our expertise and extensive product range, we have the ability to rehabilitate infrastructure back to its original condition and then further increase its lifespan."

In South Africa, economic reality has forced a different mindset from some international markets. Instead of discarding assets like pumps and valves after a few years, operators increasingly seek to refurbish and extend service life.

Corrocoat's business model leans heavily into this. Salvage yards filled with worn pumps, valves and casings are seen not as scrap, but as opportunity. Corrocoat often strips, rebuilds and relines the equipment for their clients, where a percentage of assets can often be returned to service at a fraction of their replacement cost, offering real recycling potential.



- 1 Access constraints in a valve pit
- 2 Carbon fibre wrapping to pipe external
- 3 Exposed pipeline indicating severe corrosion
- 4 Through-wall shell perforation of pipeline

"In the water sector, Corrocoat has successfully implemented extensive carbon fibre and woven roving glass-fibre wrapping, using carbon fibre reinforced polymer (CFRP) as well as glass-fibre reinforced polymer (GFRP) systems to strengthen and extend the life of pipes, tanks and other assets without replacing them. Carbon fibre wrapping is particularly valuable where pipelines cannot be taken offline, excavation is impractical, or there is a risk of catastrophic failure. In the water sector, this is especially relevant for bulk water pipelines that supply power stations, treatment works and major metropolitan areas, where shutdowns are simply not feasible," adds Collins.

Stumbling blocks

While ample technology exists to rehabilitate and structurally reinforce critical infrastructure without

costly replacement, its implementation is often constrained by systemic challenges.

Specification and procurement practices remain a major hurdle.

Many public sector corrosion protection specifications are outdated, sometimes copied and pasted from decades old documents. In some cases, obsolete materials (like red lead) are still referenced. Rather than placing the responsibility on the manufacturer or applicator to assess the operating conditions and recommend the most suitable system, specifications are often rigidly prequalified. "There should be a greater focus on the required performance outcome rather than specifying an exact product type or coating thickness," states Collins.

He says that sometimes, a corrosion protection and refurbishment contract may be awarded to a 'middleman' generally with very little or zero corrosion expertise, but who may win the contract and then apply, often incorrectly, the cheapest available product and usually including an exorbitant markup. "The same person supplying stationery and toilet paper may also be appointed to supply particularly specialised and technically difficult corrosion protection coatings. The result is that technical performance takes a back seat to procurement convenience and margin. Application standards are not met, and no one takes long-term accountability for asset performance. In the end, the coating fails prematurely, maintenance costs escalate and the client pays far more than if the correct specification and experienced applicator had been appointed from the outset."

Corrosion protection coatings can also fail due to poor surface preparation. "Success is largely

determined by the quality of surface preparation. Corrocoat have licensed applicators for a few of our less technical products. But we have a reputation to protect and will typically apply the more technically difficult coatings in high-risk environments ourselves, in order to ensure that the fully warranted maintenance and rehabilitation service offers continuous corrosion protection for decades to come," explains Collins.

Standards and specifications

This insistence on correct preparation, competent application and accountability reflects a wider industry push to raise standards across the water sector.

According to Louis Pretorius, the MD of Corrocoat South Africa, significant progress has been made over the past decade in standardising corrosion protection specifications and practitioner qualifications. "I served as chairman of the South African Qualifications and Certifications Committee for Corrosion Protection and president of the Corrosion Institute of Southern Africa, and was asked to participate in a multi-stakeholder committee. Comprising technical experts from the private sector, major metros, water boards and the Department of Water and Sanitation (DWS), the committee was tasked with to improving competence, clarifying specifications and ultimately strengthening the long-term performance of water infrastructure."

The wording of the specification required consensus from all committee members. The resulting framework has fed into updated national

standards processes and departmental specifications. The specification has been submitted to the South African Bureau of Standards (SABS) for accreditation and should be released into the marketplace for comment shortly. This will ultimately result in the withdrawal of SANS 1217 and the resubmission of SANS 1217 version 3. It has already been adopted by most players within the water sector and is available for download as Revision 2 DWS 9900.

At its core, the value of this work lies in specification clarity. For example, the standard provides clear guidance on the type of paint or coating to apply to specific infrastructure, the correct method of application and the expected service life of the coating.

"Coating selection, specification and application quality are critical, as asset owners may not have another opportunity to access that infrastructure for many years. In the case of a pipeline, for example, sections often have to be isolated, drained and in some instances completely decommissioned for the duration of surface preparation and coating application," adds Pretorius.

Constant evolution

This reality also underscores the importance of deep technical expertise and ongoing innovation in corrosion protection.

"Corrocoat has always strived to ensure that our management and staff become the most educated and knowledgeable people in the industry in terms understanding the mechanisms of corrosion as a science, thereby offering the absolute best in terms of long-term protection of infrastructure. Our research and development team is constantly assessing new ways to

- 5 Pitting corrosion has eventually perforated the pipe wall
- 6 Severe corrosion of municipal water line
- 7 Carbon fibre wrapping of concrete pipe
- 8 Spigot and socket concrete pipe rehabilitated using carbon fibre wrapping
- 9 Corrosion protection applied to pipe internals



Carbon fibre bandage

solve problems as well as achieving improved and more cost-effective ways of solving the old ones. If we do not have an existing product suited to a particular issue or operating environment, our superb research and development facilities in the United Kingdom allows us the flexibility to develop a bespoke solution to comprehensively address that particular issue or environment," explains Collins.

An example of this innovation was the nano glass flake technology used in the eight-month refurbishment Lesotho Highlands Water Project's tunnel system, whereby the glass platelets used in the corrosion protection coating material were as small as 300 nanometres in thickness, a world first.

Working across multiple tunnel sites, the company undertook extensive grit blasting to Sa 3 white-metal standard, completed steel repairs, and applied 43 000 £ of solvent-free, glass-flake epoxy coating to nearly 20 000 m² of ageing steel liners. The work was executed under challenging conditions that included constant water ingress, high humidity and low temperatures, including micro-condensing conditions and requiring continuous pumping, dehumidification and strict quality control. With 100% third-party inspection, high-voltage spark testing and non-destructive testing of all weld repairs, the upgraded lining system has extended the tunnels' service life by 30 to 50 years, safeguarding water supply to Gauteng and supporting Lesotho's hydropower generation for decades to come.

The scale and success of this project highlights a broader lesson for the sector: sustainable corrosion management demands proactive intervention, not reactive repair.

A mindset shift

"The biggest misconception about the effects of corrosion in the water infrastructure industry is that maintenance can wait. Because failure is gradual, it is often deprioritised. If left



untreated, corrosion does not resolve itself; it progressively worsens over time until it reaches the point of no return" says Collins.

Yet the real cost of inaction is clearly visible across our country, culminating in burst pipelines, critical supply interruptions and emergency repair budgets.

The alternative is not glamorous, but it is effective: early intervention, lifecycle costing and partnerships with technically competent specialists.

For companies like Corrocoat South Africa, every project is different. No two corrosion challenges are identical. That variability, and the agility to design tailored solutions rather than rely on cut and paste specifications, is what enables infrastructure owners to pro-actively assume the mantle of accountability by achieving longer asset life, lower lifecycle costs and sustained reliability in performance and plant up-time.

In a country where infrastructure reliability underpins economic stability and social wellbeing, undertaking extensive and comprehensive corrosion protection is not just a technical exercise, it is a national imperative. ●

ABOUT CORROCOAT

Corrocoat began in the mid-1970s in the UK with a simple yet powerful idea: use glass flake in resin systems to create exceptionally durable anti-corrosion coatings. Glass flakes are ultra-thin plates that form a dense, tortuous barrier in coatings, dramatically slowing the rate of moisture vapour transmission or moisture vapour permeation, as well as boosting abrasion resistance, structural stability and ultraviolet protection.

Corrocoat has evolved into a global corrosion protection innovation pioneer, with its range of approximately eighty different and specialised corrosion protection materials now protecting the very harshest industrial environments, including water infrastructure, worldwide. They operate in 38 countries and produce as much as 80% of the world's glass flake.

Corrocoat South Africa operates out of three workshops in Durban, Cape Town and Johannesburg. All three workshops are fully equipped for abrasive blast cleaning, as well as a full range of specialist coating work. The Johannesburg workshop is also equipped with a sintered fluoropolymer lining installation plant and ovens and is also the only branch within the group to offer a full range of rubber lining services and solutions for storage tanks, pipelines and processing equipment.

In celebration of Corrocoat's 50 year Anniversary, Corrocoat South Africa has recently purchased a range of particularly specialised surface preparation equipment including high pressure and ultra-high pressure water Jetting equipment up to 2800 bar; concrete floor wheel abraders of various sizes and configurations; specialist dry ice blast cleaning equipment; laser-cleaning equipment for intricate and delicate surfaces such as turbine blades, robotic internal pipe blast cleaning and coating equipment; the latest ultra-high definition camera equipment for pipe inspection purposes; magnetic tank crawler blast cleaning and coating robotics; a new fleet of diesel compressors; inter-link horse and trailer trucks and "cherry-picker" type hydraulic lifts with a safe reach up to 20 metres high.

Corrocoat South Africa have invested in this new equipment as a means of differentiating ourselves as a unique corrosion protection and value engineering service provider for the next 50 years in South Africa and the African continent.

TURNING WATER RISK INTO OPPORTUNITY THROUGH STEWARDSHIP PARTNERSHIPS

The Western Cape's water resilience strategy highlights a fundamental imbalance: the existing system yield is no longer sufficient to meet the province's growing water demand. This reality makes water stewardship interventions critical and is a compelling investment opportunity for private businesses and funders.

Businesses gain tangible value from water stewardship initiatives by lowering water-related risks across their supply chains, while also strengthening their reputation and building more constructive relationships with government, industry partners and the communities in which they operate.

Successful water stewardship projects

At catchment level, a range of water stewardship interventions have already been successfully implemented by businesses across the Western Cape and South Africa, with several standout examples highlighted below.

- **The Greater Cape Town Water Fund: investing in the clearing and management of alien invasive plants (AIPs)**

South Africa's first water fund – The Greater Cape Town Water Fund (GCTWF) – has implemented nature-based solutions such as controlling alien invasive plants (AIPs) and wetland rehabilitation up to the end of July 2025. GCTWF

is an innovative public-private partnership, led by The Nature Conservancy (TNC).

They have cleared 82 231 hectares in seven priority catchments of the Western Cape Water Supply System. As a result, streamflow increased by 34.5 Mm³ per year, and 1 344 green job opportunities were created, with around 50% held by women and 24% by youth. Although the initial clearing of dense, mature IAPs is labour-intensive and costly, consistent follow-up clearing suppresses regrowth and allows fynbos vegetation to recover. Over time, costs decline sharply while the associated water benefits continue to increase.

Water funds like the GCTWF help overcome market failures and fragmentation by offering a collective platform to coordinate implementation and long-term maintenance. They do not replace government responsibilities but strengthen and scale them, enabling

- **The uMhlathuze Catchment Management Forum: investing in water stewardship partnerships**

A WWF South Africa-CHEP water stewardship initiative in the Southern Drakensberg resulted in 615 farmers being trained in sustainable rangeland practices and approximately 1 435 individuals across 287 households benefiting from enhanced access to potable water through the protection of local natural springs. Three mobile livestock auctions were successfully facilitated and generated over R2.2 million, which was used to support farmers, encourage sustainable farming practices, and improve the economic resilience of the community. The initiative is working to formally declare nearly 2 000 hectares as ecologically critical land.

