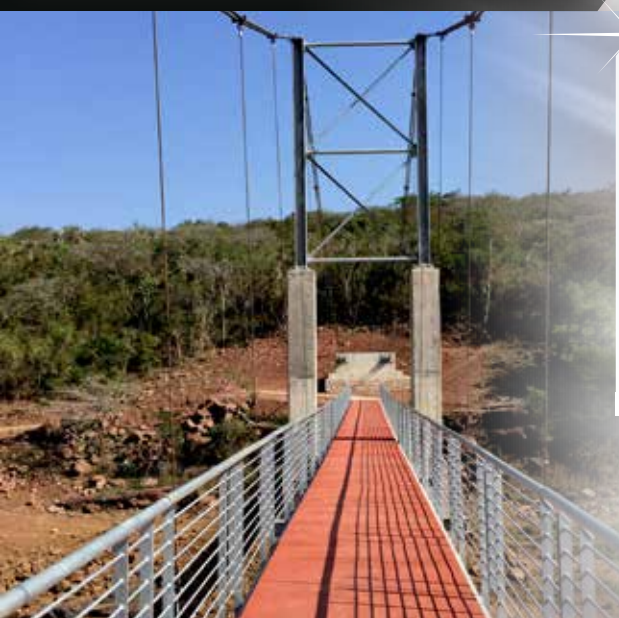
CESA AON 2018

ENGINEERING EXCELLENCE AWARDS



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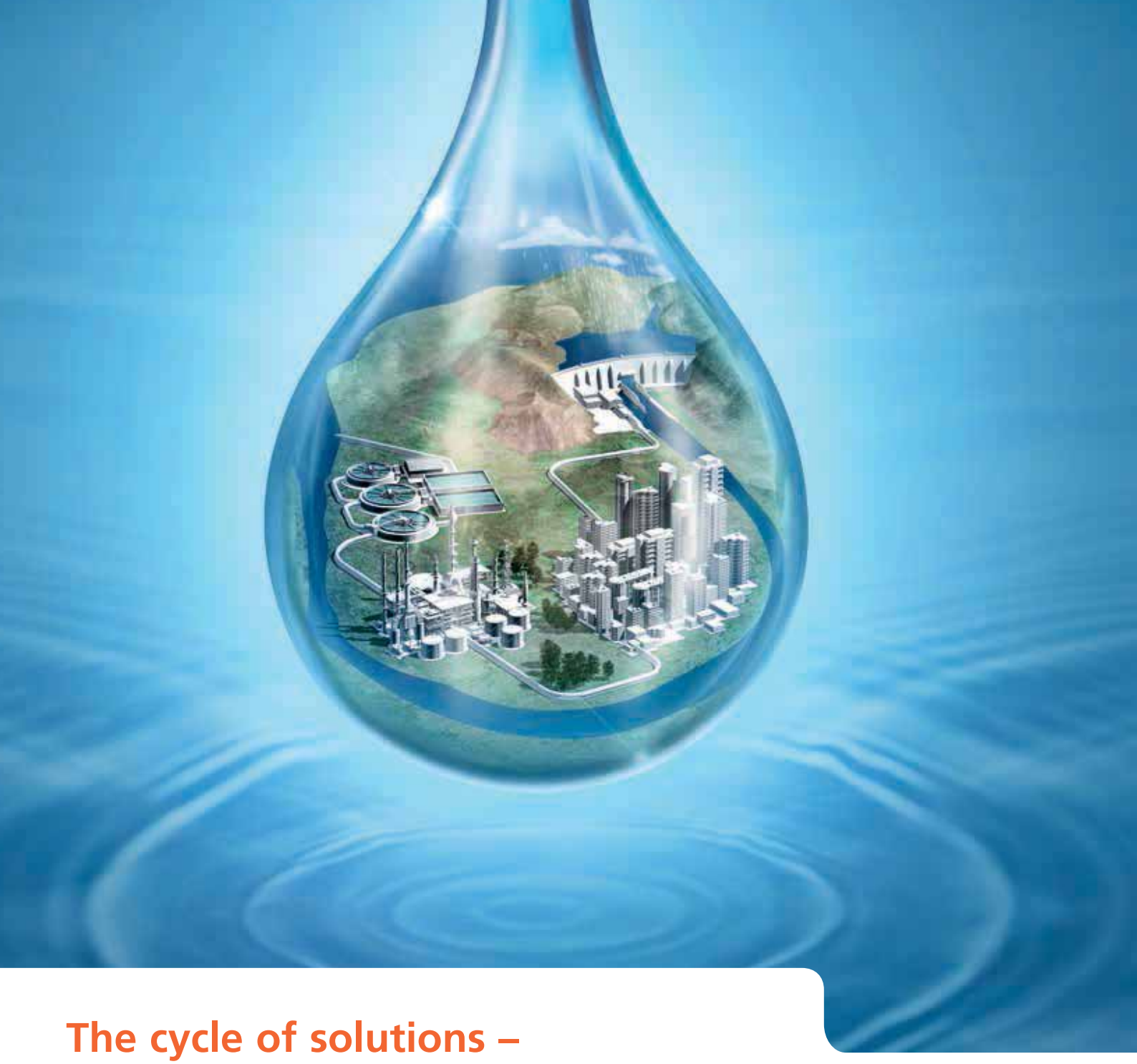

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The Quest for Excellence in Engineering

Chris Campbell, CEO, CESA

We live in a world of continuous change, but the one factor that remains constant in the engineering field is the quest for excellence. That's clearly demonstrated in this year's awards competition, which has fielded a series of outstanding entries from at home and abroad.

South African consulting engineers are recognised globally as leaders and innovators, with our engineering expertise in demand around the world. However, it is of concern that our local market is facing one of its worst trading periods in memory, with a number of the large construction companies facing profitability challenges. In the medium to longer term, unless our public sector can effectively tackle procurement and project pipeline bottlenecks during the rest of this year and going into 2019, the prospects for the entire industry are looking increasingly bleak.

Engineering capabilities can always be imported to fill the gap of departing South African companies, but that won't achieve the change we need to see. We need to create jobs, build careers and establish a vibrant secondary and tertiary manufacturing economy that fosters a more equitable balance between exports and imports. That's dependent on infrastructure as a magnet for local and international investment.

Embrace competition

We can never fear competition. In fact, we should embrace it. Particularly on megaprojects, where there are tremendous opportunities to work with the top-tier multinationals that visit our shores from time to time to work on key installations, like power stations and the Lesotho Highlands Water Project (Phase II). Wherever possible, we should encourage them to stay and put down permanent roots, encouraging them to impart training, skills and knowledge for the development of our local industry.

Given their scale and experience, they often win the lion's share of project work in Africa when it comes to complex and multifaceted developments, because they have huge technical resources, plus the proven track record and experience donor agencies insist upon. If South African firms partner with them, we have a much better chance of winning key projects on the continent.

Investments

For investors everywhere, policy certainty is a must. According to the Office of the Presidency, South Africa plans to attract approximately US$100 billion in investment inflows over the next five years. As an industry, we sincerely hope that this can be achieved. The US$10 billion recently committed by the UAE is an excellent indication that this is possible.

A look around our city skylines, particularly Sandton CBD – said to be Africa's richest square mile – reveals a plethora of tower cranes, normally the sign of a healthy construction market. But these are private sector building projects, funded by big business. Other sectors, like manufacturing and general industry, are flat. That will change for the better if a conducive Mining Charter comes to fruition and results in a sustained surge in mining sector growth, in turn serving as a catalyst for accelerated infrastructure roll-out.

We must also re-inject the same level of investment activity into our SOEs and municipalities. That includes ensuring that we have exceptional leadership and competency. A major frustration at present is the knowledge that, in many cases, the project funding is available, especially at local government level, but tantalisingly out of reach because of a lack of adequate skills in terms of programme management and execution. The end result is that our firms end up with a lot less to work with: feasibility studies are approved and then shelved. So there's definite room for improvement.

There are positive signs of a restoration of mutual trust between our industry and government. For example, CESA was recently given unprecedented access to a recent Appropriations Committee of Parliament meeting, where our views on how to get the best value from infrastructure spend was tabled.

There is definite recognition from government that CESA's member firms have the expertise to get more done with less. But those savings aren't going to be achieved by squeezing profit margins. As a rule of thumb, the upfront fees for professional services usually account for just 2% of the overall project life-cycle costs. So the saving isn't here. From an ROI perspective, the true test of a project's success has to be measured and proven over its life cycle and, therefore, investment needs to be made into project design and innovation.

As consulting engineers, we are experts in managing all phases, from planning and construction management to operation and maintenance. This year's Engineering Excellence Awards clearly reflect this. The quality of all the entries was outstanding, so congratulations to everyone for entering and proudly showcasing South African infrastructure design and development.

Ethics and design integrity

Meggyn Marot, business unit manager, Aon South Africa

Tighter budgets and increasing pressure from clients to lower construction costs and accelerate projects could be a recipe for disaster, exposing consulting engineers to potential liability. This is according to Meggyn Marot, business unit manager at Aon South Africa.

Acts of God, like cyclones, floods or bush fires, that impact projects still under construction are normally covered by Aon's Contractors' All Risk cover, but when it comes to alleged design defects and subsequent construction failures, the burden of responsibility shifts to the consulting engineer, making it absolutely essential that adequate Professional Indemnity (PI) cover is in place.

"We've noted a marginal increase in structural-type claims, including slab collapses, but no marked changes for other construction categories," says Marot. "However, what we are seeing is an increase in non-technical issues that could give rise to a claim. I'd classify them as 'moral dilemmas'. For example, where consultants make informed recommendations that are subsequently ignored by the client, but the engineers still carry on with the project for commercial reasons, even though that decision doesn't sit well with their professional judgement."

Commercial considerations do weigh heavily on the mind in these tough economic times, but the right moral compass still needs to be in place. In some cases, the best decision may be to decline certain projects.

"Aside from PI cover and our broader short-term insurance products, one of Aon's niche offerings is the provision of qualified legal advice to assist engineers with the day-to-day challenges of contracting, which proves invaluable prior to signing any agreement. From a legal perspective, we're receiving an increasing number of enquiries from consulting engineers who feel uncomfortable about instructions from clients that could impact on not just downstream quality, but their professional reputation," Marot continues.

Typical examples include requests to excessively fast-track infrastructure delivery projects, concerns surrounding health and safety compliance, or the cutting of corners on environmental codes. These trends are placing abnormal pressure on engineers. "Defects or negligence is covered by the PI policy, but the reputational risk is not," she asserts.

As Marot points out, these scenarios are far from being simple risk management issues. In response, Aon's national training workshops focus on building risk awareness of these and other dynamics in both the consulting and contracting space.

Selecting the right policy

Not all PI policies are created equal and their technicalities are often underestimated, with consultants simply electing the cheapest option. However, Aon has extensive sector experience in this specialised field, both locally and internationally, and continues to refine its PI cover to 'plug the gaps' based on claims history, data analysis and legal precedents to keep pace with the unfolding contracting landscape. This includes the implications of subconsulting work, where the lead consultant may not be directly involved, but still remains legally liable to the client. Aon's PI policies include subconsultants' extensions as a norm, to make provision for potential risk transfer. This cover also goes beyond pure engineering activities – a recent example being cover extended for the subconsulting of IT installations or psychometric testing.

