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Notes from the road

A once-in-a-decade visit to the Delivery Tunnel North

POSTCARD



Clarens,
South Africa

- In late February 2025, Thanzi Ramukosi joined TCTA as it hosted its lenders on a site visit to the Delivery Tunnel North (DTN) near Clarens, Free State, to witness the progress of its once-in-a-decade maintenance shutdown.
- The visit offered key insights into the Lesotho Highlands Water Project's role in sustaining Gauteng's water supply and the essential work to ensure its long-term reliability.
- With maintenance nearing completion, engineers remain confident that the tunnel will be rewatered on schedule.

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The unseen work behind Gauteng's water security

For nearly 25 years, the Delivery Tunnel North (DTN) has quietly transported billions of litres of water from Lesotho to South Africa, playing a vital role in sustaining Gauteng's water supply. While the tunnel has functioned without interruption, ensuring its long-term reliability requires periodic maintenance. In late February 2025, the Trans-Caledon Tunnel Authority (TCTA) hosted its lenders on a site visit to witness progress on the tunnel's once-in-a-decade shutdown and maintenance process.

This visit marked our second major excursion into Gauteng's water infrastructure, following our journey in October 2024, exploring Johannesburg's water challenges. On our first trip, we visited the Central Basin Acid Mine Drainage (AMD) treatment plant and the Vaal Dam, where declining water levels sparked serious concerns about the tunnel's closure and its potential impact on supply. Upon our return, we were eager to see whether our earlier concerns had materialised or whether intervention efforts had succeeded in stabilising the water supply. Fortunately, it rained, and the Vaal dam is currently full.

Thanks to our long-standing relationship with TCTA, we were given the rare opportunity to step inside the DTN and observe the essential work that keeps this critical water infrastructure operational. Our journey also took us to select sites within the Tugela Vaal Scheme, specifically Woodstock Dam, Sterkfontein Dam, Driekloof Dam, and Driel Pump Station—an important backup system that stabilises Gauteng's water supply. The visit provided us with key insights into the financial, energy, and logistical factors involved in water management.

Figure 1: Inside the delivery tunnel



Source: Ninety One.

Engineering marvel: A glimpse inside the Delivery Tunnel North

To fully appreciate the importance of the DTN, it is crucial to understand its engineering and operational significance. The delivery tunnel spans a total length of 37 kilometres. The Lesotho side, where it connects with Muela Dam, is 22 kilometres long, and in South Africa, the remaining 15 kilometres is used to channel water to the Ash River through a subterranean system that extends beneath the Little Caledon and Caledon Rivers.

During our time there we observed the current state of the tunnel, which, for the first time in a decade, had been emptied for maintenance work. The tunnel features cement and steel sections, with ongoing repairs focused on the steel-lined areas. This rare glimpse into the infrastructure reinforced its complexity and the meticulous effort required to ensure its continued functionality.

Figure 2: Tunnel section constructed using cement



Source: Ninety One.

Figure 3: Portion of the Delivery Tunnel (SA side)



Source: Ninety One.

Our visit uncovered that while South African maintenance efforts were on schedule, delays on the Lesotho side may push some tasks to the next closure cycle. The Lesotho Highlands Water Commission (LHWC) is expected to decide as to whether the tunnel can be rewatered, thereby restoring bulk water supply.

While the maintenance process is essential, it does come with challenges. One of the most pressing concerns is the potential impact of delays on communities such as Clarens, which rely directly on water from the tunnel. Fortunately, with the recent rise in Vaal Dam levels, Gauteng's overall bulk water security remains stable, even if the rewatering schedule was to be adjusted.

Crisis averted: The R434 million emergency water transfer that never happened

During our trip TCTA confirmed that there were significant improvements to dam levels following our initial visit. In October 2024, we noted the Vaal Dam was dropping fast. By December, the level had fallen to 23%, with forecasts warning of a decline to 18%, prompting discussions on a Sterkfontein Dam release. The plan was to release 7% of Sterkfontein Dam's water volume, which sat at 99% capacity. While the release itself would have been free (via gravity), refilling Sterkfontein would have cost R434 million due to energy-intensive pumping.

The rain aided in eliminating the need for the costly transfer. It was still raining when we visited, and the Department of Water and Sanitation expects levels to reach 75-80%, however this expectation has been exceeded, with the dam currently at 103%.

Sterkfontein and Driekloof Dams: The water reserve Gauteng depends on

While there is sufficient water in the Vaal River system, the experience of Gauteng residents suggests otherwise. The ongoing water shortages they face are not due to a lack of supply but rather a failing distribution network plagued by infrastructure decay, leaks, and inefficiencies.

In 2023, we highlighted in this article that South Africa loses an estimated 70 million litres of treated water daily due to aging infrastructure and mismanagement. This systemic failure means that despite ample water in the Vaal, residents endure service disruptions and declining reliability.

Sterkfontein Dam, which plays a critical role in ensuring Johannesburg's water security, particularly as a backup during low rainfall periods, is entirely reliant on pumped water due to its small catchment area. The current value of the water stored in Sterkfontein is estimated at R6.1 billion, based on the replacement cost to pump and fill it. The dam does not have a traditional spillway—instead, water is released through an 88m-deep opening, making it both costly and difficult to release water when needed.

Driekloof Dam situated close to Sterkfontein, also plays an integral part of this system, regulating water flow. Despite being a backup, Sterkfontein's reserves were nearly called upon in December when the Vaal Dam's levels fell dramatically. This reaffirms its importance as a safeguard against extreme water shortages.

Drakensberg pumped storage station: The silent safeguard for South Africa's power grid

While we did not enter the Drakensberg station, its role in energy security cannot be understated. If South Africa experienced a total grid failure, this is the station that would restart the entire system. Once power is generated here, it would supply Majuba Coal Power Station, which in turn would help restore the national grid. To ensure reliability, Eskom routinely tests simulations of a black start scenario. The station's storage is never fully emptied due to its critical role in emergency power generation.

The Tugela Vaal Scheme: A backup lifeline for the Vaal Dam

Our second day was spent visiting Woodstock Dam and the Driel Barrage/Pump Station, key components of the Tugela Vaal Scheme. Woodstock Dam (on the Tugela River) was 85% full at the time of our visit. The dam also plays an important role in the overall system, in that it releases water to feed the Driel Barrage, which in turn pumps water up to the Drakensberg Pumped Storage Station. Due to the heavy rainfall leading up to our visit, the Driel Barrage's gates were open, releasing excess water downstream toward the Indian Ocean.

Looking ahead: The future of water infrastructure in Gauteng

Our site visit underscored the intricate coordination required to manage the country's water resources effectively. From the high-tech inspections inside the DTN to the strategic backup provided by the Tugela Vaal Scheme, it is evident that ensuring a stable water supply involves extensive planning, investment, and maintenance.


Reflecting on both visits, it was clear how fragile yet resilient the system is. Our first trip highlighted the potential for a crisis, and this second visit confirmed that while some risks remain, proactive intervention and favourable conditions can prevent worst-case scenarios. It was also a testament to the importance of long-term infrastructure investment, as seen in the ongoing maintenance of the DTN.

As we conclude this journey, it is evident that water security is a shared responsibility. The private sector has a vital role to play in supporting these initiatives, and as we saw firsthand, the collaboration between government and infrastructure partners is what keeps water flowing to millions of people. With continued investment and strategic planning, Gauteng's future looks far more secure than it did just a few months ago.

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