The uMhlathuze Water Stewardship Partnership (uWASP), co-initiated by WWF South Africa and its partners, has initiated several stewardship projects, including convening the uMhlathuze Catchment



WHAT IS WATER STEWARDSHIP?

The United Nations Industrial Development Organisation (UNIDO) describes water stewardship as a means of using and managing water in a responsible way that protects the environment and allows people equitable access to water. This requires that communities work together with businesses and government to take action at specific sites and across entire catchment areas.



Management Forum, developing a multi-stakeholder alien invasive plant strategy, and working with farmers to improve water management.

- **FMCG company: investing in water replenishment**

A FMCG company funded a replenishment project in five municipalities (Dawid Kruiper municipality, Madibeng municipality, Mogalakwena municipality, Polokwane municipality, and Mangaung municipality) that included leak repairs in schools and the refurbishment of the municipal pressure reducing valves. Their aim was to achieve water savings equal to or higher than their annual water usage. Interventions at schools in two municipalities, resulted in average monthly water savings of 300 kl and 2 100 kℓ respectively, with paybacks of 0.4 - 1.7 years.

Successful initiatives such as these rely on strong partnerships between the private sector, conservation organisations, municipalities, and local communities. Yet, across South Africa, many businesses cite a shortage of awareness, collaboration, and co-funding as barriers to action.

The initiatives prove that nature-based solutions (such as IAP clearing) can be a cost-effective approach to increasing water supply, compared

GREENCAPE'S WORK IN THE WATER SECTOR

GreenCape's water programme concentrates on two broad areas: firstly, we aim to improve the productive use of water to support sustainable economic development; secondly, we promote the uptake of green technologies and businesses. Our overall goal is to increase job creation and investment into green water technology and services, and to improve water resource productivity.

We do this through our market research and intelligence activities; by networking and matchmaking businesses; through cleantech advocacy; and research into the economic opportunities and constraints of water.

To learn more about these initiatives and explore opportunities to engage, collaborate or invest, visit the GreenCape website:



to traditional engineering schemes, such as desalination or potable water reuse. They provide catchment-level water benefits through increased streamflow, as well as social benefits, through job creation. Furthermore, sustainable rangeland management, springs protection, and farmer training can lead to social, economic, and environmental benefits. Investment in leak repairs and retrofitting at schools can also result in financial and social benefits.

Conclusion

Investors have a timely opportunity to:

other provinces, using proven methodologies.

- 2) support initiatives that directly improve system resilience and protect business operations from future supply risks.
- 3) align with national sustainability priorities and contribute to community wellbeing

The recommendation is that private businesses and funders commit to co-investing in water stewardship partnerships. By doing so, they will not only secure long-term water supply resilience but also position themselves as leaders in sustainable resource management across South Africa. ●



R32 billion investment potential in Western Cape's water sector

GreenCape, in partnership with the Western Cape Government Department of Environmental Affairs and Development Planning (DEA&DP) has published an industry brief on replicable water stewardship projects for investment and collaboration.

Get in touch to explore these investment opportunities in greater depth:

Download full report here:

Email: info@greencape.co.za
Phone: +27 21 811 0250



Western Cape
Government
FOR YOU



GreenCape

Sanitech – South Africa’s largest integrated hygiene and sanitation solution company and first portable toilet hire company – has recently acquired Green Tech Water and Waste Technology.



ACQUISITION UNLOCKS WIDER ACCESS TO WATER AND WASTE INNOVATION

Green-Tech has been active in the sector since 2010 and is recognised for its ability to combine high-tech international systems with locally sourced South African components. This approach delivers solutions that are advanced but still cost-effective. It reduces the need to import fully built systems and gives clients reliable options backed by strong local supply chains.

Sanitech and Green-Tech have collaborated for nearly a decade. Historically, Green-Tech acted as Sanitech’s technical design partner. Sanitech would identify opportunities, engage customers and scope solutions, while Green-Tech handled detailed design, specification, pricing inputs and project execution support.

“The acquisition of Green-Tech now builds on that partnership and supports

Sanitech’s growth ambitions. Bringing this expertise in-house gives Sanitech direct access to additional well-established design capabilities, supplier relationships and technical innovation. It also expands on the solutions Sanitech offers to clients and improves access to sustainable technologies. By blending international technology with local components and offering flexible financing options, Sanitech is able to lower barriers to entry for advanced treatment systems without compromising on quality

or environmental responsibility,” explains Robert Erasmus, MD, Sanitech.

In support of this approach, the company has designed rental and rent-to-own options that remove the burden of large upfront capital expenditure, making sustainable infrastructure more

accessible to mining companies, industry and commercial users alike.

Scale, operational efficiency and expanded design capabilities

Scale is a key driver behind the move. Smaller companies do not have the capital to offer rent to own options. While they often possess deep technical knowledge, they can struggle to expand due to limited sales reach and infrastructure. Sanitech, by contrast, services more than 5 000 customers through a national sales team of over 50 representatives. Combining this footprint with Green-Tech’s technical depth creates a platform to accelerate the adoption of modern, sustainable water and waste technologies at a national level.

Operational efficiency is another benefit of the integration. With design, procurement and execution now more closely aligned within a single organisation, Sanitech expects faster project turnaround times, improved consistency and stronger risk management across its portfolio.



Robert Erasmus, MD, Sanitech

This is supported by the company's ISO accreditations in quality, environmental management, food safety and occupational health and safety, which underpin its commitment to responsible operations and high service standards.

The integration also enhances product development capability. One example is Sanitech's new self-sufficient mining toilet solution – a bio-reactor-based unit designed to operate without traditional holding or conservancy tanks. Prototypes are already developed and field testing with customers is scheduled for early 2026. Future iterations will include above-ground configurations and solar-powered enhancements.

Water and wastewater division

Green Tech will fall within Sanitech's water and waste treatment division. Established in 2014, this division has successfully implemented various water and waste treatment facilities (using Green-Tech design) across Sub Saharan Africa as well as Ghana and Côte d'Ivoire. Applications typically fall into five key areas:

- 1 Water abstraction and potable treatment for remote operations
- 2 Industrial process water treatment prior to discharge
- 3 Decentralised sewage treatment for workforce
- 4 Water treatment where municipal supply quality is inadequate
- 5 Risk mitigation solutions to address water outages through reuse and storage

"Our water and waste division was initially established out of operational necessity," explains Erasmus. "As a compliant company, we are committed to disposing of all waste from our portable toilets in accordance with local regulations. In certain regions, however, disposal sites were located far from our areas of operation, resulting in high transport costs. Municipal discharge tariffs were also escalating. To address this, we established three wastewater treatment plants in Steelpoort, Secunda and Witbank to manage this waste more efficiently and cost-effectively."

"What began as a practical solution to support our core sanitation business



has since evolved into a fully-fledged water and waste treatment offering. The success of these facilities demonstrated the viability of decentralised treatment, prompting us to develop mobile and modular wastewater treatment plants for external clients. Today, this division services a growing client base across the industrial, mining and food processing sectors."

Demand for decentralised and on-site treatment solutions is increasing, driven by water quality concerns, infrastructure constraints and water security risks.

Sanitech is seeing growing interest from the mining and manufacturing sectors, as well as from residential estate developers facing municipal capacity limitations. In some regions, new developments are required to implement a localised water and waste solutions before receiving service approvals – creating further demand for modular and scalable treatment systems.

Green-Tech makes sure that most of the mechanical items of the plant – like pumps and pipes – are sourced locally. This makes maintenance and any repair requirements less costly and reduces downtime. Clients may require a full-time Sanitech technician to operate the plant, alternatively Sanitech can train an on-site staff member, or provide ongoing support through scheduled monthly maintenance visits.

These decentralised wastewater treatment plants play a pivotal role in supporting Sanitech's customers in achieving the environmental

objectives of their Environmental, Social, and Governance (ESG) goals. The plants minimise a company's environmental impact associated with waste transportation and presents opportunities for water reuse that reduces water demand and effluent discharge – creating a dual benefit for businesses through cost reduction and compliance.

Acquisitions

The Green-Tech integration forms part of a broader strategic expansion. Sanitech has signalled active interest in further acquisitions over the next three to four years, particularly in specialised cleaning, hygiene and pest control sectors where regional expertise can be scaled nationally.

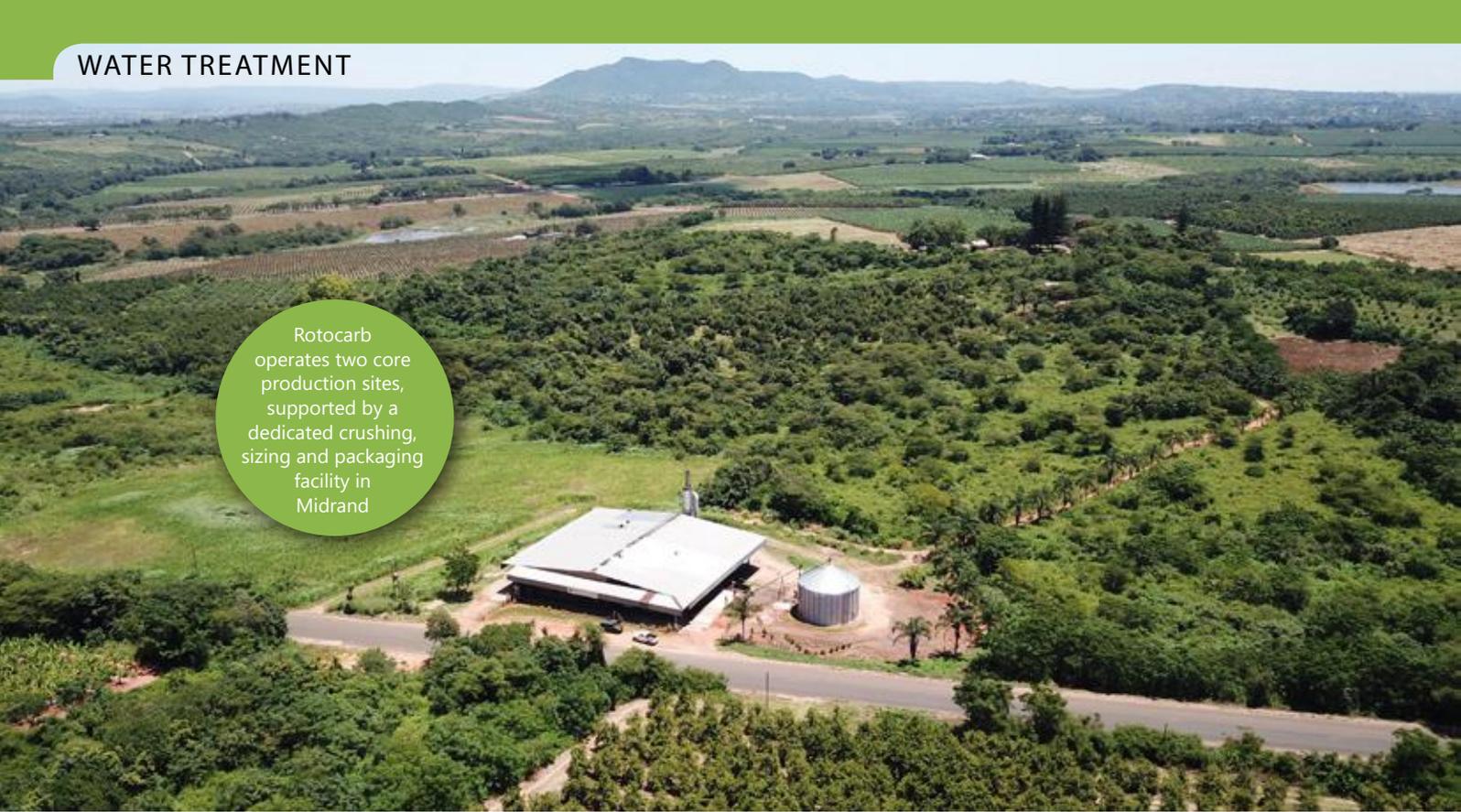
Some of Sanitech's previous acquisitions include Nanchem – a Namibian pest control business, Rent-A-Toilet, Pristine Health Services, Gem-care as well as various smaller toilet hire companies.