Aon's PI extensions also include potential exposure caused by engineering contractors appointed by the consultant. An example would be where the consulting engineer appoints a specialist drilling contractor to carry out geotechnical studies.

"We try to ensure that our PI policies are as broad as possible and that they are uniquely in line with the practices of a consulting engineer. We also provide expert advice in considerations on setting adequate insurance limits in terms of the quantum around each specific project and not just for damages, but also any associated legal costs, and aspects like VAT payment implications. Knowing what you're covered for is essential, and being underinsured is not an option. At Aon, we've taken the guesswork out of PI cover," Marot concludes.

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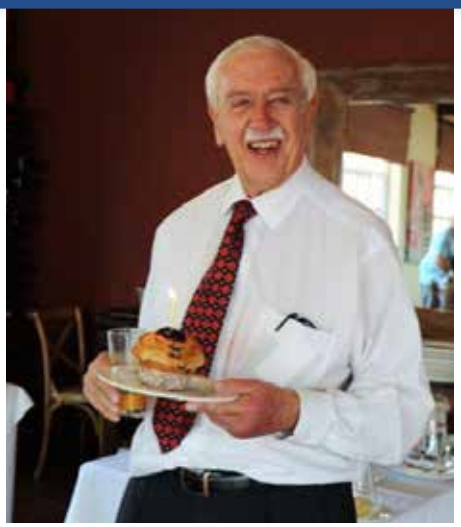
Ivor Evans



Ivor Evans was a registered professional engineer born in 1936 who spent his career in the South African consulting engineering profession. He served for 37 years with the same firm, engaged initially in the design of engineering and industrial projects, then project management and contract administration, coupled with business functions, becoming executive chairman in 1989.

In 2000, he was elected president of the South African Association of Consulting Engineers (SAACE), now CESA. He retired in 2001 to practise as an independent consultant, mediator and arbitrator, and act as non-executive chairman of his firm. While his career was initially wholly devoted to technical matters, in later years, Evans was more heavily engaged in business, dispute resolution and institutional affairs.

In addition to acting as mediator, adjudicator arbitrator or expert witness in dispute resolution, he chaired ECSA's Identification of Work Steering Committee from 2006 to 2013. From 2012, he assisted CESA in the development and presentation of a one-year distance learning course in the business of consulting engineering, with an advanced course in the management of consulting engineering to follow. In the training field, he presented a one-day course on topics relevant to the engineering and construction industries, and wrote case studies on lessons to be learned from failures or mishaps resulting in claims, for an international firm of risk management specialists and insurers.

SANRAL

The year 2018 is key in SANRAL's growth as a visionary organisation within the broader South African engineering and construction sectors. SANRAL enters its third decade with a fresh strategy – Horizon 2030 – and a clear vision on how to deliver a safe, efficient, reliable and resilient road transport system for the benefit of all South Africans.

Road infrastructure is widely recognised as a catalyst for socio-economic growth and transformation in the country. The 22 000 km primary road network managed by SANRAL forms the arteries for the delivery of essential services and vital connections between communities living in outlying areas to opportunities in the urban hubs.

A new dawn in South Africa's socio-economic development will also focus greater attention on the role of infrastructure and the contributions of the engineering and construction sectors. SANRAL recognises its critical role and accepts the responsibility to lead the transformation of these industries.

Through its transformation policy, it intends to maximise the participation of black professionals, contractors and suppliers, and break down existing monopolies in the supply chains of materials, equipment and technology. This will ensure much broader-based participation of these enterprises in the design, construction and maintenance of infrastructure. Over the past year, SANRAL embarked on a process of extensive consultation with industry associations, professional bodies, stakeholders and communities in all nine provinces to explain its proposals for transformation and to ensure alignment with these objectives.

SANRAL continues to strengthen the country's expertise in engineering and construction through the accelerated development of its own professionals as well as strategic interventions in education and research designed to promote knowledge and expertise.

Through bursaries and learnerships, it enables young people at schools and universities to continue their studies; through partnerships with tertiary institutions, it improves the quality of teaching in maths and science; and through sponsorships, it encourages advanced research that contributes to knowledge creation.

The SANRAL Technical Excellence Academy in Port Elizabeth offers a structured programme for graduate engineers to equip them with advanced knowledge and competencies. Graduates are exposed to real design projects under the guidance of mentors and they progressively assume more responsibilities until they are able to work independently.

The engineering and construction sectors have great potential to improve the quality of lives of ordinary citizens through the provision of strategic infrastructure. Most big projects are accompanied by opportunities for local job creation and skills development.

SANRAL wants to work with the private sector, representative industry bodies and professional associations to ensure communities derive the maximum possible benefits from investments in infrastructure.

Through these initiatives, SANRAL will continue to be a visionary participant in the engineering and construction sectors and make its contribution to the delivery of critical infrastructure that is required to support sustainable economic growth in South Africa.

WINNER

Construction of the Cape Flats 3 Bulk Sewer – Phase 2

PROJECT TEAM
Client: City of Cape Town
Consulting engineer: AECOM
Contractor: CSV Construction

The successful construction of the Cape Flats 3 Bulk Sewer – Phase 2 (CF3-2), designed by AECOM and constructed by CSV Construction, provides the final link in the City of Cape Town's strategic Cape Flats bulk sewerage system. The CF3-2 is a 1 000 mm diameter ductile-iron rising main with a design capacity of 1.3 m^3/s. This project stands out because of its innovative design aspects, such as the inclusion of a barometric loop with vortex drop structure, and state-of-the-art construction methods, including microtunnelling.

The 5 km route traverses a densely populated area of Cape Town. Sections of the pipeline needed to be constructed through busy roadways and in close proximity to existing buildings and services. Microtunnelling was used to install a total of 1 200 m of the pipeline using a Herrenknecht tunnel boring machine (TBM) – the first of its kind to be owned and operated by a Southern African company.

The recent innovation of ductile-iron jacking pipes meant that the pressurised product pipe could be installed using the TBM without the need for a sleeve. This was a cost-effective and technically efficient solution that was employed for the first time on South African soil.

COMMENDATION

N11 Section 10 – Middelburg to Loskopdam

PROJECT TEAM
Client: Sanral
Consulting engineer: HHO

The N11 section 10 from Middelburg to Loskopdam passes through spectacular mountain scenery en route to Limpopo. HHO was appointed in 2010 by Sanral to undertake the upgrade of the road.

Apart from being a transport route for heavy vehicles, it also forms part of a tourist hub. The Forever Loskopdam is a main attraction together with the various wildlife reserves nearby. These reserves are home to more than 70 species of wildlife, including buffalo, leopard and white rhino.

The road upgrade was needed due to the deteriorating condition of the narrow 7.0 m surfaced roadway. The upgraded roadway is 12.4 m wide over most of its length. In the Kranspoort Pass, the roadway is wider, allowing for four lanes.

One of the main objectives of the project was to include safety features in the pass, as many lives have been lost in this dangerous section of the route. Safety features provided on the project included the straightening-out of tight bends, the installation of two arrestor beds, as well as the provision of concrete barriers.

There are a total of eight major cuttings within the pass, with heights of up to 40 m and cut slopes as steep as 75 degrees. In order to protect the future road users against falling rocks, various slope stabilisation methods were used. Soil nail anchors with mesh draping are provided along the higher quarzitic sandstone cut faces, while tied-back 8 m to 10 m high gabion walls are provided in the weathered dolerite sections. Rock traps of 4 m to 6 m wide and concrete barrier walls are provided at the foot of the cuttings.

The project delivered high-quality infrastructure, which integrates perfectly with the surroundings and provides the traveller with a safer passage.

ENTRY

Gamsberg 4 Mtpa Zinc Mine – Tailings Storage Facility

PROJECT TEAM
Client: Black Mountain Mining, a part of Vedanta Resources
Consulting engineer: Knight Piésold Consulting
Contractor: Liviero Civils

Situated 300 km from the town of Upington, approximately 1 000 km from Gauteng and 800 km from Cape Town, Gamsberg Mine is located in a remote region of the Northern Cape.

Liviero Civils and Knight Piésold were awarded the contract for the engineering, procurement and construction of the mine's tailings storage facility. Due to the fast-tracked nature of the design/construct contract that had to be completed within 12 months, Knight Piésold executed the detail design within three months in order for Liviero Civils to start construction.

The design was optimised by changing the deposition method to on-wall cycloning, hugely reducing the earthworks quantities. Cycloning also allows for a reduction on footprint area and higher acceptable rate of rise.

The whole facility was lined using 1.5 mm high-density polyethylene (HDPE) liner, textured on the slopes and smooth in the basin. Where possible, the basin earthworks were prepared to allow deployment of the liner without first placing protective geofabric material.

The concrete decant penstock tower was constructed using pre-formed concrete sections to act as formwork, with reinforcing being fixed in the void and filled with concrete. This allowed for quicker construction and eliminated the need for stripping formwork after construction.

The return water dam and stormwater dam were sized at 20 000 m^3 and 18 075 m^3, respectively. The return water dam was provided with a double HDPE liner system incorporating a leakage detection system and sand layer, doubling as a UV and liner protection layer.

One of the main challenges of the project was sourcing of materials due to the remoteness of the site location. Significant construction cost savings for the client, as well as improved water recovery in this water-scarce area of the country, were achieved by using the cycloning method.

The project team is proud to have delivered this complex project on time and within budget.

ENTRY

Western Aqueduct Phase 2 – Inchanga to Hillcrest

(contracts WS6190 and WS6191)

PROJECT TEAM
Client: eThekwini Municipality
Consulting engineers: Western Aqueduct JV – Knight Piésold Consulting, Royal HaskoningDHV and Naidu Consulting
Contractor: Cycad Construction

Conceived in the mid-1990s to address water shortages in the northern and western parts of Durban, the Western Aqueduct Bulk Water Conveyance Project eclipses all other water distribution systems within eThekwini Municipality, being the area's single biggest project in terms of size, complexity and cost.

The planning for this 30-year, 400 MLD project commenced in the mid-1990s and is a credit to the municipality's water planners and engineers who drove the project to fruition.

Phase 2 of the project consists of 56 km of steel pipeline ranging between DN 1 600 and DN 500. This phase runs from Inchanga to Ntuzuma and has been constructed under six different contracts. For both contracts, WS6190 and WS6191, advance work was required in road reserves and private properties to prepare the required working corridor. Road rehabilitation and reinstatement was also undertaken.

The pipeline was constructed through both highly and moderately developed agricultural, residential and commercial land. This presented significant logistical challenges and required close attention to traffic control, community liaison, environmental and heritage issues, with the biodiversity impact needing careful management.