"We like to focus on sectors or regions where Sanitech is not yet strong, then using those acquisitions as a base to roll out nationally," adds Erasmus.

Sanitech's parent group, Waco, plays a key role in the acquisition process. "A sales person or manager will identify a potential company, and that company will be approached by the chief financial officer at Waco, who will inevitably sign a non-disclosure agreement. They will then do due diligence. I will then get involved at a later stage," says Erasmus.

Together with its disciplined acquisition strategy and strong group backing, Sanitech is reinforcing its long-term growth trajectory. By targeting complementary expertise and scaling it nationally, the company continues to strengthen its service offering across hygiene, sanitation and water treatment – positioning itself to deliver integrated, future-focused solutions that respond to South Africa's evolving infrastructure and environmental demands. ●





Rotocarb operates two core production sites, supported by a dedicated crushing, sizing and packaging facility in Midrand

TURNING MACADAMIA WASTE INTO A CRITICAL WATER TREATMENT SOLUTION

Founded a decade ago, Rotocarb pioneered the manufacture of virgin steam-activated carbon from macadamia nut shells in South Africa. Now producing over 1 000 tonnes annually, it is the continent’s largest locally owned producer and is expanding capacity to cement its position as Africa’s leading premium activated carbon manufacturer.

“Recognising that South Africa is the world’s largest producer of macadamia nuts, the company identified an opportunity to beneficiate this agricultural by-product, macadamia shells, into high-grade activated carbon,” explains Richard Oldnall, Business Development Manager at Rotocarb.

Activated carbon is made by pyrolysing a carbon-rich material and then activating it with steam or chemicals to develop a highly porous structure. This activation process significantly increases surface area and develops a highly porous

structure, enabling effective adsorption of contaminants from liquid and air streams.

In water treatment, activated carbon is widely used to remove dissolved organic compounds, taste-, colour- and odour-causing substances such as geosmin and 2-MIB, residual disinfectants including chlorine, and emerging contaminants such as pharmaceuticals, pesticides and industrial chemicals.

Activated carbons are produced from various raw materials – including coal, coconut shell, wood and other agricultural feedstocks – each offering distinct pore size distributions and adsorption characteristics. The choice of carbon is therefore application-specific and dependent on the target contaminant and performance requirements.

In partnership with Thermopower Furnaces, Rotocarb commissioned its first production facility in Levubu. The company now operates two core production sites, supported by a dedicated crushing, sizing and packaging facility in Midrand. Today, Rotocarb is South Africa’s largest locally owned activated carbon manufacturer, primarily serving the water sector alongside a range of industrial applications.

The performance of these products is underpinned by the unique characteristics of macadamia nut shells.

“Macadamia shells develop both high microporosity and mesoporosity during steam activation,” says Oldnall. “Micropores are highly effective at adsorbing smaller contaminants, while mesopores accommodate medium-sized compounds, resulting in a broader adsorption spectrum than many conventional coal- or coconut-based carbons.”

In effect, this delivers a dual-function material capable of targeting a wider range of contaminants within a single product.



Richard Oldnall, business development manager, Rotocarb

Macadamia nut shells

Founded in 2016, Rotocarb was established to serve South Africa’s growing demand for carbon-based water purification solutions.



As South Africa is the world's largest producer of macadamia nuts, Rotocarb saw an opportunity to beneficiate macadamia shells into high-grade activated carbon

Misconceptions

"There is a common misconception that a single type of activated carbon can remove all contaminants. In reality, different carbons have distinct pore structures, surface chemistries, grades and activity levels. Each is optimised for specific contaminants, water qualities and operating conditions, and effective treatment depends on selecting the right carbon for the right application," adds Oldnall.

Rotocarb offers more than 20 granular and powdered activated carbon products, all compliant with the Food Chemicals Codex (FCC) and SANS 52903 and SANS 52915 standards. Compliance with these standards ensures consistent, independently verified product quality, with defined performance characteristics, purity criteria and safety requirements. This consistency is critical in purification applications, where even minor variations in activated carbon quality can affect treatment efficiency, regulatory compliance and operational reliability.

"Our emphasis on quality is non-negotiable. It is essential that customers trust our locally produced activated carbons," says Oldnall. "We maintain full control of the entire process, from raw material selection through to the finished product."

Another misconception is that biochar is equivalent to activated carbon. "There's a growing narrative that you can produce char, label it as activated carbon and somehow earn carbon credits in the process," says Oldnall. "From a technical

standpoint, that simply does not make sense – but that is perhaps a discussion for another day."

He continues: "Char is not activated and therefore has an undeveloped pore structure. High quality activated carbons typically have surface areas in the region of 1 000 m²/g, whereas biochar generally ranges between 200 and 400 m²/g. This performance difference is substantial. As a company, we believe it is important to distinguish clearly between the two – particularly in regulated water treatment applications where performance, safety and compliance are critical."

Growth

At the time Rotocarb was established, virtually all activated carbon used in South Africa was imported and often subject to long lead times, minimum order quantities and volatile pricing linked to forex rates.

"The core purpose behind Rotocarb's establishment was to provide the water sector with a reliable and sustainable local alternative to imported carbon," says Oldnall. Over the past decade, our active client base has grown from approximately 40 customers to more than 300."

He adds that the industry is seeing encouraging growth in the adoption of locally manufactured activated carbon, driven by increased awareness of supply chain resilience, quality consistency and the benefits of supporting local beneficiation momentum. "As water quality challenges intensify, there is a growing interest from the private sector in activated carbon from smaller water treatment companies, while in the public sector, there is a stronger push from government to execute and fulfil activated carbon tenders."

As a privately controlled South African manufacturer, built on internally developed thermal processing technology, Rotocarb has embedded sustainability at the core of



Macadamia shells develop both high microporosity and mesoporosity during steam activation



Rotocarb offers more than 20 granular and powdered activated carbon products

its operating model. Macadamia nut shells that were once an agricultural waste stream are converted into high-value filtration media used to purify drinking water for communities and industry, before ultimately returning to the environment in a benign form. The model reflects genuine industrial symbiosis rather than incremental environmental optimisation.

Equally significant is how the carbon is manufactured. Rotocarb employs a proprietary, autogenous thermal process that combines charring and activation into a single facility. This unique approach dramatically reduces energy demand, with most of the process energy generated internally rather than drawn from the grid. Facilities are further supported by solar power and rainwater harvesting, resulting in exceptionally low to almost non-existent emissions compared with conventional activated carbon production routes.

Through the consistent local production of high-quality, standards-compliant activated carbon derived from an agricultural by-product, Rotocarb reduces import dependence and reinforces supply resilience for municipalities and industry amid escalating water quality pressures. ●

GROUNDWATER GOVERNANCE

THE MISSING LINK IN THE WATER CRISIS

Johannesburg's water crisis has finally drawn national attention. Suburbs have endured weeks without supply, residents queue at tankers, and civil society is calling for disaster declarations. President Cyril Ramaphosa acknowledged infrastructure failure in his State of the Nation Address and promised investment. The focus is necessary, but incomplete. **By Yazeed Van Wyk, research manager, Water Research Commission**



The public conversation is currently framed around pressure management, pipe bursts, pump station failures, and under-expenditure. These are real problems. Ageing infrastructure, operational inefficiencies, and governance fragmentation have pushed parts of Johannesburg to the brink. Yet if we reduce this crisis to broken pipes alone, we miss the deeper structural issue. South Africa's water crisis is not only about infrastructure decay. It is also about regulatory modernisation. And beneath the surface lies a governance blind spot that receives far too little attention: groundwater and the growing complexity of contaminants entering our water systems.

Groundwater

Around 80% of South African municipalities use groundwater in some form. In many rural areas, it is the primary or sole source of drinking water. In urban centres, it

supplements surface supply or serves as emergency backup during outages. Yet very few municipalities employ dedicated hydrogeologists. Monitoring networks are sparse. And routine water-quality testing remains focused largely on conventional parameters designed decades ago. At the same time, our contamination profile has changed dramatically.

Across Africa, including South Africa, groundwater systems are increasingly impacted by contaminants of emerging concern, such as pharmaceuticals, antibiotics, personal care products, endocrine-disrupting compounds, industrial chemicals such as PFAS (per- and polyfluoroalkyl substances), and microplastics. These compounds are persistent, mobile, and often resistant to conventional treatment processes. They are not hypothetical risks. They are being detected in shallow and fractured aquifers influenced by wastewater leakage, landfill leachate, and urban runoff.

When wastewater treatment works fail, and many are failing, the problem is not limited to nutrients and pathogens entering rivers. It includes pharmaceuticals from human consumption, industrial compounds from manufacturing zones, and persistent chemicals that can migrate through soil profiles and vadose zones and ultimately into aquifers. When landfill containment is weak, leachate carries complex chemical mixtures into the subsurface. When irrigation reuse expands under water-stressed conditions, treated effluent may introduce trace contaminants into shallow groundwater systems. Yet our regulatory frameworks and monitoring regimes have not evolved at the same pace.

The Department of Water and Sanitation's Blue Drop, Green Drop, and later No Drop programmes were important governance innovations, introducing benchmarking and performance transparency for drinking water quality, wastewater treatment performance, and water loss management. However, while these frameworks improved accountability around conventional parameters and infrastructure efficiency, they were not designed to address the emerging contaminant profile now shaping groundwater and surface water risks.

The National Water and Sanitation Master Plan provides a strategic blueprint for infrastructure renewal and long-term supply security. These initiatives deserve recognition. But they were designed in an era when conventional contaminants dominated policy thinking.

Microbiological safety, nutrients, turbidity, and traditional chemical



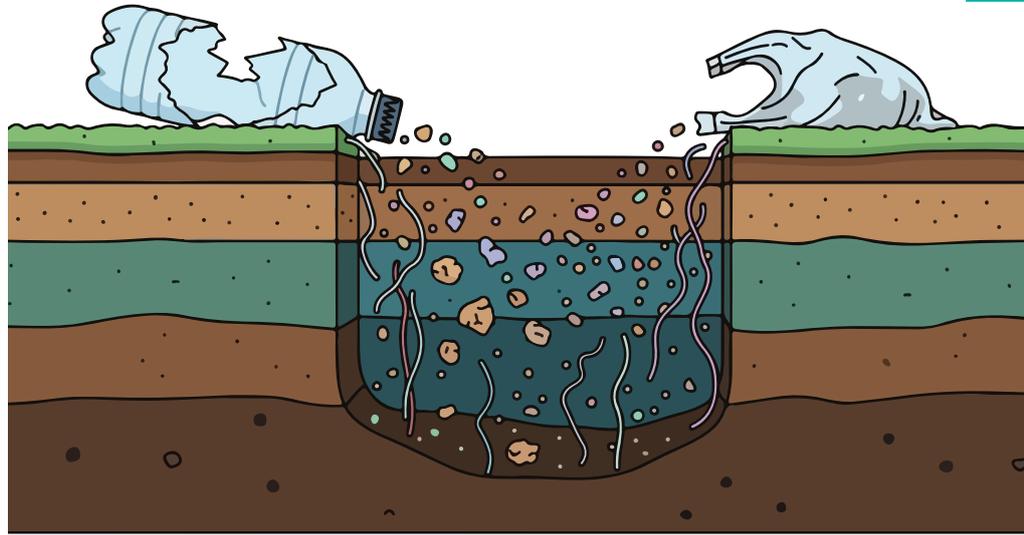
parameters remain essential. However, they no longer represent the full risk landscape. We modernised how we measure water quality. We now need to modernise what we measure. Most municipalities do not routinely screen for pharmaceuticals in groundwater. Few, if not all, have the capacity for high-resolution mass spectrometry to detect complex contaminant mixtures. Groundwater-specific guideline values for many emerging contaminants remain absent. Analytical capacity is unevenly distributed, concentrated in a handful of research institutions and specialised laboratories. In effect, we are managing a 21st century contamination profile with 20th century regulatory tools. This is not a criticism of individuals working within the system. It is a structural gap.

Beneath the surface

Johannesburg's current crisis is framed as a quantity problem: reservoirs too low, pumps not functioning, supply interrupted. But quantity and quality governance are inseparable. When surface systems falter, communities turn to boreholes and private abstraction. When wastewater infrastructure collapses, shallow aquifers become more vulnerable. In highly urbanised and industrial settings such as Gauteng, where fractured and unconfined aquifers enhance hydraulic connectivity, contaminants can move more rapidly than we assume. We should not wait for a contamination scandal to discover this blind spot.

The People's Water Forum and other civil society groups are correct to demand accountability, transparency, and systemic reform. Calls for independent investigations and emergency funding highlight legitimate frustrations. But beyond stabilising supply, we must ask a more fundamental question: are we equipping our water governance systems to manage the contaminants of today and tomorrow?

Cape Town's experience during the 2018 Day Zero crisis offered important lessons. Behavioural change, transparent data-sharing, and diversified supply planning helped avert catastrophe. Long-term strategy, including groundwater abstraction, desalination, and reuse, became central to resilience planning. But resilience is not only about augmenting supply. It is also about understanding what moves through that supply.



Contaminant governance

If Johannesburg and other metropolitan areas increasingly integrate groundwater, reuse, and alternative sources into their portfolios, then contaminant governance must be modernised in parallel. This includes systematic monitoring of emerging contaminants in vulnerable aquifers, development of interim screening thresholds informed by international benchmarks, and integration of hydrogeological vulnerability mapping into infrastructure planning.

Recent regulatory developments in Europe, such as enforceable limit values for selected PFAS in drinking water, illustrate how governance frameworks can evolve in response to emerging risks. Direct transplantation of international standards may not be feasible in South Africa's socio-economic context. However, the principle of precautionary, risk-based monitoring is instructive. We do not need perfect data before acting. We need adaptive governance that recognises complexity. The Johannesburg crisis should therefore serve as a catalyst, not only for infrastructure repair, but for regulatory renewal.

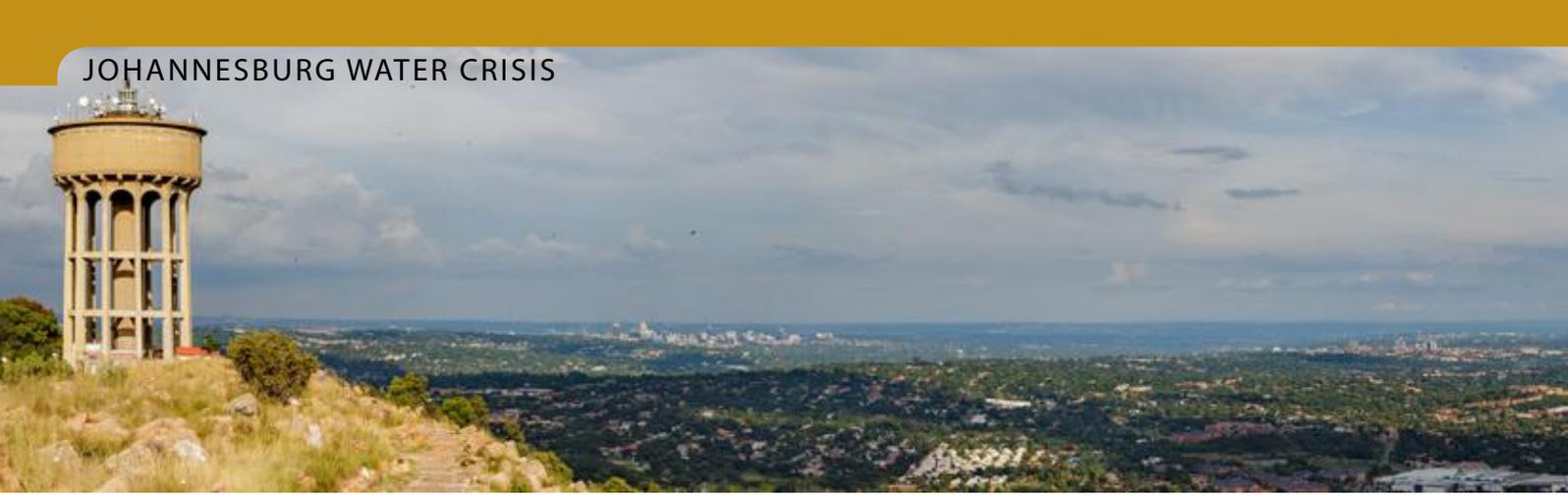
This renewal requires investment in the right skills. Municipalities that depend on groundwater must, as a matter of urgency, employ registered and skilled hydrogeological expertise. Monitoring networks must extend beyond surface reservoirs to include aquifer systems. Laboratory capacity must be strengthened to detect complex contaminant mixtures. Data must be publicly accessible, fostering the same transparency that proved decisive in Cape Town.

Above all, groundwater must be brought into the epicentre of the water governance conversation. It cannot remain an invisible, emergency backstop. It is a strategic national asset. South Africa

does not lack policy documents. It lacks integrated implementation that bridges infrastructure investment, regulatory modernisation, and scientific capacity. The National Water and Sanitation Master Plan acknowledges systemic weaknesses. Blue Drop and Green Drop provide accountability mechanisms. Civil society is demanding action. The President has signalled urgency. The newly established National Water Crisis Committee now provides a platform to embed groundwater governance and contaminant modernisation into the national response, not as an afterthought, but as a core pillar of reform. The opportunity now is to connect these strands.

Johannesburg's crisis is not only about fixing what is broken. It is about governing what is unseen. Beneath the surface lies both vulnerability and resilience. If we continue to treat groundwater as an afterthought and emerging contaminants as a research niche, we risk stabilising supply while overlooking evolving risks. If, however, we use this moment to modernise water governance, integrating infrastructure renewal with contaminant awareness, hydrogeological expertise, and transparent monitoring, then this crisis can become a turning point. Empty taps are visible and politically urgent. Invisible contaminants are, however, more subtle but equally consequential. True resilience requires confronting both.

The question is not whether South Africa can fix Johannesburg's pipes. It is whether we are prepared to update the system that governs the water flowing through them above and below ground, and whether the National Water Crisis Committee will seize this moment to modernise not only infrastructure, but the governance framework that protects it before the next crisis forces our hand. ●



FROM BULK SUPPLY TO BROKEN TAPS

The story of Johannesburg's latest water crisis, forming part of a larger ongoing crisis, is largely one of infrastructure neglect and political inaction. **By Duncan Nortier**



Residents from Midrand, Westdene, Melville, Parktown, Emmerentia, Laudium, and Soweto have gone without water for weeks.

The Commando System

At the centre of the problem is the Commando System. Known for its ageing infrastructure and under strain from a growing population, Johannesburg Water's Commando System is facing serious pressure. It is prone to water shortages, along with low water pressure, especially in high-elevation areas of the supply zone.

Named from where the Rand Water supply meter is located (Commando Road, Industria), the Commando System receives water from the Rand Water Eikenhof Pump Station and supplies water to three hospitals (Rahima Moosa Mother and Child Hospital, Helen Joseph Hospital and Garden City Hospital).

The Johannesburg Water Commando System comprises the Brixton, Hursthill and Crosby complexes. These facilities include four reservoirs and a tower, as well as two pump stations. The reservoirs and tower are:

- Crosby Reservoir (46 Mℓ capacity)
- Hursthill Reservoir 1 (22.7 Mℓ capacity)
- Hursthill Reservoir 2 (22.7 Mℓ capacity)
- Brixton Reservoir (22.7 Mℓ capacity)
- Brixton Water Tower (1.1 Mℓ capacity)

The pump stations are:

- Crosby Pump Station
- Brixton Pump Station

These supply water to two universities (University of Johannesburg and University of Witwatersrand), parts of Region B (Northcliff, Melville, Auckland Park, Bordeaux and Bryanston extensions) and Region F (Johannesburg CBD, City Deep, Robertsham, Linmeyer, Fordsburg, Kibler Park and Mulbarton).

The reservoirs are interdependent, meaning they rely on each other for

water. Therefore, an issue of supply to one will have a ripple effect, causing the others to also lose supply.

The core infrastructure was built from 1917 to 1940, and although the system has received upgrades, much of it remains old and poorly maintained. In 2024, Johannesburg Water announced a sizeable investment into the Crosby Pump Station and Brixton Reservoir.

- 1 25-35% of all the water supplied to Johannesburg is lost through leaks
- 2 Johannesburg Water has implemented advanced leak detection and says this will be crucial to solving the crisis
- 3 Executive Mayor of Johannesburg, Dada Morero, is facing harsh criticism from the public for his handling of the water crisis

Johannesburg Water has made sizable investments into upgrading its water infrastructure, but long build times mean the current system is still vulnerable.



Built more than a century ago and now losing nearly half its water to leaks and mismanagement, Johannesburg's ageing Commando System has become the fragile backbone of a city running dry.

Part of this investment was adding a 1.4 megalitre (Mℓ) tower and a 22 Mℓ reservoir to the Brixton system. This was originally planned to be completed in April 2025, but it has not been completed as of February 2026. Johannesburg Water and the City of Johannesburg state they are in the stage of final testing, and when integrated into the existing system, the increased capacity should improve water delivery to the region.

Issues upon issues

The old and failing system, along with its not-in-use upgrades, faces compounded challenges. Johannesburg Water is constantly under budget constraints. This stems from users not paying, illegal water connections, and diverted funds. In 2025, Executive Mayor of Johannesburg Dada Morero was accused of diverting R4 billion in funds meant for Johannesburg Water to other municipal expenses. This illustrates the importance of ring-fencing Johannesburg Water's revenue, which is now being done.

Johannesburg Water has also taken over the billing duties previously handled by the City of Johannesburg, which long term, serves to enable accurate billing, better revenue collection, and create a solid reinvestment pipeline within the entity.

Johannesburg Water also faces issues related to vandalism and illegal

connections, where water infrastructure is vandalised for political or financial gain and areas without access to water break existing infrastructure to create illegal water networks. Criminals in South Africa have exploited the need for water and the precarious situation of many residents in informal settlements by purposely cutting off the water supply and then selling water to residents at a premium. This destabilises the entire water network as many systems are interdependent.

Maintenance is another sore issue, with much of the ageing infrastructure not being properly looked after and leaks going unnoticed. Johannesburg Water's water loss rate is close to 50%, meaning that 50% of all the water supplied from Rand Water is lost inside Johannesburg's water system, 25-35% is due to leaks alone.