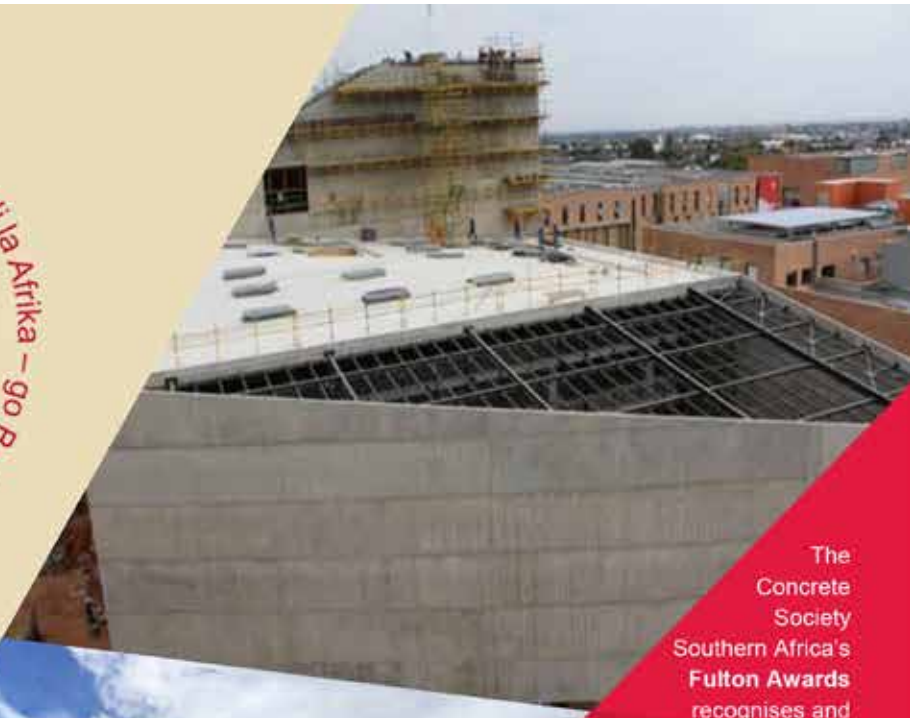
Innovation from both the consultants and contractors was required for this complex project. This included modified scour chambers that significantly reduced the drowning risk to maintenance workers while speeding up pipeline repairs, as well as the use of the historical Durban to Johannesburg railway line and the 'Inchanga Choo Choo' to move a large proportion of the pipes during construction, saving both time and costs, protecting the environment, creating employment, and upholding the heritage of the area.

One of the immediate benefits of this pipeline was that its higher residual pressure is presently being used to supply water under gravity to Botha's Hill Reservoir, effectively replacing a pumped supply that was originally commissioned in the 1970s.

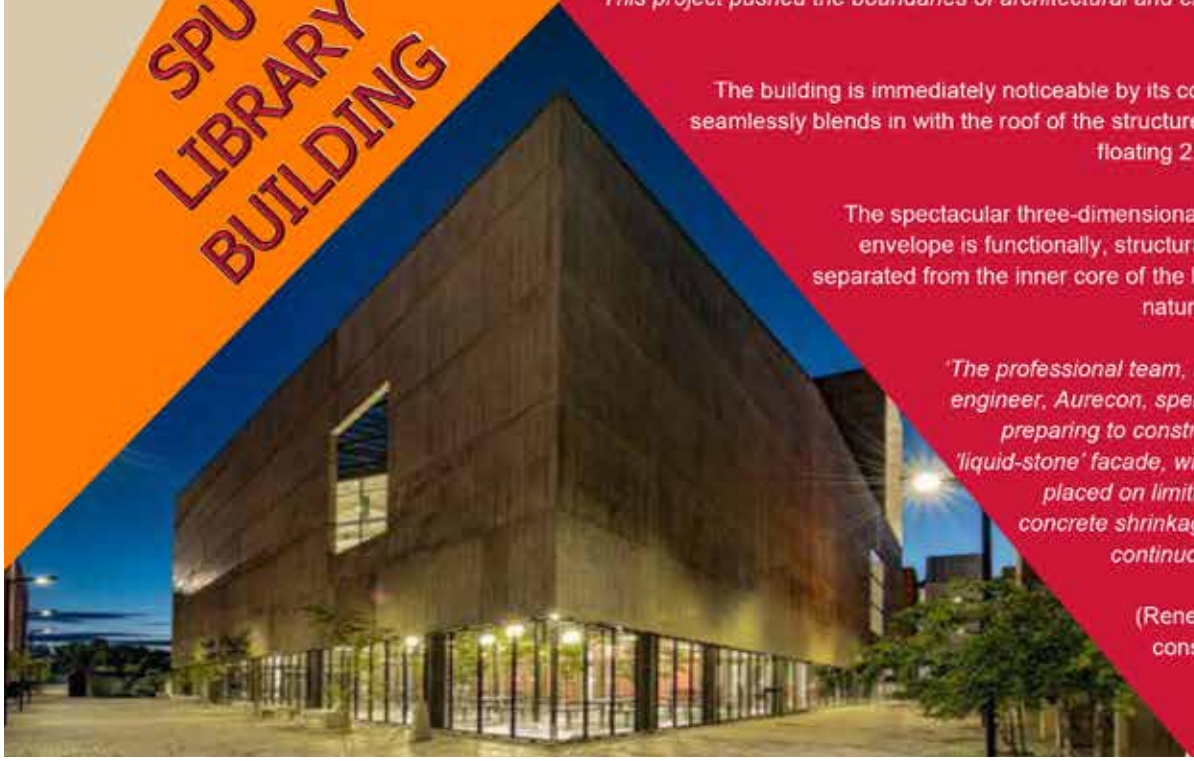
Light from Africa – for Humanity • Lesedi la Afrika – go Batho • Lig uit Afrika – vir die Menswom

SOL PLAATJE UNIVERSITY

2017 FULTON AWARD



SPU LIBRARY BUILDING



The Concrete Society Southern Africa's **Fulton Awards** recognises and honours excellence and innovation in the design and use of concrete – a core component of the Society's mission.

The new six-storeys Sol Plaatje University Library and Resource Centre was completed late in 2017 and won the prestigious **FULTON AWARD** for the category: *Buildings Greater than Three Storeys* and also received a commendation in the category: *Architectural Concrete*.

The architect of this central showpiece was Mark Horne from *designworkship:sa* and the main contractor was Murray & Dickson Construction Group.

'This project pushed the boundaries of architectural and engineering design.' (Judge's citation)

The building is immediately noticeable by its concrete façade that seamlessly blends in with the roof of the structure and appears as if floating 2,4m off the ground.

The spectacular three-dimensional external concrete envelope is functionally, structurally and technically separated from the inner core of the building and allows natural light to all floors.

'The professional team, including structural engineer, Aurecon, spent up to six months preparing to construct this cast in-situ 'liquid-stone' facade, with significant focus placed on limiting the influence of concrete shrinkage on such a large, continuous in-situ concrete element.'
(Renell Samuel, building construction director at M&D Group)

WINNER

Sol Plaatje University Library and Student Resources Centre

PROJECT TEAM
Client: University of Witwatersrand & Sol Plaatje University
Architect: designworkshop : sa
Consulting engineer: Aurecon
Main contractor: Murray & Dickson Construction

Situated in Kimberley, a historic mining city that has felt the effects of disinvestment in recent years, the Sol Plaatje University (SPU) Library and Student Resources Centre (the Library) is the focal point of the first newly built public university in the Northern Cape. It is also a rapidly expanding node that has become a catalyst for the rejuvenation of the surrounding Kimberley CBD.

SPU appointed Aurecon to provide structural, civil, electrical, fire and wet services for the Library, situated in the heart of the new central campus district, to the south of the student square. The project pushed the boundaries of architectural and engineering design to be visually striking, yet perfectly blend in with the surrounding buildings.

The Library is draped in a seamless in situ concrete shell, which takes on a strong, angular, diamond-like shape, reminiscent of the gem that helped put Kimberley on the world map in 1870. The floating façade walls, raised 2.4 m off the ground and separated from the concrete floor slabs, is the design highlight of the project.

The slenderness, off-shutter finish and eccentric steel supports demanded considerable research, precision and out-of-the-box thinking from the project team, especially given the isolated and constrained construction market in Kimberley. The project team was under immense pressure to get the design right the first time, as any necessary repairs would have damaged the off-shutter concrete aesthetics.

To mitigate this risk, a large (to-scale) sample wall and sloping roof section were constructed to test the geometry, design, proposed construction joint preparation strategy, formwork panel alignment, tie-hole options, material workability and vibration techniques to ensure proper compaction and surface finishing.

Design work started in August 2014, with construction commencing in October 2015 and reaching completion in November 2017. The Library opened to students in March 2018.

COMMENDATION

Grayston Pedestrian Bridge

PROJECT TEAM

Client: Johannesburg Development Agency
Consulting engineer: Royal HaskoningDHV
Architect: Glenn Mills
Wind loading expert: Dr Adam Golliger
Geotechnical expert: Michael Pavlakis & Associates
Contractor: Concor Infrastructure (previously Murray & Roberts Infrastructure)

In excess of 10 000 people per day make their way across the busy M1 highway in Johannesburg from Alexandra township to their jobs in the affluent business hub of Sandton. This mere 5.2 km journey used to take many of them hours across busy roads.

The City of Johannesburg decided to formalise this walking route by making it safe and convenient, and the Great Walk project was born. The Grayston Pedestrian Bridge forms an integral part of this and now provides safe and convenient pedestrian and cyclist access into Sandton. It literally bridges the gap between two communities with opposite economic backgrounds, while creating a visual gateway into the economic hub of the country.

The 289 m long cable-stayed bridge, which crosses the M1 at Grayston Interchange, has eight spans with a continuous post-tensioned concrete box girder deck. The main span over the M1 highway is supported along its centreline by cable stays. The cables are supported by a concrete pylon with a height of 54 m above deck level. The pylon, in turn, is supported by backstay cables anchored into the ground. The length of the cable stays vary between 25 m and 114 m, with the majority being around 60 m. Redundancy was built into the design so that any single cable could be removed for maintenance.

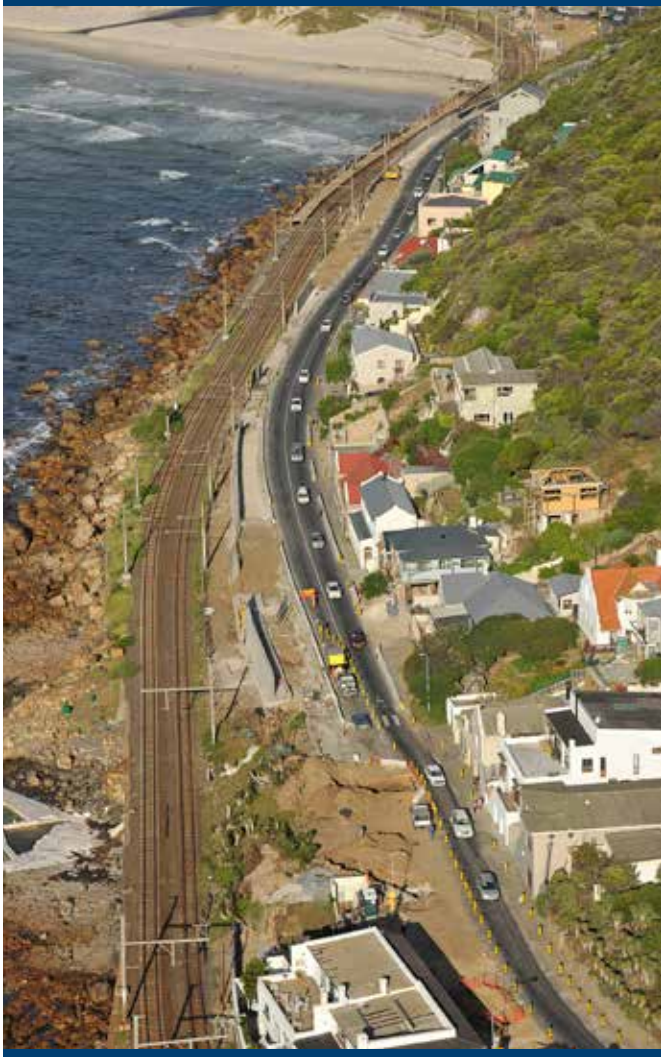
This was envisaged as a community-focused project incorporating sustainable best practices such as local labour and design approaches intended to minimise future maintenance needs. While the project has achieved the original design goals, there were many challenges. These required the project team to identify innovative solutions during construction without impacting the final cost.