Breakages and backlogs also plague Johannesburg, as demonstrated in early February 2026 when a pump breakdown at Brixton went unattended because there were no parts on hand to fix it.

Reports from 2025 show that the city needs R27 Billion to overcome its water crisis, but persistent infrastructure failings, low funding, and long-time frames have more than likely increased this figure.

Johannesburg Water is the entity responsible for delivering water to its residents, Rand Water are a bulk water service provider who supply

municipalities. The crisis has highlighted the nature of this relationship, with Rand Water reducing supply by 400 Mℓ a day to Johannesburg citing high demand leading to unstable supply. Johannesburg Water states that this unstable supply is feeding the crisis. While the crisis predates the operational issues Rand Water faced earlier this year, the crisis was exacerbated by power-related disruptions at Palmiet Station and the Zuikerbosch Treatment Plant, with the already precarious systems that they feed unable to recover.

What is being done

The immediate actions underway include night-time throttling to reduce losses, strategic bulk meter restrictions in high-consumption zones, intensified pressure management, and advanced leak detection technologies deployed across the network. Additionally, the City is conducting rapid response repairs for identified leaks, increasing the frequency of system audits, and collaborating with local ward committees to identify problem areas more quickly.

These actions are designed to curb excessive demand, minimise water wastage, and ensure fair and sustainable access to water for all residents.

In the long term, the City plans to address Infrastructure challenges, illegal connections, and historical

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underinvestment, which continue to strain the system. Through Johannesburg Water's Water Conservation and Water Demand Management Strategy, the City is accelerating reservoir repairs, pipeline replacement programmes, smart metering, and more rigorous enforcement of by-laws to reduce non-revenue water and restore system efficiency.

Johannesburg Water employees also went on an unprotected strike at the height of the crisis, only worsening the situation.

The Minister of Water and Sanitation, Penny Majodina, has authorised Rand Water to abstract additional water from the Integrated Vaal River System (IVRS) as part of urgent interventions to stabilise Gauteng's strained water supply network.

The decision follows a series of disruptions between 27 January and 1 February 2026, when several electro-mechanical failures at Rand Water's Palmiet and Zuikerbosch pump stations, coupled with a major pipe burst at the Klipfontein reservoir, significantly reduced the supply of treated water to municipalities across the province.

Although Rand Water restored operations and resumed its full supply capacity of 5 000 million litres per day by 4 February, the reduced output of treated water between 27 January and 3 February led to the depletion of numerous municipal reservoirs – particularly in high-lying areas – leaving many communities without water.

Other key interventions between Rand Water, Johannesburg Water and DWS include:

- Accelerated repair of leaks in municipal distribution systems, including the replacement of old leaking pipes, by municipalities
- Removal of illegal connections by municipalities
- Acceleration of municipal water and sanitation capital works programmes, particularly the construction of additional reservoir storage capacity and pumping capacity
- Load shifting (moving water volumes between stable and critical systems) to balance the system. This results in reduced pressure in stable areas but does not result in supply disruptions in stable areas
- Controlled throttling (managing reservoir outlets to build storage levels overnight)
- Approval of level 2 water use restrictions by municipal councils, and enforcement of the restrictions, particularly in high-use areas, and
- Improved communication between municipalities and the public.

Day Zero?

The term 'Day Zero' strikes fear into the hearts of South Africans. Cape Town's water fiasco, branded as 'Day Zero', was tumultuous, but the threat was named and tackled. In contrast, Johannesburg residents have started to use the phrase but have been met with technicalities from the higher-ups. Very technically, Day Zero refers to the total system collapse

where water delivery is no longer possible. Johannesburg Water and the mayor have tried to communicate that what is happening is not a total system collapse, but the unclear communication and brushing off of fears has only enraged residents who have gone without water for 25 days now.

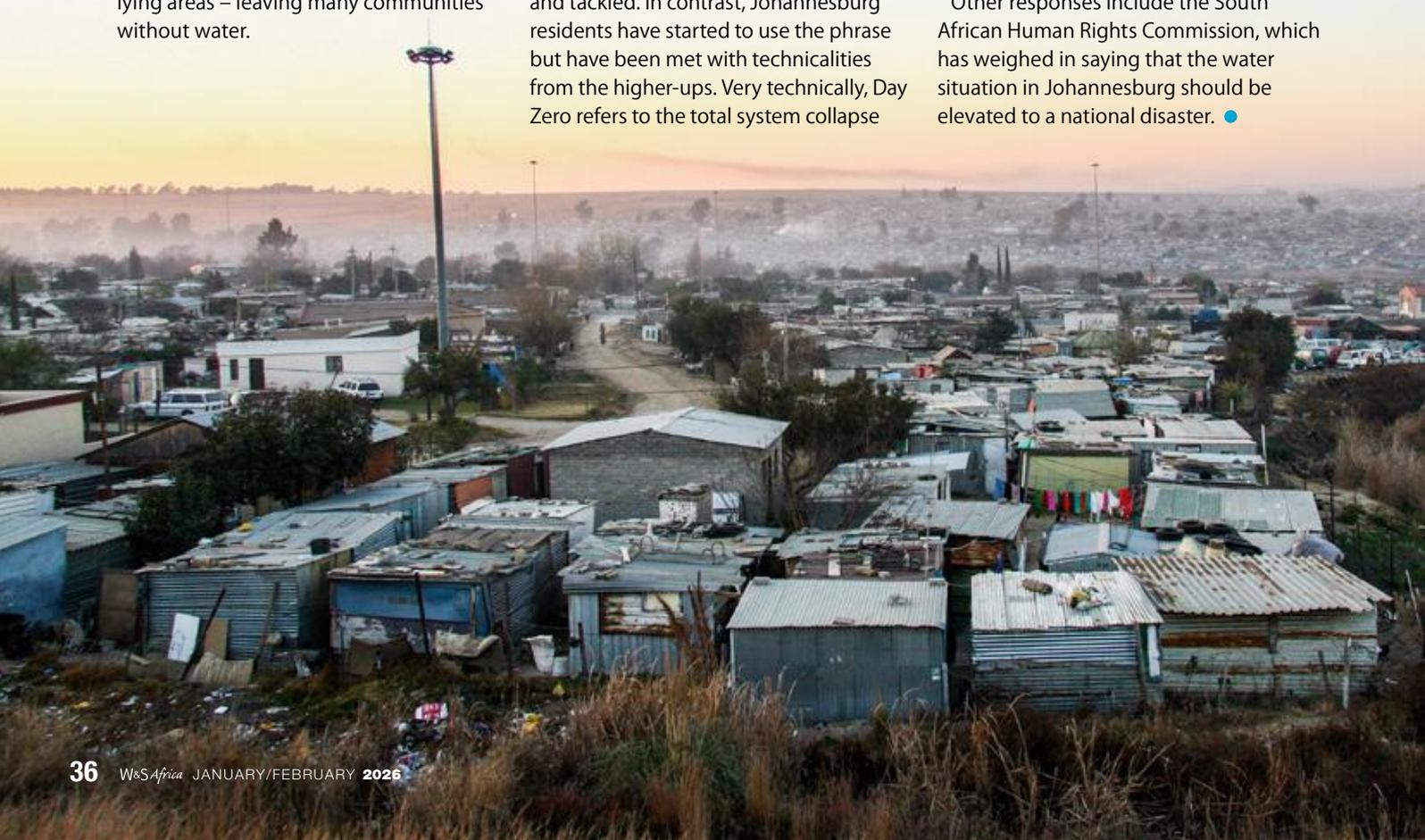
While it is not 'Day Zero,' it feels like it to the suffering residents.

A political catastrophe

Mayor of Johannesburg Dada Morero was quoted in August 2024 saying, "Don't expect much from me", and he has delivered on his word.

While the latest incarnation of the water crisis has dominated headlines, it is important to note that this is an ongoing crisis marked by periods of intense instability and then relative calm. Last year, in February 2025, Johannesburg was experiencing a similar scenario. The inability of Morero to properly address the crisis has been met with fierce criticism from political opposition, residents, and civil society. On 11th February 2026, residents gathered to peacefully protest against the inaction of the city. Mayor Morero addressed these citizens by suggesting that consumption be reduced, and that the crisis driven by demand, yet with 20-plus days of no water, frustrated residents cannot reduce their water from zero to less than zero.

Other responses include the South African Human Rights Commission, which has weighed in saying that the water situation in Johannesburg should be elevated to a national disaster. ●



For South Africa to emerge from its current water crisis, the Johannesburg Water operations manager for water demand management, Jimmy Callander, says "the focus must be on water demand management (WDM)."



THE ECONOMIC RIPPLE EFFECT: WATER DEMAND MANAGEMENT IS VITAL TO WATER SECURITY

One of the biggest concerns for South Africa, and Johannesburg in particular, is non-revenue water (NRW). This is water that is purchased from a bulk supplier, but is lost through municipal systems, either through leaks, vandalism, or illegal water connections.

"WDM inefficiencies occur when water supplied into the system does not translate into revenue or productive use," adds Callander. This creates a damaging financial cycle: "Loss leads to reduced revenue, which limits maintenance, resulting in further losses. As income declines, the municipality's ability to fund essential maintenance and renew ageing infrastructure, already below global best practice benchmarks, becomes increasingly constrained."

Socio-economic barriers and the 'culture of non-payment'

Callander notes, "The challenge is not purely technical; it is deeply rooted in socio-economic conditions." Johannesburg faces complex issues regarding billing and revenue collection, particularly in marginalised communities where the inability to pay is a dominant factor."

However, he also identifies systemic behavioural challenges: "While inability to pay is often the dominant factor, there is also a culture of non-payment and sporadic misuse of metering that harms service provision and municipal finances." This resistance to systems like prepayment and metering often stems from a "complex mix of affordability challenges, mistrust of billing systems, and illegal connections".

Water insecurity directly threatens national gross domestic product, affecting industrial productivity,

manufacturing plants, and investor confidence. For the average resident, the instability necessitates "additional costs such as water storage tanks, boreholes, and bottled water purchases," burdens that disproportionately affect lower-income households.

The path forward

Despite the "billions of rand in infrastructure backlogs," Johannesburg Water has outlined several strategic responses:

- Leak detection and infrastructure rehabilitation: targeting physical losses through pressure management zones.
- Smart metering: aiming to improve billing accuracy and consumption monitoring.
- Infrastructure investment: focusing on reservoir upgrades and pipeline replacements.

Ultimately, effective WDM is viewed as a "new water source". By reducing inefficiencies, the city can potentially increase revenue without raising tariffs, improve public health outcomes, and bolster the long-term lifespan of critical infrastructure. Callander concludes, in a city of Johannesburg's scale, "even a 1% reduction in water loss represents massive financial savings". ●

Jimmy Callander, operations manager for water demand management for Johannesburg Water





**SAFETY MUST
COME FIRST:**

A CALL FOR RESPONSIBLE WATER TANK INSTALLATION IN SOUTH AFRICA

A Jojo Tank collapsed in the Sol Plaatje municipality on the 5th of February 2026, bringing attention to the precarious nature of water in South Africa, away from major metros. As communities increasingly rely on water storage for supply, the importance of safety, installation, and responsible infrastructure cannot be overstated.

The collapsed tank severely injured a man, and the incident has drawn attention to how municipalities carry out their duties.