COMMENDATION

Rehabilitation of Main Road between Atlantic Road, Muizenberg and Clovelly Road, Clovelly – Phase 3

PROJECT TEAM

Client: City of Cape Town Roads and Stormwater Department
Consulting engineer: Knight Piésold Consulting
Contractor: Martin & East



The scenic 4.5 km stretch of coastal road between Muizenberg and Clovelly, one of only three routes linking the Cape Town metropolitan area with the far south, had last been resurfaced in 1994 and was designed to last approximately 10 years.

In 2006, Knight Piésold was appointed by the City of Cape Town to rehabilitate Main Road from Muizenberg to Clovelly, as well as repair or replace the municipal services including, inter alia, water, sewerage and stormwater.

Due to the complexity of the route, the project was undertaken in three phases, of which the Atlantic Road to Casa Labia and Kalk Bay Harbour to Clovelly Road is Phase 3. A key factor in the design of this project was that all services had to remain fully functional and that Main Road had to be able to accommodate traffic at all times during construction. This required the utilisation of very innovative techniques, as all components had to be constructed in an extremely confined space.

A critical aspect for the City of Cape Town was that the end product be aesthetically pleasing due to the scenic nature of the area, as the road itself is part of a historical route that passes through a number of historical villages that attract tourists from across the world.

Phase 3 commenced in February 2014 and was completed in January 2018. It was completed in accordance with the contract programme, which was revised to take account of delays in receiving approvals from Prasa, as well as the inclusion of additional works such as the upgrading of the Point parking area at Kalk Bay and the demolition of the old Clovelly Station railway platform.

ENTRY

Rehabilitation of Black-Mac and Macassar Sewer Infrastructure

PROJECT TEAM
Client: City of Cape Town
Consulting engineer: Aurecon
Civil contractor: Exeo Khokela Civil Engineering Construction
Mechanical contractor: Inenzo Water
Electrical contractor: Kaltron Electrical Engineering
Pipeline rehabilitation contractor: Tuboseal
Pipeline civil contractor: Afriline

The Black-Mac (Blackheath – Macassar) bulk sewer was constructed in 1983. Its catchment consists of Blackheath, portions of Blue Downs, Croydon and portions of Macassar in Cape Town. Wastewater collected from the high-density residential areas in Cape Town passes through the Black-Mac screening station, down large sewers (7.3 km in length) and underneath the Eerste River, before entering the large and deep Macassar pump station, which pumps it to the Macassar wastewater treatment works for further treatment.

The pump station was in need of a major upgrade after being in operation for more than three decades. Not addressing these issues could result in untreated wastewater regularly overflowing into the Eerste River, which presented a public health risk.

Aurecon was appointed by the City of Cape Town to address these issues, as consulting engineer on the project. The Aurecon project leaders assembled a dynamic, multi-disciplinary team to design and manage the reconstruction and refurbishment of the screening station and pump station, as well as the rehabilitation of the conveying sewers.

The team worked closely with various entities within the client body and engaged with local communities to understand the array of social, engineering, durability, operational, political, safety and budgetary issues at play, which were further complicated by severe security threats in the area and the fact that the day-to-day operation of the existing system needed to continue.

The Black-Mac screening station and Macassar pump station were successfully commissioned on time in September 2017 and are currently operating efficiently. The rehabilitation, by means of trenchless technology (CIPP liner), of the 3.5 km section of 800 mm diameter pipeline between the screening station and the Eerste River siphon was completed in early January 2018. A completely new 3.8 km section, comprising concrete pipes with an integral HDPE liner and pipe diameters ranging from 900 mm to 1 200 mm, was also installed from the Eerste River siphon to the Macassar pump station to replace the current, structurally deteriorated sewer.

ENTRY

The Rehabilitation and Addition of the Third Lane of the N2

between Borcherds Quarry Road (M22) and Swartklip Interchange (R300)

PROJECT TEAM

Client: Western Cape Government, Transport & Public Works
Consulting engineer: HHO Consulting Engineers
Contractor: Power Construction

The N2 – linking the greater Cape Town, Cape Town International Airport and the Western Cape to the rest of South Africa – is one of the country's most important transport hubs, providing a crucial link with air and road transport. The overwhelming traffic demand along this route has led to severe congestion, making journeys along the N2 difficult and at times unpleasant for road users.

The purpose of this project was to alleviate the situation by increasing the capacity along this route and providing foundations for future infrastructure that will further connect the airport and Airport Industria to the rest of Cape Town.

The Western Cape Provincial Government appointed HHO Consulting Engineers to investigate the need for upgrading this hub to accommodate current and future growth in traffic. This upgrade project has significant benefits to the surrounding areas through the following improvements:

- The addition of a wider median lane in each direction: these can easily accommodate both light and heavy vehicles to improve the overall capacity of this section of the N2.
- The rehabilitation of the roadbed: the rehabilitated carriageways provide a smoother drive along the N2 in contrast to the ageing and deteriorating concrete road that has functioned for over 40 years.
- Provision of foundations for a future interchange bridge (the Eisleben Interchange): this will improve connectivity and interactions between local communities and greater Cape Town when the link is complete.

The complexity and sophistication in this project comes from transforming the N2, a road considered an urban barrier, into an interactive transport hub through comprehensive engineering, community involvement and a driven project team.

Project Sunrise

ENTRY

PROJECT TEAM
Client: Sumitomo Rubber SA
Consulting engineer: Bosch Projects

The Project Sunrise development completed for Sumitomo Rubber SA comprised over 27 structures, which were designed and constructed from the start of August 2014 and completed in March 2017.

The expansion enabled Sumitomo Rubber to strengthen its production and distribution of passenger tyres within Southern Africa from its previous output of 10 000 to 14 000 tyres per day. With this came the introduction of new SUV tyre models that

were not yet being manufactured at the Ladysmith plant. To meet the unique requirements of each zone and room, the consulting engineers, Bosch Projects, utilised 14 different structural design types to complete the expansion within time and budget.

This included expansions to the existing gable ends of the current factory building. The new design needed to cater for photovoltaic panels on top of the roof sheeting. This marginal load increment facilitated a redesign of the structure and enabled Bosch Projects to use a modern approach to the portal frame design using standard member sizes and types, along with a versatile design of the cruciform section for the column for bidirectional movement resistance.

The project was initially broken up into three phases to suit the machine procurement and installation process. Phase 1 comprised the infrastructure needs and buildings required for the front end of the production process. R1.1 billion was allocated by parent company Sumitomo Rubber Industries in Japan for the development of Phase 1.

The short-term benefits of the expansion created enormous job opportunities for the neighbouring township of Steadville, translating into long-term benefits for those residents who completed their training and were selected to work in the newly expanded factory.

ENTRY

Watervalspruit Phases 1 and 2
Mega Housing Development

PROJECT TEAM
Client: Cosmopolitan Projects
Lead consulting engineer: Infraconsult Engineering
Traffic engineer: Dhubecon Consulting Engineers
Main contractor: Sikhumba Construction
Environmental consultant: LEAP Environmental Consultants
OHS safety consultant: Successful Safety Solutions

Against the backdrop of a huge national housing backlog, and more specifically in Gauteng and especially the East Rand (Ekurhuleni), developer Cosmopolitan Projects launched the Watervalspruit mega housing development on 1 June 2016.

The conceptual planning, town planning and preliminary designs on this project started as early as 2005. Infraconsult Engineering was part of this project from the onset as lead consultant.

The Watervalspruit project (now named the Sky City housing project by Cosmopolitan) is situated south of Alberton, north of the border between Ekurhuleni Metropolitan Municipality and Midvaal Municipality, east of the R59.

The entire Watervalspruit Residential Development will consist of 15 358 residential units, which will be developed and completed within 11 phases over a period of 8 to 10 years.

Watervalspruit will provide housing to a group of people normally referred to as the 'missing gap' when it comes to housing beneficiaries – i.e. people with a combined monthly household earning of more than R3 000 who do not qualify for RDP housing grants and people who cannot afford higher-class houses of above R500 000. These are people who earn at least R10 500 per month.

During Phase 1 and Phase 2 of the Watervalspruit Residential Development, Infraconsult Engineering was responsible for the provision of bulk and internal engineering services to 2 975 RES 1 stands and 425 high-density stands, a shopping centre, filling station, taxi rank, two schools and three social-node stands for community facilities, at a cost of approximately R220 million.

Summary of the scope of services installed during Phases 1 and 2:
- 2.1 km of bulk water supply line
- 32 km of internal water reticulation pipelines
- 45.8 km of internal sewer reticulation pipelines
- 13.7 km of bulk and internal stormwater drainage pipelines
- 31 km of tarred roads
- two major Gautrans intersections
- 208 km of electrical reticulation
- an electrical substation
- a private school.

ENTRY

Foskor Selati Tailings Storage Facility – New Decant Tower

PROJECT TEAM
Client: Foskor
Consulting engineer: Knight Piésold

Knight Piésold was appointed by Foskor Limited to carry out the design of the new decant tower system for the Selati Tailings Dam (TD) at Foskor Phalaborwa, following the failure of the existing main decant outfall conduit in February 2013.

A trade-off study was completed in May 2013 to determine the optimum decanting solution for the STD to the end of 2050. Options considered included gravity decants, pumped decanting and siphoning. The preferred option was a gravity decant tower of similar design to the old tower.

The new tower structure was positioned on the southern part of the tailings dam, on the only remaining natural ground within the TD basin. The decant pipe will gravitate supernatant water and process water from the tailings dam to the outlet, where it will report into the existing return water dam via an energy dissipator. The first 740 m of the buried outlet pipe is encased in reinforced concrete, with the remaining 2 380 m being mild steel, placed on surface.

Constructed on to a circular base, the concrete tower is 64 m tall. It has four decant flow channels, which will decant water from the pond on a rotational basis. Each channel has 35 flow tubes (600 mm diameter) that will be used during the operational life of the tower system. Access to the control room is via a 64 m tall standalone mild steel/stainless steel hybrid staircase, providing much improved safety to operators over the existing cat ladder system.

This is a cost-efficient, low-risk and low-maintenance system that requires no external electricity to run. Even the electrical systems in the control room are powered by solar-powered battery sets.

The project was completed on time and included major cost savings for the client: the preferred decanting system was carried out at 53% below budget and the detail design of the tower at 19% under budget.

ENTRY

Hilton Water Reticulation Replacement

PROJECT TEAM
Client: uMgungundlovu District Municipality
Consulting engineer: Naidu Consulting
Contractor: WK Construction

The Hilton Water Reticulation Replacement (HWRR) project was initiated by the uMgungundlovu District Municipality (UMDM) in Hilton, approximately 10 km north-west of Pietermaritzburg, KwaZulu-Natal. UMDM is the water services provider for Hilton and is responsible for operating and maintaining the water supply network, which required urgent replacement to reduce water losses and non-revenue water.

The existing water network was over 40 years old and comprised mainly asbestos cement pipes laid in the early 1970s. This pipe had weakened considerably with age and the frequency of bursts had escalated to the point where water losses of around 57% had become untenable.

UMDM appointed Naidu Consulting in May 2013 to provide professional services for the complete replacement of asbestos cement pipelines to help reduce non-revenue water to 14%.

The HWRR project saw the complete replacement of the 89 km of aged municipal water supply reticulation with uPVC and HDPE pipelines, which was partitioned into 14 new bulk supply zones for increased accuracy of water balancing for the client. Furthermore, pressure reduction was implemented throughout the supply network, with a pressure range of 20 m to 60 m applied within each metering zone, through the use of pressure control valves and break pressure tanks. The project was supported by the Development Bank of Southern Africa, which enabled the economic upliftment of low-income communities within the outlying areas of Hilton. Work opportunities were created through the Expanded Public Works Programme (EPWP) with labour-intensive construction methods used where deemed applicable and practical. Fourty local youths were given formal training and experience in plumbing and concrete work.

WK Construction was appointed through public tender for the construction and, in total, 88% of the 89 km of trenching for pipelines was excavated by hand and 100% backfilled by hand, resulting in over 550 jobs being created from 14 wards and over R18 million in wages paid to EPWP labour.

ENTRY

Restoration of the Old Granary Building

Heritage Western Cape is a provincial authority that seeks to conserve the rich and diverse heritage resources of the Western Cape, ensuring that they are conserved for generations to come. The beautiful building on Buitenkant Street in Cape Town, known simply as the Old Granary, is well over 200 years old and is part of the city's heritage. It had fallen into a state of disrepair and stood empty for 20 years.

Designed by French-born South African architect and engineer Louis Michel Thibault – who worked on many of the city's more elaborate buildings – it was constructed between 1808 and 1813 by Jacobus Hendricks for use as a house and bakery. Subsequently, this neoclassical building was used for a range of other purposes, including as a customs house, granary, magistrate's court, post office, the Caledon Police Court, a women's prison, the Civil Engineer's office and the city's first (informal) astronomical observatory.

In late 2015, Archbishop Desmond Tutu came to the rescue, offering to contribute funds towards the granary's refurbishment. He also agreed to take on the lease of the building as a home for the Tutu Foundation Centre. The city, in turn, contributed further funds towards its restoration. Construction began in early 2016, with all works completed by March 2018.

Royal HaskoningDHV was appointed as the lead consultant by the city for the rehabilitation and restoration of this historic building. The restoration had to follow sound conservation and sustainability principles. An important objective for the city was to enable ancillary economic activities to ensure the sustainable management of the Old Granary.

The building is protected by the National Heritage Resources Act and has recently been nominated for heritage site status.

PROJECT TEAM
Client: City of Cape Town
Consulting engineer: Royal HaskoningDHV
Architect:
GAPP Architects & Urban Designers
Contractor: Edel Construction

ENTRY

Construction of the Tugela River Bridge – Nyakana

The mighty Tugela – KwaZulu-Natal's largest river – cuts through the pristine bush land of the North Coast. Members of the Mankenganeni community, including more than 270 learners, are faced not only with the constant risk of flash flooding, but are also forced to traverse the treacherous, crocodile infested waters daily by boat, to access basic services such as schools and clinics. Sadly, several lives – including children – have been lost to the ravenous Tugela.

The client's brief was to develop an economical, low environmental impact engineering solution that would accommodate the environmentally sensitive area and would be able to accelerate the construction process, with no piers in the river.

Through ingenuity and innovation, a solution was developed that comprised the construction of a 210 m long composite structural steel truss and reinforced concrete slab deck bridge with spans of up to 50 m and no piers in the river, making it the longest composite bridge to be constructed over the Tugela River.

Notable advances in construction and design techniques made through the composite modular bridge deck solution allowed for the 360 t of structural steel deck truss to be prefabricated some 290 km away, off site, concurrently with the construction of the substructure.

The elegant lines of the structural steel trusses and slenderness of the concrete deck slab and piers also presented a uniquely aesthetically appealing solution with a limited construction footprint. This resulted in lower environmental impacts during construction and a reduced carbon footprint for future sustainability.

Forty-seven jobs opportunities were also directly created through employing members from the local community as well as 30 youths below the age of 35, who were trained in a six-month National Youth Service learnership.

Through a collaborative effort between the client, engineer and contractor, the quality, time and project budget were effectively and efficiently managed. This ensured that the project was completed on time and within budget, and without any major health and safety incidents – despite the challenges of working at heights of up to 20 m above the ground.

The often devastating effects of crossing the mighty Tugela during flooding will be a nightmare of the past for the learners and members of the adjacent communities.

PROJECT TEAM
Client: KwaZulu-Natal Department of Transport
Consulting engineer: Naidu Consulting
Contractor: Umso Construction

WINNER

Tugela River Pedestrian Bridge

PROJECT TEAM
Client: KwaZulu-Natal Department of Transport
Consulting engineer: Hatch Africa
Contractor: Ingonyama Nicon

The new Tugela River Pedestrian Bridge is a landmark structure that forms part of the Pedestrian Bridge Programme initiated by the KwaZulu-Natal Department of Transport. The programme seeks to redress past imbalances to historically impoverished communities by implementing infrastructure that will improve the quality of life of these communities.

The new bridge, with an overall length of 180 m and towers that are nearly 27 m high, was opened to the public in June 2017 as the first steel pedestrian suspension bridge in Mvumase, Maphumulo District, northern KwaZulu-Natal.

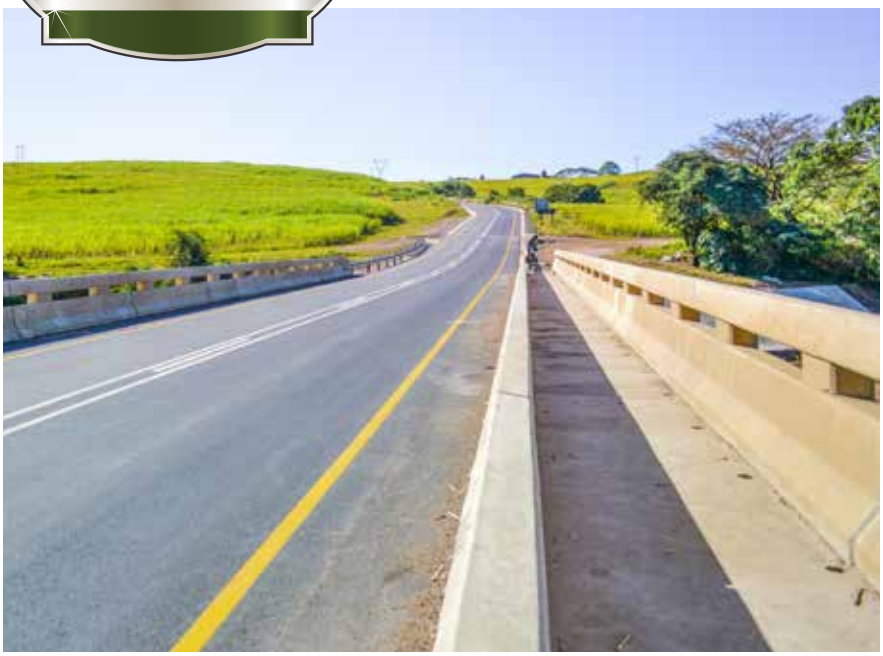
Prior to the construction of the bridge, community members crossed the 150 m wide Tugela River by removing all clothing and wading across the river with their valuables held over their heads in a bucket. Local community members suffered loss of life and attacks by wildlife while trying to cross the river to access jobs, schools and essential amenities.

Local residents now have dignified and safe access to essential amenities and work opportunities. The bridge also provides learners with a tangible reason to aspire to careers in science and mathematics.

The project was designed and supervised by Hatch, and constructed by contractor Ingonyama Nicon. The project highlights successes when there is a conjunction of commercial and social opportunities, and how the best corporate responsibility initiatives can be both scalable and sustainable when they are mainstreamed within the operational activities of a professional services, private sector company like Hatch.

COMMENDATION

Tongati River Bridge widening



PROJECT TEAM
Client: KwaZulu-Natal Department of Transport
Consulting engineer: Naidu Consulting
Contractor: Afrostructures

The KwaZulu-Natal Department of Transport appointed Naidu Consulting to investigate the upgrading of Main Road P714 to a two-lane, surfaced road. In order to accommodate the increased capacity, the existing bridge over the Tongati River would need to be widened.

Initially, a completely new bridge was under consideration, however, through ingenuity and innovation, a much quicker and more economically viable solution was formed.

After a thorough structural investigation of the existing bridge, it was discovered that the existing piers had adequate strength to be able to anchor an extension onto them. The existing deck proved to be under-strength for the increased load capacity and it was decided to replace the existing deck.

The designer opted to replace the deck with precast panels and widen the substructure. The abutments were conventionally widened and it was proposed that the piers be widened on the downstream side by tapering them from bottom to top and attaching the new extension to the existing piers.

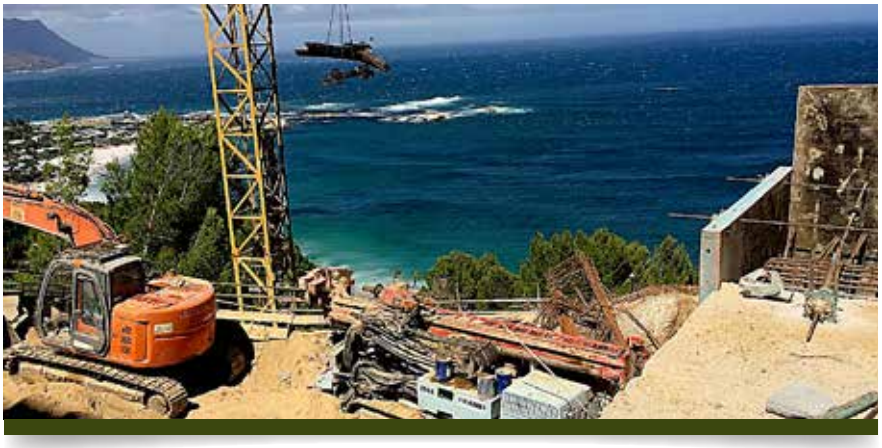
The new bridge deck was constructed in two phases. During both phases, traffic was accommodated on a single lane over the Tongati River. The pier widenings were undertaken by means of a combination of dowels and diagonal stressed dywidag bars embedded into the existing piers. This selected method removed the need to install piles for the pier widening. Utilisation of this widening method provided major carbon footprint reductions as opposed to conventional systems.