Water storage plays a critical role in household and community sustainability, but it also carries real risks if systems are poorly designed, incorrectly installed, or inadequately supported. South Africa is under growing water pressure, and for many households and communities, water tanks have shifted from being optional extras to essential infrastructure.

A full water tank, however, is more than a simple container. It is a structure carrying significant weight, and when placed on unstable ground or supported by inadequate stands, the risks increase significantly.

This incident has reinforced the importance of correct installation,

appropriate support structures, and regular maintenance in keeping water storage systems safe. This is a shared responsibility.

Simple design, proper installation

Proper installation is not a technical formality; it is a safety requirement. Engineered, load-bearing stands, level and stable foundations, strict adherence to installation guidelines, and routine inspections are all essential. When these elements are overlooked, manageable risks can quickly escalate, especially in environments where children and other vulnerable community members are present.

Consumers are often encouraged to prioritise capacity and price when selecting water storage solutions. Yet true quality extends beyond the tank itself. The stand, foundation preparation,

installation method, and ongoing maintenance all play a critical role in ensuring long-term safety.

As water storage becomes more widespread, education around these factors must keep pace. Safety guidance should be clear, visible, and consistently reinforced, whether tanks are installed by private contractors, municipalities, or community-based programmes.

JoJo calls on all stakeholders to take proactive steps to prevent future harm:

- Municipalities and public bodies must ensure that tanks installed as part of water relief or infrastructure projects meet appropriate safety and installation standards.
- Installers and contractors must use fit-for-purpose, load-bearing stands and follow installation guidelines without compromise.
- Consumers and communities should ask questions, insist on compliant installations, and ensure that tanks and stands are kept secure and inaccessible to children.

Water insecurity should not introduce new risks to life and safety. Access to water must go hand in hand with responsible infrastructure decisions.

Jojo states that they remain committed to promoting safe water storage practices and supporting the education around proper installation. ●

Western Cape water security challenges should not paint a doom and gloom picture

Lower-than-normal rainfall in parts of the Western Cape has led to a significant decline in key dam storage levels. The hydrological report of 16 February 2025 shows a week-on-week drop across the province, raising concerns about water security should dry conditions continue. **By Rayi Malusi, deputy director: Communications, Department of Water and Sanitation (Western Cape)**



The Western Cape Water Supply System (WCWSS), which supplies water to Cape Town and surrounding areas including Stellenbosch, Drakenstein, Swartland, Saldanha, the Berg River area, and certain towns within Theewaterskloof is currently at 56.36%. This reflects a notable decrease from 75.04%.

Concerningly, the Gouritz River Catchment which covers the coastal belt and little karoo is seating at 42,31% compared to 74,57% same time last year with the Garden Route being the hardest hit district or region. The Theewaterskloof Dam, the largest dam in the Western Cape Province, which forms more than 54% of the total storage of the local WCWSS regional system dams has seen almost 30% decline hovering below 60% compared to 85,44% last year.

Of particular concern to the Department of Water and Sanitation (DWS) is the water supply system in Knysna, which is currently facing critical challenges due to a severe localised drought

affecting the Garden Route region of the Western Cape. The Akkerkloof Dam, the municipality's primary storage facility, is presently at approximately 29% translating to an estimated over 20 days of usable water at current consumption levels.

This situation is further compounded by the long-term neglect of maintenance and upgrades to critical water infrastructure.

Positive interventions

DWS, together with other spheres of government, is collaborating to implement short-, medium-, and long-term interventions aimed at mitigating the impact of these water challenges on both households and the broader economy.

For instance, DWS has reprioritised funds from the Water Service and Infrastructure Grant (WSIG) and avail emergency relief allocation to Knysna Municipality, together with the provision of technical capacity.

We commend the Water Services Authorities (WSAs) which has proactively imposed or ramped up water restrictions as means of curbing excessive water usage and urge all water users to adhere to the imposed water restrictions.

It is important to note that, despite these challenges, the current interventions are a source of optimism and hope.

However, even though the government is taking all measures to mitigate water challenges, water users, particularly high-end users, can play a big role in reducing water consumption. In this regard, water users are urged to:

- Drive down water demand
- Continue using water sparing
- Fix/report water leaks

Furthermore, the Department promotes the proactive development of a diversified water resource mix to enhance security of supply, particularly when a specific resource or source is severely compromised.

The effects of climate change are real and are already being felt. In this regard, it should be noted that the Department can only manage bulk water supply (in storage) and projected demand by user sectors (through the implementation of restrictions, where necessary). However, it cannot control unpredictable weather conditions.

As we face the reality of water challenges as a result of several factors including climate change, high water demand attributed to population and economic growth in the province of the Western Cape, it's time for us all to take responsibility for our water usage, use water wisely, and don't wait until it's too late. ●



MINIMUM FIRE COMPLIANCE IS NO LONGER ENOUGH

Fire is not an insurance boogeyman; it is a real risk to business, life, and infrastructure. Compliance with South Africa's fire protection regulations is more than a regulatory exercise; it is a necessary part of ensuring security and safety for any building.

South Africa has SANS 10400-T, part of the National Building Regulations that deal specifically with fire protection. While it prescribes a minimum and stipulates access to municipal water, in practice, going beyond these requirements is essential to achieve meaningful fire resilience.

Paul Warrener of Rainbow Reservoirs says, "These regulations are put in place for protection, but more importantly, they're minimums. They don't account for what happens when municipal supply fails in a real emergency."

SANS 10400-T and the limits of municipal supply

Under SANS 10400-T, municipalities are legally required to supply water for fire protection. However, the regulation does not address operational realities such as pressure fluctuations, burst pipes, maintenance shutdowns or unplanned outages.

According to Warrener, this gap has become increasingly apparent over the past 18 months.

"We've seen a noticeable increase in site visits related specifically to fire and emergency water storage," he says. "Fire engineers and insurance companies are far more aware of the risks created by unreliable municipal supply."

As a result, insurers are often applying stricter requirements than those set out in the regulations, particularly for high-value or high-occupancy buildings.

Emergency water storage as a first line of defence

Warrener emphasises that emergency water storage systems are designed to operate independently of external supply.

"Emergency water storage provides an immediate, reliable and independent water source for fire suppression," Warrener explains. "It's there to respond instantly, with the correct pressure and flow rate, when the fire starts."

These systems are designed to support sprinkler systems, hydrants and hose reels during the critical early stages of a fire.

"The first few minutes are decisive," Warrener says. "The goal is to suppress and contain the fire until the fire department arrives. Without guaranteed water, that simply doesn't happen."

The minimum water supplied is calculated by area and time. The water tanker must run for a given time over the specified area for it to be effective.

Meeting the ASIB standards, Rainbow Reservoirs provide a robust solution to the hazards of on-site fires



Hoses must have a flow rate of 0.5 litres per second, while hydrants usually have a stipulated pressure of 100 to 150 kilo newtons per metre squared.

Insurance exposure and business risk

While municipal supply may satisfy the letter of the law, it does not always satisfy insurers. In practice, insurance assessments focus on risk mitigation rather than minimum compliance.

"If a warehouse or shopping centre burns down and there is no backup water storage, insurers are going to ask why," says Warrenner. "Relying solely on the municipal line is a risk many businesses can't afford." Municipal water infrastructure is subject to maintenance, downtime, and leaks, which can make immediate access to water in an emergency non-viable. There is also the documented decline in water infrastructure in South Africa that makes a permanent tank a much more reliable solution.

Warrenner adds that losses following uncontrolled fires are often unrecoverable.

"In many cases, businesses never reopen," he says. "The upfront cost of emergency water storage is small compared to the long-term financial and legal consequences."

When dedicated fire-water storage is required

The requirement for separate emergency water storage is typically determined by a combination of factors, including building size, occupancy levels and usage.

"Size matters, but it's not the only factor," Warrenner notes. "It's also about how many people are inside the building and what's being stored or processed there."

Large commercial and public buildings, such as shopping centres, hospitals, factories and apartment complexes, are commonly required to install sprinkler systems supported by dedicated emergency water storage. Smaller buildings may rely on hydrants and hose reels, but still require stored water and pumping systems capable of delivering adequate flow.

Design, placement and performance

Although fire-water tanks are often specified in litres or cubic metres, capacity alone does not guarantee performance.

"A fire engineer doesn't just say how much water you need," Warrenner explains. "They specify how much water must flow, at what pressure, and for how long before emergency services arrive."



For businesses who are serious about fire protection, high-quality, dependable fire tanks are essential

To meet these requirements, systems must be carefully designed. Placement is critical: tanks should be protected from damage but located close enough to reduce pumping losses and delays.

Technical features also play a role. Rainbow Reservoirs, for example, incorporates customised vortex inhibitors into its systems.

"These prevent air from being drawn into the pump," Warrenner says. "You get a steady, uninterrupted flow of water, which is essential when the system is under pressure."

Modern emergency water storage systems are increasingly customised to suit site-specific constraints.

"After the fire engineer has done their work, we assess the site," Warrenner explained. "Space and accessibility don't always work together."

In large urban developments, tanks have been installed in otherwise unused structural spaces. One notable example is the Mall of Africa, where tanks were installed within the spiral columns of the parking ramps.

"That allowed the client to remain compliant without losing parking bays or buying additional land," Warrenner said.

In environmentally sensitive settings, aesthetics also play a role.

"For game lodges, we use colours that blend into the surroundings," he added. "You don't want a bright metal tank disrupting the landscape."

Dual-use water storage

Customisation also allows for dual-use systems, where stored water can serve operational needs without compromising fire protection.

"We can include a mid-level outlet for cleaning or domestic use," Warrenner adds, "while always maintaining the minimum volume required for fire suppression."

This approach is increasingly popular in factories and large commercial facilities, where water security is a growing concern.

The role of ASIB certification

Oversight of fire suppression systems in South Africa falls largely to the Automatic Sprinkler Inspection Bureau (ASIB), an independent body responsible for regulating sprinkler and hydrant systems.

"ASIB sets very strict standards for design, installation and maintenance, they inspect systems and issue compliance certificates."

The organisation's track record is widely regarded as exceptional. "Since the 1970s, there has been no recorded loss under normal fire conditions in any structure with a valid ASIB clearance certificate," he notes.

ASIB certification is recognised by insurers and is often a prerequisite for full cover.

"It's proven reliability," Warrenner says. "It protects building owners legally, financially and operationally."

From compliance to resilience

As water reliability becomes less predictable, the fire protection conversation is shifting from compliance toward resilience.

Warrenner emphasises that, "This isn't unnecessary red tape, it's life-saving infrastructure."

In an environment where municipal systems can no longer be assumed to perform consistently under emergency conditions, on-site emergency water storage is increasingly viewed as essential, not optional, for protecting people, property and business continuity. ●

SOUTH AFRICA'S OVERLOOKED FOUNDATION FOR WATER SECURITY

As South Africa grapples with worsening water insecurity, flooding, and infrastructure failures, attention is increasingly turning to a form of infrastructure that is often invisible on balance sheets but essential to economic and social stability: ecological infrastructure. **By Duncan Nortier**

According to the South African National Biodiversity Institute (SANBI), ecological infrastructure refers to “the naturally functioning ecosystems that generate or deliver valuable services to people.” These ecosystems, including rivers, wetlands, grasslands, mountain catchments and estuaries, underpin water security, disaster risk reduction and climate resilience, yet remain among the most threatened systems in the country.