Through ingenious design, the Tongati River Bridge widening project has created savings in excess of R35 million to the client in comparison to a complete bridge replacement. The project was completed on time and within budget with minimal disturbance to the road user as well as the environment.

ENTRY

Residential property at 145 Kloof Road

PROJECT TEAM
Client: SMBT
Geotechnical, civil and structural engineer: JG Afrika
Main contractor: Cape Island Construction
Piling contractor: Franki
Principal agent and quantity surveyor: SBDS Quantity Surveyors
Architect: SAOTA
M&E engineer: De Villiers & Moore



Single-dwelling residential property construction is normally straightforward, with minor considerations for lateral support of excavations required. The property at 145 Kloof Road became a unique technical challenge to JG Afrika, the appointed geotechnical and structural engineers.

The site is located on the steep slopes of Lion's Head and the client's brief was to have the proposed six-storey building chiselled into the hillside, and for the footprint of the structure to maximise the allowable coverage of the site. However, the neighbours on each boundary of the site would not permit anchors to be secured under their properties, making it necessary for all excavation stability to be contained within the site.

This challenge, combined with unstable site geology, forced the team to think innovatively. It was finally agreed that the construction of an RC box system – with tension anchors rooted within the property boundaries, which would resist horizontal forces, and conventional vertical piles, which intercepted the slip-circle plane – was the best solution for this development.

The fact that minimal ground movements were detected during the entire two-year-long build is proof of a very successful technical solution to the challenges set before the design and construction team.

ENTRY

Groot Marico River Bridge Repairs

PROJECT TEAM
Client:
Bakwena Platinum Corridor Concessionaire
Consulting engineer: JG Afrika
Main contractor: G4 Civils
Concrete works: Civilcon
Piling contractor:
Stefanutti Stocks Geotechnical
Bridge jacking: MBR

The repair of the Groot Marico River Bridge is an example of how systematic monitoring, innovative design and creative thinking can extend the lifespan of an existing structure. Situated on the N4 between Pretoria and Botswana, the bridge forms part of a busy highway used by thousands of vehicles each day.

JG Afrika oversees the bridge management system for Bakwena Platinum Corridor Concessionaire. This involves detailed inspections of all structures along the highway every five years.

In 2015, a bridge inspector identified a large vertical crack in one of the Groot Marico Bridge piers. However, before the repairs could commence, large-scale flooding took place in the area, causing the old portion of the pier to rotate and one side of the deck to sag.

This rotation was further aggravated during construction, to the point that it required real engineering ingenuity and, as the peak traffic end-year festive season approached, some out-the-box solutions needed to be applied to fast-track completion of the repairs.

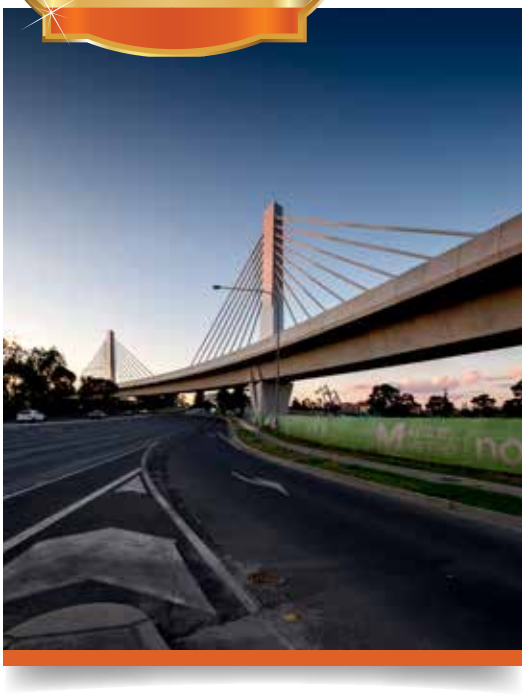
JG Afrika formulated the repair methodology that involved first diverting and stabilising the structure, before installing piles at each of the corners of the piers. A concrete beam with a lip was then constructed, connecting the four piles, and the lip was constructed under the failed pier. Once the pier had been supported on the beam, the bridge could be jacked back up to its original level and steel shims of varying heights would be used to support the bridge deck in order for the crack to be repaired.

In order to prevent the same problem occurring in the future, smaller-diameter piles were specified in a V-shape in front of the two piers to either side of the failed pier.

Despite several challenges, the team was able to come up with innovative solutions to repair the bridge in time for the December peak traffic and the rainy month of January.

WINNER

Sydney Metro
Cable-stayed Bridge



PROJECT TEAM
Consulting engineer: SMEC South Africa
Contractor: Salini Impregilio

Located in the north-west of Sydney, Australia, is a unique, curved, three-span, cable-stayed rail bridge constructed using precast segmental concrete. The bridge forms the tail end of a 4.5 km elevated viaduct that is part of the new Sydney North West Metro.

The cable-stayed bridge and its temporary works were designed by SMEC South Africa. The team first conceived the winning tender design, for contractors Salini Impregilo, in a design and build tender. It then went on to develop the detail design and undertook the erection engineering work for its

construction. It was a mammoth task that absorbed a team of up to 15 staff for over four years.

Curved, cable-stayed bridges are rare and curved, cable-stayed rail bridges even rarer. The conceptualisation, detail design and construction of this bridge presented huge technical challenges that went beyond conventional cable-stayed practice and technology.

The project is especially noteworthy in that the deck superstructure was first built as a seven-span continuous girder on temporary supports using an overhead self-launching gantry. Thereafter, the bridge was converted into a three-span, cable-stayed bridge and the temporary supports were removed. The use of the precast segmental concrete for the deck superstructure was a required continuation of the main viaduct. The challenge for the SMEC team became the integration of the techniques and temporary works used to build precast, segmental concrete bridges with the demands of cable-stayed bridge construction.

On a technical level, this project has proven that longer suspended, precast, segmental bridges can be erected using conventional erection methods. It was this innovation that provided the cost-competitive edge that won the project for the design and build contractor. This method of construction also had major safety benefits in that it eliminated the need for any daytime closures of traffic lanes across Windsor Road.

COMMENDATION

Von Bach Dam Asphaltic Seal Replacement

PROJECT TEAM
Client: Namibia Water Corporation (NamWater)
Consulting engineer: Knight Piésold
Contractor: WALO International

The Von Bach Dam is the backbone of the water supply for Windhoek, the capital of Namibia. After a three-year drought, the dam storage volume reached 10%, its lowest water level in 20 years. This, however, provided an ideal window of opportunity to rehabilitate the deteriorated asphaltic seal, which forms the watertight membrane of the dam.

Time was of the essence for the project team, as failure to successfully complete the project before the next rainy season could result in storage loss and water shortages, which would have dire consequences for water users in Windhoek and result in a negative impact on the regional economy. Asphaltic-faced rockfill dams are not a common feature in Africa. Namibia has two of these dams, while South Africa has none, and there are only several similar dams in the rest of Africa.

The unique type of seal structure demanded a best-practice approach during the design phase since design guidelines on hydraulic asphalt seals are based on an empirical approach. Knight Piésold consulted with experts in the construction and rehabilitation of asphaltic membranes. Several configurations of asphaltic membrane seals were considered, based on international guidelines, and the most suitable option, which exceeds guideline standards, was selected for the Von Bach Dam.

Due to time constraints, specialised expertise was required to carry out this fast-tracked project. The following was required in less than three months: demobilising the specialised construction plant in Europe, shipping it to Namibia, arranging temporary import clearance and taxes, establishing equipment on-site, and completing the work. The success of the project was dependant on the consultant, client and contractor working together and going the extra mile to assist in completing this complex project within budget and on time.

ENTRY

Massingir Dam Rehabilitation Project

PROJECT TEAM

Clients: Mozambique National Directorate of Water and Regional Administration of Water South
Design: Aurecon South Africa
Construction supervisor: Aurecon Mozambique, LDA
Main contractor: CMCRA/CMC AA JV
Subcontractor: ATB Riva Calzoni

On 22 May 2008, there was a massive bursting failure of the downstream portion of two reinforced concrete conduits at Massingir Dam in the Gaza province of Mozambique. Prior to the failure, the two downstream radial gates of the bottom outlet works were closed and the water level in the reservoir was at 122.4 m, which is 7.4 m above the 115 m gated spillway sill level.

The National Directorate of Water, through the Regional Administration of Waters in the South, appointed Aurecon to design and supervise the rehabilitation of the damaged bottom outlets and related works on the dam.

Rehabilitation of the bottom outlet works included the installation of 6.4 m internal diameter steel liners into the existing reinforced concrete outlet conduits, the installation of hydropower offtakes, mass and heavily reinforced infill concreting and grouting, the rehabilitation of the two downstream radial control gates (including the replacement of all four structural steel A-frame arms of the radial gates – two for each), as well as entirely new hydraulic, electrical and computerised control/instrumentation equipment for operation of the bottom outlet works.

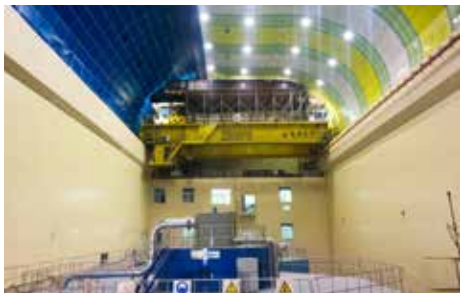
Funded by the African Development Bank, and partially by the government of Mozambique, the project enhanced the safety of the dam and rendered it fully operational again, increasing its capacity to supply downstream irrigation demands, thus enhancing the local economy.

Aurecon drew on extensive previous experience in delivering cost-efficient and constructible major dam infrastructure projects in Africa, relying on a collaborative team in Mozambique and South Africa to ensure the most successful possible outcomes. The project was successfully commissioned in January 2018, on time and on budget.

ENTRY

Kariba South Expansion Project

PROJECT TEAM
Client: Zimbabwe Power Company
Consulting engineer: Hatch
Contractor: Sinohydro



This US$390 million (R5.2 billion) project involved the construction of a new 300 MW hydropower station on the Zimbabwean bank of Kariba Dam. It is the largest infrastructure project implemented in Zimbabwe since independence and has made a significant difference to Zimbabwe's power needs.

The project was executed under a design, build and finance model, with Hatch acting as Zimbabwe Power Company's (ZPC's) owner's engineer. This role included concept design and project definition, specifications development, contractor procurement, contractor design and methodology reviews, site supervision, quality assurance and FAT testing during construction, and performance verification during commissioning.

The detail design and construction of the facility was carried out by Chinese contractor Sinohydro in only 40 months. Unlike many other examples in Africa, where Chinese contractors have delivered mixed results, the project was delivered on time, within budget and to high quality standards. This was achieved through extensive interaction with the contractor prior to awarding, to ensure that what was being offered aligned with ZPC's requirements, and then enforcing this during construction. This extended to the use of local labour, which peaked at 1 200, and various other housing and social initiatives.

Shamiso Kumbirai | Aurecon

WINNER

Shamiso Kumbirai is a civil engineer at global engineering and infrastructure advisory company Aurecon South Africa, where she specialises in water engineering. She has worked on projects in South Africa, Uganda, Swaziland and Rwanda involving hydropower schemes, pipelines and irrigation works.

Kumbirai believes that removing water as a development constraint and harnessing this resource as a tool to help power Africa will positively change the lives of the millions who call it home.

Kumbirai holds a bachelor of engineering degree from the University of Cape Town and has recently completed her master's degree in civil engineering, with a focus on participatory upgrades in large-scale water and sanitation infrastructure projects. She is also an associate member of the South African Institution of Civil Engineering (SAICE) and a registered candidate engineer with the Engineering Council of South Africa (ECSA).

She is passionate about advancing women in STEM. Since 2011, Kumbirai has been involved with WomEng, a global organisation aimed at empowering the next generation of women in engineering, where she served as development director in 2015.

Kumbirai was selected to represent the voice of Southern African youth at the World Economic Forum (WEF) in Davos in 2018 and is one of 200 candidates selected for the 2018 Obama Foundation Leaders: Africa, where she will gain the opportunity to further her leadership skills.

Ntseuoa Motsieloa | Bosch Projects

COMMENDATION

Ntseuoa Motsieloa joined Nyeleti Consulting in 2015 as a senior structural engineer. He is registered as a professional engineer specialising in structural engineering and obtained BSc and MSc degrees in civil and structural engineering from the University of Cape Town in 2009 and 2012, respectively.

Motsieloa has extensive engineering work experience attained from the private as well as the public sector over more than seven years. Prior to joining Nyeleti, he worked as a manager of structural engineering services at Engineerex/Bicacon and as an acting quality manager responsible for infrastructure projects, including both design and construction, where he led multidisciplinary teams on various projects.

Currently, he is working as a designer on major national infrastructure projects including the Rand Water Zuickerbosch Purification Plant with capacity of 600 MLD and the N2 Wild Coast Highway structures.

Motsieloa currently serves on various committees for empowerment and mentors engineering students looking into a career of civil engineering. He is young, energetic and progressive and his passion for consulting engineering speaks for itself.

Loyiso Morrison | Bosch Projects

A professional engineering technologist with Bosch Projects, Loyiso Morrison strives to provide innovative solutions to construction challenges.

Morrison registered with ECSA at the earliest opportunity, first as a professional engineering technician, and later as a professional engineering technologist, and has worked with ECSA to provide assistance on its registration process.

He has been involved with design and architecture work on several projects, notably the A18 Raw Water Pipeline Replacement for Rand Water and the construction of a 1.1 Mℓ Concrete Elevated Tower, Architectural Façade and Associated Works at Etwatwa Extension 19 – Phase 2 for Ekurhuleni Metropolitan Municipality.

Morrison works to give back to the community and upcoming professionals. His association with the Young Professionals Forum commenced from his early working years and he has had the opportunity to work on a community project (MAD – Make a Difference) to source funding from companies and donors.

He currently mentors a draughtsman-in-training on specialisation-oriented work. He was also given the opportunity to work as a lecturer at the Tshwane University of Technology, where he achieved his National Diploma in Civil Engineering and BTech in Structural Engineering. Here, he worked to continuously motivate his students, creating a deep sense of will to achieve.

ENTRY

Morrison strives to be an effective contributor, providing versatile experience by remaining in touch with developments in the academic, construction and consulting sectors.

Disele Mathabatha | Nyeleti Consulting

ENTRY

Disele Mathabatha is a young engineer with a passion for water engineering and the power of the profession to change the lives of our communities for the better. Her continued enthusiasm for the profession is kept going by the combination of science, art and social impact that each project she works on brings.

Mathabatha joined Nyeleti as a student and has progressed well as a young professional. She works in the Municipal Services Department at the Nyeleti head office in Tshwane, where she is involved in a variety of water engineering projects.

Mathabatha holds a National Diploma in civil engineering (2012) and a BTech in water engineering (2015) from the Tshwane University of Technology and is currently working on her application for consideration as a professional technologist.

She serves as an associate member of SAICE (Water Division) and as a committee member of SAICE Pretoria Branch and the SAICE Young Members panel. In 2016, she was a finalist in the SAICE/SAFDEC awards' Young Technologist of the Year category. She won the title of Female Technologist of the Year at the Nyeleti Consulting 2013 Awards.

Her work ethic has earned her recognition at Nyeleti, where she has been earmarked as a potential future leader and member of management of the company.

Phuti Sekoaila | Nyeleti Consulting

ENTRY

Phuti Sekoaila is a water engineering technologist with a Btech degree in water engineering from the Tshwane University of Technology. She started with Nyeleti Consulting in 2011 as a technician and has grown within the company to her current position over the past seven years.

She currently serves as a senior technologist in Nyeleti's Municipal Services Division, where her involvement varies from the design and project delivery of water reticulation networks, to bulk supply pipeline projects and sanitation services for buildings in townships, urban areas and industrial sites. She has successfully managed three water-related projects from inception to close out – two with minimal supervision and one without supervision.

Sekoaila is an associate member of SAICE and a member of the SAICE Water Division, and serves on the Young Professional Forum GN's committee running where she has been running the marketing portfolio. In 2015, she was awarded Nyeleti's female technologist of the year.

Sekoaila is currently studying towards a Business in Consulting Engineering Certificate, which she will complete at the end of 2018.

Sabata Malope | Nyeleti Consulting

ENTRY

Sabata Malope is a young professional with five years' experience in the field of civil engineering where he focuses mainly on the geometric design and drainage of highways and urban roads. He has also designed and worked on various civil projects, including water supply and sanitation systems.

Currently employed by Nyeleti Consulting, Malope is in the process of registering for Pr Tech Eng. with ECSA. Sabata joined SAICE as an associate member in May 2010 and ECSA as a candidate technologist in November 2012. He serves in the SAICE Transportation Engineering Committee and on the CESA Young Professionals Forum of the South Gauteng Committee as vice-chairperson.

Since joining the Nyeleti Transportation Division as a geometric design engineer from Aurecon in 2013, he has mainly worked independently with minimal supervision. Nyeleti honoured Sabata with the Upcoming Young Professional of the Year Award in 2016 for his contribution to the company and the industry. He was also a finalist in the construction and engineering top 5 for the Standard Bank Rising Star Awards 2017.

Winston Nxumalo | Jones & Wagener

Winston Nhlanhla Nxumalo currently serves as a technical director for Jones & Wagener, where he started his career as a candidate engineer back in 2007. Nxumalo has progressed through the company's ranks and has become a key member of the J&W technical team and a management representative.

He was appointed as the BBBEE manager in 2017 and has taken ownership of the challenging portfolio, resulting in J&W achieving a Level 2 BBBEE rating in 2017 and 2018. He has demonstrated tenacity in strategy implementation and has subsequently been given further responsibilities through his appointment on the J&W management committee as the transformation manager.

Over the course of his career, Nxumalo has accumulated experience in geotechnical engineering, geometric design and pavement engineering, hydrology and hydraulic design, and construction site supervision. He is registered with ECSA as a professional engineer and is currently in his final year of studies towards an MBA.

Nxumalo is an active member of several societies, including SAICE, SAIGE, SACPCMP and CESA YPF. He has been involved in a range of community and social responsibility projects with J&W and has been tasked with establishing a corporate social responsibility committee for the company, which will coordinate all activities aimed at contributing towards the betterment of society.

ENTRY

Graham Jennings | Knight Piésold

A professional civil engineer with over 20 years' experience, Graham Jennings, head: Structures at Knight Piésold, has always had a passion for mentoring young engineers. Through the organisation's structured Mentoring Policy and Procedures, he provides new graduates with the assistance and support they need, ensuring that they are able to attain their professional registration with ECSA.

He holds both a BSc Civil Engineering and an MEng Structural Engineering and Structural Materials from the University of Cape Town. His key experience includes:

- Bridge engineering – conceptual and detail design, drawings, estimates, project specifications and contract documentation in both steel and concrete bridges. Bridge hydrology and hydraulics, as well as bridge repair, modification works and bridge rehabilitation to provide extended service life.
- Bridge inspections – detailed on-site bridge inspections and preparation of condition and maintenance reports as part of bridge management systems. He is a certified Sanral bridge inspector.
- Water retaining civil structures.
- Building structures, including sports centres and private residences.

WINNER

Jennings' main focus is to ensure that young engineers receive the required experience to achieve competence in all ECSA outcomes so that they are prepared for professional registration. It is an ongoing relationship, which is reinforced by regular formal and informal contact sessions concluding with quarterly reporting and recommendations for future progression.

He ensures that young engineers improve their engineering judgement by exposing them to tasks with increasing responsibility in terms of identifying problems, providing solutions, determining potential impacts, providing mitigation measures and considering ethical issues – each of which promotes candidate accountability. He also assists in reviewing and signing quarterly reports to determine whether objectives are being met in terms of achieving the required outcomes at an appropriate level of responsibility within agreed timeframes.

His philosophy is to upskill candidates as quickly as possible. "People respond to what you inspect, not what you expect, with respect," he believes.

Naidu Consulting

WINNER

Naidu Consulting continues to invest time and effort in capacitating its staff to meet industry demands. As part of its commitment to developing engineers, a fully fledged mentorship programme has been established. This provides a structured programme, which enables the registration of company staff as professionals. The programme also caters for client staff, providing much-needed technical expertise to the public sector.

In line with the NDP, more than 65% of Naidu Consulting's employees are youth, offering an opportunity to showcase talent. This youth input, coupled with industry-leading engineers and technologists, makes for an award-winning combination of fresh ideas, married with sound engineering principles.

The mentorship process involves a detailed assessment of each candidate by a registered mentor through Naidu Consulting's commitment and undertaking with ECSA. Based on the experiential gap analysis, the mentor crafts a personalised training plan in conjunction with supervisory staff to fast-track registration through ordinary day-to-day project work.

Currently, more than 15 mentors assist more than 26 mentees to gain practical experience as well as to complete their ECSA registration forms. This effort has seen seven engineers register as professionals, with approximately 10 further candidates expected to submit applications in the near future.

Knight Piésold

COMMENDATION

One of the founding principles of Knight Piésold's success over the past 97 years has been its focus on human resource development across its global workforce. This focus includes promoting diversity in terms of culture, leadership style, ethnicity and the way opportunities are developed for engineers.

This is achieved through the company's formalised mentorship programme. At Knight Piésold, mentoring is integrated in every aspect of its operating philosophy. It is instilled in the company culture and in the minds of its people, as is the belief that the transfer of skills at all levels is essential for the growth of the engineering industry in South Africa.

Knight Piésold was the first consulting company in South Africa to provide a CETA-funded mentorship programme to its candidate technicians, technologists and engineers. Its Performance Development Programme ensures that training and development continue long after professional status has been obtained, thus ensuring that the firm continues to cultivate leaders and experts in the engineering industry.

Knight Piésold has a formalised Mentorship and Coaching Programme for ECSA registration that includes its Candidacy Programme, as well as the Knight Piésold Emerging Leaders Programme, which further develops professionally registered employees. These programmes all form part of the company's Workplace Development Plan for employees.

AECOM

ENTRY

Mentoring is not a new concept to AECOM. The company launched its first structured mentoring programme in 2009. The programme aligns with continuous industry changes and mentoring approaches, which are constantly adapted to address relevant needs.

In 2017, AECOM launched the AECOM Africa Candidacy Support and Mentoring Programme, in partnership with MENTORING 4 SUCCESS™, which specialises in structured mentoring programmes and training.