SANBI’s mandate, rooted in the National Environmental Management: Biodiversity Act, is to “explore, celebrate

and champion biodiversity for the benefit and enjoyment of all South Africans,” explains Dr Nontutuzelo Pearl Gola, director of biodiversity mainstreaming at SANBI. This includes generating biodiversity knowledge, providing policy advice, managing national botanical and zoological gardens, and supporting sustainable development through improved access to biodiversity data and capacity building.

Nature as infrastructure

Ecological infrastructure is often described as the nature-based equivalent of built infrastructure, but its importance is still widely underestimated. “Just as with built infrastructure, it is important to manage, invest in maintaining, restoring and rehabilitating ecological infrastructure,” says Gola. When functioning properly, these ecosystems provide services such as flood attenuation, water purification, sediment retention and disaster risk reduction, services that would otherwise require expensive engineered solutions.

Yet South Africa’s ecological infrastructure is under severe pressure. The National Biodiversity Assessment of 2025 reveals that rivers and wetlands are the most threatened and least protected ecosystems in the country. “Over 60% of river and wetland types are threatened, while less than 10% are well protected,” Gola notes.

These systems face a convergence of pressures, including altered water flows, pollution, land-use change, invasive alien plants and failing wastewater infrastructure. “Rampant infestation of invasive alien plants causes significant water loss from aquatic ecosystems,” Gola explains, while increasing nutrient loads from poorly maintained sewerage systems and urban and agricultural runoff degrade water quality. Human settlements encroaching on wetlands and rivers, along with livestock overgrazing, further compound the problem.

Ecological infrastructure does not operate in isolation. In many cases, it directly supports built infrastructure and reduces long-term costs. Rivers, wetlands and high-rainfall catchments enhance both water quality and water quantity, while also protecting dams, treatment plants and settlements from extreme events.

“Ecological infrastructure can support and, in some instances, complement built or engineered infrastructure, saving costs



Dr Nontutuzelo Pearl Gola, director of biodiversity mainstreaming at SANBI

associated with its maintenance," says Gola. Healthy wetlands upstream of dams, for example, trap sediment and pollutants before they reach water treatment facilities, lowering purification costs and extending infrastructure lifespan.

These systems are also critical for disaster risk reduction. "Ecological infrastructure can decrease the vulnerability of people and built infrastructure to damage during extreme events like floods and droughts," Gola explains. Buffer zones of intact ecosystems slow water flows, reduce flood peaks and protect downstream communities.

Water security and the limits of engineered solutions

With South Africa approaching the limits of its dam-building potential, ecological infrastructure is becoming increasingly central to water security planning. "There is a growing recognition that South Africa is running out of options to build new engineered solutions such as dams, which are also technically demanding and costly," says Gola.

Instead, the focus is shifting towards maximising existing water resources. "Healthy ecological infrastructure, such as wetlands, rivers and Strategic Water Source Areas, can directly support water security by increasing stream flow and water storage in soils, preventing or delaying sediment build-up in dams, improving water quality and reducing flood damage by storing and slowly releasing flood waters," she says.

The consequences of neglecting ecological infrastructure are already visible across the country. When these systems are damaged or destroyed, they lose their ability to deliver essential services. "Expansion of industries such as mining, inappropriate agricultural practices, inadequate land-use planning and poor operation and maintenance of wastewater infrastructure have increased these challenges," Gola explains.

Degraded ecosystems increase the vulnerability of built infrastructure during extreme events and drive up maintenance and repair costs, a burden that ultimately falls on municipalities and consumers.

A case study: the Mthinzima Wetland

One of the clearest examples of ecological infrastructure supporting water security is the Mthinzima Wetland in Mpophomeni, KwaZulu-Natal. Located upstream of Midmar Dam, the wetland sits between the township and one of the region's most important water supply assets.

"Mpophomeni township has a long history of failed wastewater infrastructure," says Gola. As a result, polluted water flowed into Midmar Dam, affecting water quality and increasing treatment costs. The wetland played a critical buffering role. "It trapped effluent from the Mpophomeni Wastewater Treatment Works and ameliorated the water quality effects on the dam," she explains.

Recognising its importance, the wetland was prioritised for rehabilitation by the Working for Wetlands programme. Initiated in 2019, the project followed an integrated approach combining wetland rehabilitation, wastewater infrastructure repair, water quality monitoring and community education.

"This integrated process considered the socio-ecological elements of the system and the built-ecological infrastructure complementarity of the wetland, the stream, the wastewater treatment works and the dam," says Gola. Flow-altering structures were introduced to restore wetland function, while the wastewater treatment plant was refurbished to improve sewer network capacity.

Community involvement was a key enabler. "The use of

Wetlands are vital to natural flood prevention, the erosion of them has led to increased flooding and severity of flooding in South Africa

a citizen science approach brought in youth to assist in monitoring the wetland and associated stream," Gola notes. The project also formed part of the uMngeni Ecological Infrastructure Partnership's 'Save Midmar Project', demonstrating the value of collaboration across government, civil society, academia and the private sector.

Wetlands and flood control

Beyond water quality and supply, wetlands play a vital role in flood management. "Different types of wetlands may play different roles in flood control," Gola explains. Peatlands act like sponges, absorbing rainfall and releasing it slowly, while floodplains allow water to spread out, reducing its depth and speed.

However, these benefits are lost when wetlands are disturbed. "Building settlements on floodplains should be avoided because it alters their function and results in those settlements being flooded," she warns.

As climate risks intensify, SANBI argues that ecological infrastructure must be treated as a strategic national asset. Protecting and restoring these systems is not only an environmental imperative, but a cost-effective investment in water security, disaster resilience and long-term development.

"Ecological infrastructure supports biodiversity, livelihoods and the economy," Gola concludes. "Healthy ecosystems are fundamental to South Africa's ability to adapt to climate change and secure water for future generations." ●

Ecological infrastructure refers to the naturally functioning ecosystems that generate or deliver valuable services to people

CAN NATIONAL GOVERNMENT HOLD MUNICIPALITIES ACCOUNTABLE FOR POOR SERVICE DELIVERY?

South Africa's Constitution clearly defines the powers and limits of national, provincial and local government. Yet as municipal water and sanitation services decline, questions persist about accountability. The Department of Water and Sanitation outlines why national government cannot simply 'take over' struggling municipalities, and why interventions often fail. **By Dr Sean Philips, director general and Wisane Mivasa, spokesperson of the Department of Water and Sanitation (DWS)**



Section 40 of the Constitution states: "In the Republic, government is constituted as national, provincial and local spheres of government which are distinctive, interdependent and interrelated." The keyword is "spheres" – it does not say that there are three layers of government, with national government above local government.

Section 156 of the Constitution states that local government has executive authority in respect of, and has the right to administer, the local government matters listed in Part B of Schedule 4, one of which is water and sanitation services. Functions listed in Part B of Schedule 4 are considered inherent local government functions, or "original powers" of municipalities.

In the late 1990s, in terms of the Municipal Structures Act, the then minister of provincial and local government appointed 144 out of the 257 municipalities in South Africa as Water Services Authorities (WSAs). In some areas of the country, the district municipality is the WSA, and the local municipalities under the district municipality do not have a role to play in the provision of water services.

Water Services Act

S155(7) of the Constitution states that the national government has the legislative and executive authority to see to the effective performance by municipalities of their functions in respect of matters listed in Schedule 4 by regulating the exercise by municipalities of their executive authority. This means the national government can provide a legal framework for the exercising of this executive authority by the local government – and the Water Services Act was enacted in 1997 to provide this framework for municipal water services.

S155 of the Constitution and the Water Services Act enable the DWS to issue regulations related to the provision of water services by WSAs. The DWS issues national norms and standards for municipal water services in terms of the legislation but currently does not have enforcement powers for the norms and standards. The Water Services Amendment Bill that is currently before Parliament provides for the DWS to be given additional regulatory powers to direct WSAs to comply with the norms and standards, and for noncompliance with key aspects of the norms and

standards to be a criminal offence, similarly to the National Water Act.

However, there are also limitations to the degree to which regulatory action can address poor performance – for example, the fact that the DWS currently has criminal charges under the National Water Act against 56 of the 144 WSAs for sewage pollution has not resulted in a significant improvement in wastewater management by municipalities.

If "holding municipalities accountable" means making information publicly available regarding their performance, the DWS is doing this through its Blue, Green and No Drop regulatory assessment reports, which have provided evidence of the general decline in municipal performance with regard to water and sanitation services.

However, the Drop reports have not resulted in an improvement in performance. For example, the January 2024 Water Services Summit and the March 2025 Water and Sanitation Indaba, in which Water Services Authorities participated, took resolutions that all





Dr Sean Philips, director general,
Department of Water and Sanitation



Wisane Mivasa, spokesperson,
Department of Water and Sanitation

WSAs will produce corrective action plans to address their 2022 and 2023 Blue, Green and No Drop report results. However, by September 2025, 53 WSAs had not yet produced corrective action plans. These 53 are among the 105 worst performing WSAs that obtained Blue, Green or No Drop scores which indicated that their water and sanitation systems were in a poor or critical state of performance.

S154 of the Constitution provides for the national and provincial government to support municipalities. The national government is providing considerable support to municipalities for water and sanitation services, including technical and engineering advice and assistance, capacity building and training, financial management advice and support, and grants in excess of R60-billion per annum.

However, despite all the support being provided by the national and provincial governments to municipalities, municipal water and sanitation services continue to decline. This is because there are limitations to which national and provincial support can turn around the decline. For example, in those cases

where the leadership of the municipality is not responding to directives or not taking advice, performance can only be improved by addressing the leadership challenges.

In addition, S139 of the Constitution and S63 of the Water Services Act provide for the national government to intervene in local government when a municipality is not fulfilling its water and sanitation services obligations. However, S139 and S63 interventions have generally not been effective in addressing service failures. This is partly because these interventions are limited in duration (S139 interventions usually involve the appointment of an administrator for six months) and the situation usually deteriorates again after the intervention. The Constitution does not provide for permanent intervention (a “takeover”) of the municipal water and sanitation function, because water services are original municipal functions in terms of Part B of Schedule 4 of the Constitution.

S151(3) of the Constitution states that a municipality has the right to govern, on its own initiative, the local government affairs of its community, subject to

the national and provincial legislation. Therefore, S139 interventions cannot include permanently removing the executive authority of local government in respect of the water services function.

Only the electorate can fire a mayor

If “holding municipalities accountable” for poor water and sanitation services includes implementing consequence management measures, such as removing a mayor, or removing the member of the mayoral committee responsible for water and sanitation or taking disciplinary action against water and sanitation officials in the municipality, then this cannot be done by the national government.

Disciplinary action against water and sanitation officials in a municipality can only be implemented by the municipality itself. In addition, neither the President nor any minister in the national government can fire a mayor. There are separate local government elections which result in the election of the political leaders of local government, and the only people with the authority to remove that leadership are the local electorate. ●



NAVIGATING SMART WATER METERING: HELP IS HERE

Smart water metering is transforming utilities from reactive billing entities into data-driven managers of demand and losses. Modern meters combine sensors, connectivity and analytics to detect leaks, reduce non-revenue water and improve customer engagement. Yet many utilities remain unsure how to implement systems effectively and secure long-term value.

In response to this, the Smart Water Networks Forum (SWAN), partnered with the Water Research Foundation and Co-PI GHD to create the Smart Metering Playbook. "Municipal smart metering is a consequential investment for water utilities worldwide but up until now, those embarking on that journey have had to navigate without a true compass. This playbook changes that. Built on the collective expertise of over 50 utilities, engineering firms, and technology partners across 22 countries, this industry resource orients entities within the evolving smart metering landscape, helping them understand where they are along the maturity curve. It equips utilities and their partners with the tools to proactively identify risk, structure smarter procurement, and derisk decisions at every stage of the journey – from forming the business case to full-scale deployment. In a sector where getting it wrong costs communities dearly, we have curated this to be the trusted guide the water industry has long needed."