The programme addresses the candidacy journey across the whole built environment, as well as other appropriate professional statutory bodies applicable to AECOM's candidate professionals. It is specifically designed and customised around each individual and is a full life-cycle programme that benefits everyone, whether they are graduates not registered as candidates, young candidates, as well as mature candidates who have been registered as candidates for more than five years.

Participants also have access to world-class mobile mentoring apps and analytic dashboards, which measure and track engagement, knowledge needs and critical context.

AECOM currently has a total of 56 staff members – of which 17 are women – participating in the programme, across its four offices in South Africa, namely Pretoria, Sandton, Cape Town and Durban.

Seventeen of AECOM's participating mentors have received accreditation as professionally registered mentors with the South African Board for People Practices (SABPP) – a first for the built environment.

Nyeleti Consulting

ENTRY

Nyeleti Consulting is passionate about mentorship. Its culture is one of 'continued development' and the company firmly believes that skills need to be current. It has various mentorship initiatives running, which are mostly in-house and tailored in line with industry requirements.

Nyeleti currently has 21 employees enrolled in the mentorship programme in preparation for registration as engineers, technologists or technicians with ECSA, and unequivocally supports the personal development of staff members. The company grants bursaries at its own discretion to:

- full-time students not employed by the company
- employees who wish to study part-time.

Nyeleti believes that mid-level leaders are the key to succession planning and the sustainability of an organisation. With this vision, 22 young people between the ages of 25 and 33 were identified to participate in a Nyeleti leadership development initiative. The central theme of this initiative is to expose employees to marketing and business development, while allowing them to develop networking skills by engaging with their peers in the public and private sector.

Seconded staff also follow the company's internal mentorship programme. HR devises a tailor-made programme with deliverables and timeframes in order for the secondment to be successful. The actual evaluation of the deliverables is done by the client body.

Knight Piésold

WINNER

Knight Piésold is an employee-owned global consulting firm that provides specialised services to the mining, power, water resources, infrastructure, oil and gas industries. Established in South Africa in 1921, the company has expanded its reach into a global network of over 750 professionals based in offices in North and South America, Europe, Africa, Australia, and Asia.

The firm's corporate strategy places leadership as the key to current and future success. Every employee is treated as a leader, with opportunities being continuously created for them to display and develop their leadership capacity and potential.

Knight Piésold's reputational backbone has always been that of dam design, hydropower and construction management, throughout Southern Africa and across the world.

Knight Piésold has also grown and diversified over the years to offer engineering solutions to the transport and mining sectors. The Transportation Division, which currently manages numerous projects throughout South Africa, continues its partnership with Sanral, as one of the company's longest-standing local clients. This is complemented by strong bridge design, geotechnical expertise and stormwater capabilities.

To retain technical excellence, there is a strong focus on disciplined project management (in-house system), along with ISO 9001, 14 000 and 18 000 accreditation.

Knight Piésold has a Level 2 BBBEE rating and achieved a 51% BBBEE ownership in March 2018.

BVi Consulting Engineers

BVi has a unique management structure for an engineering company. It is based on a broad shareholding by the owner-managers of the company, which BVi feels is the key to its success.

The goal of this broad owner-managed structure is to ensure the full commitment of managers and senior personnel to the BVi vision, more specifically to its goals of personal attention on a project level, superior quality and service to clients.

BVi's decision-making authority is strongly decentralised, enabling managers to make operational decisions and execute projects without red tape. BVi believes this structure is the key to its success and differentiates it from other larger engineering firms.

BVi is a 53% black-owned company, with more than 50% shareholding by professional engineers and technologists; 100% of BVi shares are owned by South Africans citizens. This makes BVi one of the largest black-owned consulting engineering firms in South Africa.

In 2014, a new ERP system was introduced to improve transparency of information for decision-making. In the last three years, the system has been imbedded and provides information to management quickly and efficiently.

The ISO 9001 Quality Management System forms part of BVi's Integrated Management System. BVi is currently in the process of moving from ISO 9001:2008 to ISO 9001:2015.

COMMENDATION

Naidu Consulting

A proudly South African company, Naidu Consulting is a 100% black-owned BBBEE Level 1 company with more than 160 employees. The company continues to grow through innovation, passion and commitment via a dynamic team comprising more than 60% youth and more than 35% women.

The company has garnered several awards each year in several platforms for technical excellence and social upliftment through its projects. These include:

- SAICE National Community Based Projects Award for an unprecedented five years in a row
- SAICE National Technical Excellence Awards
- KZN Kamoso Awards for Best Projects and Best Consultants.

Each year, Naidu Consulting also recognises a project team for technical excellence and innovation through its internal company awards.

Naidu Consulting has a dedicated social upliftment unit, which focuses on job creation through infrastructure delivery. This unit currently supports the KwaZulu-Natal Department of Transport.

Naidu Consulting was also instrumental in policy revisions that support social upliftment through government spend, supporting the National Department of Public Works in six provinces to implement the Expanded Public Works Programme.

Naidu Consulting is a Dekra-accredited ISO 9001, 18001 and 14001 company.

ENTRY

Small Company of the Year

Infraconsult Engineering

Infraconsult Engineering is a small firm consisting of approximately 15 full-time staff members.

The 51% black-owned, Level 2 BBBEE company has an excellent 25-year track record for civil and structural engineering projects, and is currently working on the Watervalspruit Mega Housing Development. This will consist of approximately 15 000 residential stands to be serviced with civil engineering and electrical engineering internal and bulk services over a period of eight to ten years.

Infraconsult Engineering is passionate about the introduction of young learners to engineering and science and has consistently taken part in the annual CESA Job Shadow Day for more than 10 consecutive years.

Infraconsult Engineering was presented with an Award of Recognition by CESA in 2014 for its continuous commitment to the development of young professionals. The firm has been actively involved in the final year civil engineering programme at the University of Johannesburg Civil Engineering Department over the past five years and, through this involvement, has employed five young graduates from the university, and provided them with training and skills development. 60% of Infraconsult's current engineering and technical staff members are youth.

Infraconsult Engineering's Quality Management System is ISO 9001:2015 certified.

WINNER

Tiso Blackstar Group

WINNER

Tiso Blackstar Group is a global company with its roots in Africa, operating market-leading media, broadcast and retail marketing properties. The group has strong exposure to the rapidly growing digital, broadcast and mobile markets, with a leading position in South Africa and a broad footprint across Kenya, Ghana and Nigeria.

The company is South Africa's largest national English publishing group, the second largest digital publisher, owns the largest music and independent film catalogues on the African continent, and operates unique TV channels. It is the proud custodian of iconic brands that include the Sunday Times, Sowetan, Financial Mail, The Herald, Gallo Music and Uniprint. The Hirt & Carter Group is the biggest marketing solutions company for the retail sector in Africa.

The Tiso Blackstar Group business model is underpinned by a unique network of assets, dedication to excellence, and a strong entrepreneurial focus. It is committed to providing quality content and services to its varied audiences and customers, and value to its investors.

Tiso's brands set the national agenda. They inform, inspire, delight and give a voice to the nation.

Sunday Times · Times LIVE · Saturday Dispatch · Times SELECT
WeekendPost · financialmail · Sowetan · BusinessDay
The Herald · Daily Dispatch · wanted · HOME OWNER

Crown Publications

WINNER

Crown Publications, one of South Africa's largest business-to-business publishing houses, came into existence in 1986. Since then, the company has grown from producing a single magazine, *Electricity SA* (renamed *Electricity+Control*), to publishing six monthly magazines, three quarterlies, and a number engineering handbooks.

Crown Publications' dynamic team of qualified staff and informed editors understands the challenges of meeting the ever-changing requirements of businesses that operate in the technical field. They pride themselves on ensuring that the information published across all magazines is relevant and credible.

Their magazines cover various engineering disciplines with particular emphasis on industrial applications in the chemical, construction, electrical, mechanical and mining fields. They offer a balanced mix of technical and product information, making them an ideal platform for promoting company growth within Africa.

bvi 50 YEAR CELEBRATION EST 1967

• ENGINEERING • PROCUREMENT • MANAGEMENT

LEADING IN TRANSFORMATION
AND INVESTING IN OUR YOUTH

MESSAGE FROM DAVID LEUKES
- MANAGING DIRECTOR

As a leader in the engineering industry, BVi sets high standards in transformation, and we are proud of achieving a 53% majority black-owned shareholding and Level 1 B-BBEE contributor status. This is a significant milestone for the BVi group and a step forward in the engineering industry.

In addition to BVi being a 53% black-owned company, with more than 50% of its shareholding owned by professional engineers and technologists, we have restructured our management, with the goal to obtain a minimum of 50% black representation at management level. BVi's workforce is already more than 50% black, and by applying a strict equity policy, 70% of all of last year's new recruits were black.

Our mentor/learnership programme aims to fast-track youth career paths through the BVi BEE Employee Trust, to advance the careers of young black qualified engineers and technicians into management. Our B-BBEE score is evidence of our longstanding commitment to procure from BEE companies, and we have assisted many smaller firms to learn essential consulting engineering skills.

BVi supports our local community through corporate social responsibility projects in all our offices. In 2017, in celebration of our fiftieth anniversary, we launched the successful BVi Visionaries project, in which seven winners nationally were rewarded as 'BVi Visionaries', with each of them qualifying for a bursary and educational support for the duration of their studies.

BIG ENOUGH TO MAKE A DIFFERENCE, SMALL ENOUGH TO CARE

TIISETSO MORGAN NTLHANE
Ratshepo High School
GAUTENG WINNER

FANELESIBONGE DLAMINI
Maceba Secondary School
KWAZULU-NATAL WINNER

MODISE OLEBOGENG
Bainsvlei Combined School
FREE STATE WINNER

ASHWANITA SWARTS
Wesbank High School
WESTERN CAPE

RAYWIN WITBOOI
Protea Hoërskool
NORTHERN CAPE WINNER

KWAKHANYA MONA
Sandiswe High School
EAST LONDON WINNER

SIPHOSETHU MKOTO
Soqhayisa Senior Secondary School
PORT ELIZABETH WINNER

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Royal HaskoningDHV
Enhancing Society Together

Enhancing Society Together

Enhancing Society Together In partnership with clients, stakeholders and communities
Once it was enough for engineers to ask themselves: how can people's lives be made easier? Today, in the face of unprecedented challenge and change, we believe this question no longer reaches far enough. In response, we have focused the work and passion of our engineers and consultants towards a deeper level. How do we make lives not simply easier, but better?

By working in partnership with our clients and other stakeholders, we are committed to make an impactful contribution to society through our projects. We are focused on solutions to the Global Challenges faced in respect of Urban, Water, Transport and Industry through our Business Lines of **Water; Transport & Planning; Industry & Buildings; and Maritime & Aviation**. The framework underpinning our focus on enhancing society rests on four simple questions. These are addressed in every project we undertake:

- Will our solution meet the demands of the stakeholders?
- Will it add value for society as well as clients?
- Are we providing the best solution now and in the long term?
- Can we deliver what is required with an optimal use of resources and fossil fuel energy?

Working alone, we cannot change the world.

Working together with our clients, stakeholders, partners and communities, we are in the process of moving towards a better future for all.

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