A research team carried out an extensive literature review and collaborated with utilities and the supporting ecosystem to gather key learnings from project initiation to benefits realization after deployment. This was followed by the launch of a global utility smart metering survey, covering key questions related to smart metering drivers, meter selection and communication protocol considerations.

The research team also conducted interviews with dozens of utilities and meter industry representatives and collected global smart metering case studies.

Key findings

Smart metering delivers value beyond billing - utilities are leveraging AMR and AMI technologies to enhance operational efficiency, reduce water loss, optimise asset management, and drive meaningful customer engagement.

Success requires cross-functional alignment - effective smart metering initiatives require collaboration and stakeholder engagement across departments – particularly IT, operations, customer service, and leadership and alignment with strategic utility goals.

Communication networks are strategic assets - as utilities shift from AMR to AMI, the choice of wireless communication (cellular, long range wide area network (LoRaWAN), narrowband-Internet of things [NB-IoT]) becomes critical not only for connectivity, but for broader smart city and infrastructure convergence goals.

Metering data is the real value driver – high-frequency data from AMI systems unlocks opportunities for near real-time insights, predictive maintenance, advanced leak detection, and enhanced customer transparency.

Smart metering is not one-size-fits-all - meter types, deployment models, business cases, and technology strategies must be tailored to local context, including geography, regulation, budget, and customer needs. Contrary to when smart metering first entered the water sector, there are now many meter vendor options, more communication protocols, and unique business models to consider such as Metering-as-a-Service and Network-as-a-Service.

Shirley Ben-Dak, senior advisor, SWAN

Path forward

To realise the full value of smart metering, utilities must:

- Align metering investments with clear organisational goals (reducing water loss, enhancing customer service, improving asset management).
- Develop internal capacity to interpret and act on the data collected through AMR/AMI systems.
- Leverage partnerships with experienced vendors, software providers, and consultants to accelerate deployment and optimise performance.
- Prioritise change management and staff training to support evolving roles and customer expectations.
- Track measurable outcomes such as reduced non-revenue water, increased billing accuracy, and improved customer engagement.

Some of the outcomes from the survey

■ Hardware

The majority of utilities surveyed (69%) indicated plans to procure static or smart meters rather than traditional mechanical



meters, signalling a clear industry shift toward smart metering.

Unlike mechanical meters, smart meters require active management throughout their lifecycle, including battery monitoring, firmware updates, data transmission performance, and cybersecurity oversight. These devices function as part of an integrated digital system, requiring coordination between IT, operations, and customer service teams.

Despite these advantages, battery life emerged as the top hardware-related concern among respondents, underscoring the need for utilities to consider long-term maintenance strategies and total cost of ownership when transitioning to smart metering technologies.

Software

In this digital ecosystem, metering software bridges the gap between field data and utility strategy. For utilities to fully capture the benefits of smart metering investments, it is essential to invest in scalable, interoperable, and user-friendly platforms that can evolve alongside the technology and the utility's operational needs.

Beyond the meter data management system, utilities are increasingly adopting smart water platforms that integrate smart meter data with operational technologies such as SCADA, GIS, and work order management systems.

DEFINING SMART METERING

Smart water metering refers to the use of digital technology to measure, record, and communicate water usage data more efficiently and accurately than traditional manual metering systems. It includes both Automated Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) technologies, which offer different levels of functionality and connectivity.

This integration enables the use of digital twins, advanced analytics, and interactive dashboards for:

- Optimising network performance and reducing non-revenue water.
- Enhancing asset management through predictive maintenance.
- Modelling system behaviour under different demand, pressure, or climate scenarios.
- Supporting regulatory compliance and sustainability reporting.

Communications

This study found that security, reliability, and coverage are the top considerations for utilities when selecting a wireless network. These factors are essential for ensuring consistent data transmission, safeguarding sensitive customer and operational data, and maintaining system uptime – particularly in geographically diverse or hard-to-reach service areas.

The type of communications network required depends heavily on whether a utility is implementing Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI):

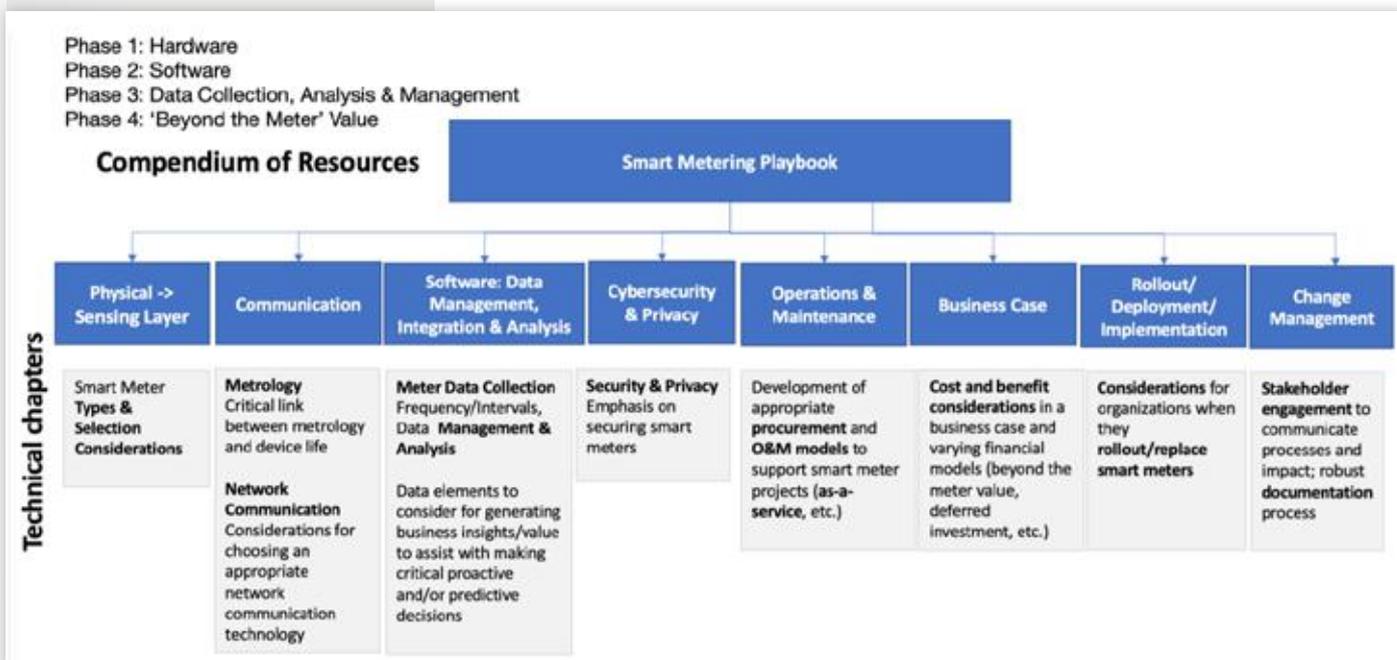
- AMR systems typically support one-way communication, often collected via drive-by or walk-by methods using handheld or mobile receivers. These systems require minimal network infrastructure but limit the frequency and scope of data collection.
- AMI systems, by contrast, enable two-way communication via fixed, wireless networks that support near real-time data transfer. AMI enables advanced functionality such as remote shutoff, hourly usage alerts, leak detection, and integration with broader utility and municipal systems.

As utilities move from AMR to AMI, they are increasingly viewing communications networks not just as a channel for meter reads, but as a strategic asset. There is growing interest in using AMI networks to support broader smart city and digital infrastructure goals, such as real-time monitoring of pressure zones, flow sensors, tank levels, environmental sensors, and even assets beyond water – like street lighting and waste management. ●

To download the full Smart Metering Playbook for free, scan the QR code and subscribe to the Water Research Foundation Public Plus account (can sign up for free individual account):



The playbook structure



STAYING STEADY IN A STRAINED SYSTEM

Throughout Africa, rapid urbanisation continues to put strain on existing water networks. When water systems fail through pressure loss, pipe bursts, or supply interruptions, the consequences ripple through communities. As populations grow and climate pressures intensify, sustainable water management becomes a cornerstone of social stability.

Today, effective pressure monitoring is no longer a technical add-on; it is a strategic necessity.

Accurate, real-time pressure data helps utilities maintain consistent supply, reduce nonrevenue water, protect infrastructure, and meet sustainability targets. VEGA provides pressure instrumentation designed for efficiency, operational resilience and environmental stewardship.

A holistic approach to water management

Water management spans abstraction, treatment, distribution, wastewater collection and safe discharge. As African nations work toward Africa Water Vision 2063 and SDG 6, utilities recognise the role of precise pressure monitoring in reducing losses and improving efficiency.

Recent assessments show progress in Integrated Water Resources Management implementation across Africa, but financial and institutional constraints are slowing momentum. Operational efficiency is therefore critical, and standardised instrumentation supports better data quality and lower maintenance burdens.

VEGA's standardised pressure solutions offer a cohesive approach to sustainable operations, enabling facilities to streamline processes, reduce waste, and minimise environmental impact.

While upfront cost remains a key consideration for utilities, the long-term implications of poor-quality instrumentation are far more significant. Inaccurate pressure readings can lead

to pipe bursts, pump failures, and unplanned outages – events that erode public trust and inflate operational costs. Recent supply disruptions in major metros highlight the urgent need for reliable monitoring and proactive maintenance.

Our range

The VEGABAR 38 supports remote monitoring of tanks, pipelines, and chemical dosing systems, reducing the need for site visits and lowering operational emissions. Its IOLink communication ensures seamless integration into automated systems, while its energy-efficient LED ring and intuitive VDMA menu structure enhance usability and reduce energy consumption.

Engineered with a robust ceramic measuring cell, the VEGABAR 82 withstands abrasion, chemical exposure, and extreme conditions commonly found in sewerage feeds and high-pressure pipelines. Its long service life and low maintenance requirements support utilities in reducing downtime and conserving resources. When paired electronically with other VEGABAR 80 series sensors, it enables precise differential pressure measurement without complex mechanical setups.

The VEGADIF 85 delivers accurate influent and effluent flow measurements and detects filter contamination, ensuring stable performance across fluctuating conditions and supporting regulatory compliance.

Designed for deep wells, reservoirs,

The VEGAWELL 52 offers durable hydrostatic level and pressure monitoring in demanding environments



With infrastructure under strain, pressure management is proving vital to existing water systems



VEGA have a series of pressure monitoring sensors to aid in managing pressure

and basins, the VEGAWELL 52 offers durable hydrostatic level and pressure monitoring in demanding environments. The VEGAWELL 42 complements this with an energy-efficient design ideal for treatment plants seeking to reduce operational costs while maintaining high measurement accuracy.

Connectivity that supports sustainable Operations

VEGA's commitment to innovation extends beyond hardware. Bluetooth-enabled devices and the VEGA Tools App allow operators to configure, diagnose, and maintain sensors remotely. This reduces the need for onsite interventions, cuts travel-related emissions, and improves safety, particularly in hard-to-access or hazardous locations.

As African nations strengthen water governance and climate resilience, advanced pressure monitoring offers a practical pathway to sustainability. By supporting real-time optimisation and proactive maintenance, VEGA helps utilities deliver safe, reliable water while protecting critical infrastructure and communities. ●



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