COVERING THE WORLD OF CONSTRUCTION

DECEMBER 2019

CROWN PUBLICATIONS

Construction WORLD

SPECIAL ISSUE
BEST PROJECTS 2019

2019 BEST PROJECTS





NO MATTER FROM WHICH ANGLE YOU LOOK AT OXFORD PARKS, it is always a winning one

Concor Buildings delivers innovative and complex projects within budget and on time, creating value for all stakeholders. Offering world class solutions across the broad spectrum of building, industrial and civil projects, the company has a solid safety record underpinned by the Concor Stop.Think.Act! philosophy, and is ISO 9001, ISO 14001 and OHSAS 18001 accredited.

concor BUILDINGS

A leading black-owned infrastructure and buildings business, operating in South Africa and selected African countries, and a member of the Southern Palace Group.

A proudly Level 1 B-BBEE accredited business.

Tel: +27 11 590 5500
Email: info.buildings@concor.co.za
Website: www.concor.co.za

SOUTHERN PALACE

CONTENTS

ON THE COVER

AfriSam was the specialist *concrete* supplier for The Leonardo. This project was the Joint Winner in the Specialist Suppliers or Contractors category.

Read the summary on page 34

Some of the Crown Publications staff who attended the 18th Best Projects Awards at the Rand Club. From left*: Erna Ooshuizen (Advertising Manager:* Construction World*), Katlego Montsho (Layout Artist:* Construction World*), Karen Grant (Publisher: Crown Publications), Munesu Shoko (Editor:* Capital Equipment News*), Bennie Venter (Advertising Manager:* Modern Mining*) and Wilhelm du Plessis (Editor:* Construction World*).*

COMMENT

The December issue of *Construction World* is dedicated to the winners and finalists of the Best Projects Awards that, for the 18th year, recognised excellence in the built environment. The 2019 instalment of the Awards took place at a time in the country's history when low confidence and adverse sentiment, primarily caused by a dire lack of government spending (civils) and now also private investment (building) are threatening the very existence of the South African construction industry as we know it.

For the first time in its 18 year history, the Awards attracted no entries in the Civil Engineering category. As such it echoes the reality faced by the construction industry.

The decline in government spending, coupled with the increasing failure by government to pay contractors on time, are major factors for the decline of the construction industry. In fact, the South African construction industry has been in decline for the better part of seven years, but has now reached historical lows.

However, Databuild's CEO Morag Evans believes that government can provide much needed stimulus to get the industry back on track by starting a process consisting of five vital elements.

One

She believes that if government spends the funding that has been allocated in the national budget for vital infrastructure like roads, reservoirs, schools, hospitals, clinics and low cost housing the construction industry will be able to pull out of the depths it finds itself in.

Two

Maintenance of existing infrastructure needs to be prioritised. The massive need for this will generate numerous construction projects and will employ thousands.

Three

An area that requires immediate attention is the late (or even non-payment) of contractors. This has been and still is a major cause of job losses. The National Treasury regulations stipulate that contractors must be paid 30 days after invoicing. However, the cidb says that some 60% of all payments are made after this stipulation. The result is cash flow issues, liquidation and huge job losses.

Four

The private sector, which has kept the construction industry ticking over until 2017 when it too started to decline on the back of low confidence levels, needs to be collaborated with in a more effective manner.

Five

The tender process needs to be more transparent and open. Government needs to ensure that unnecessary red tape is minimised and complex regulatory measures must be simplified.

Evans says that "all economies fluctuate between periods of expansion and contraction and the improvement in business confidence between August and September is one of several signs that the construction market is beginning to turn. The steady flow of construction projects being put out to tender, of which many have been successfully awarded, also bodes well for the industry and we should soon start to see a further increase in momentum."

Wilhelm du Plessis

Editor

Captions for pages 18 and 19

1. Rosebank Link | 2. The Leonardo (AfriSam entry) | 3. The Leonardo | 4. Bundu Reservoir | 5. Hi Hotel Montecasino | 6. Main Road 118 | 7. Growthpoint Lakeside Offices | 8. Oxford Parks | 9. Azambi Hydropower Project | 10. 2 Pybus Road | 11. Rosslyn cogeneration plant | 12. Christian Rivival Church and 13. Witklipfontein Game Farm

@ConstWorldSA www.facebook.com/construction-worldmagazinesa

EDITOR & DEPUTY PUBLISHER
Wilhelm du Plessis constr@crown.co.za

ADVERTISING MANAGER
Erna Oosthuizen ernao@crown.co.za

LAYOUT & GRAPHIC ARTIST
Katlego Montsho

CIRCULATION
Karen Smith

PUBLISHER
Karen Grant

PUBLISHED MONTHLY BY
Crown Publications cc
P O Box 140
BEDFORDVIEW, 2008
Tel: 27 11-622-4770 • Fax: 27 11-615-6108

PRINTED BY
Tandym Cape

TOTAL CIRCULATION:
(Third Quarter '19)
6 685

www.constructionworldmagazine.co.za

SIKA PRODUCTS

FROM BASEMENT TO ROOF

shaping the world around you

WATERPROOFING

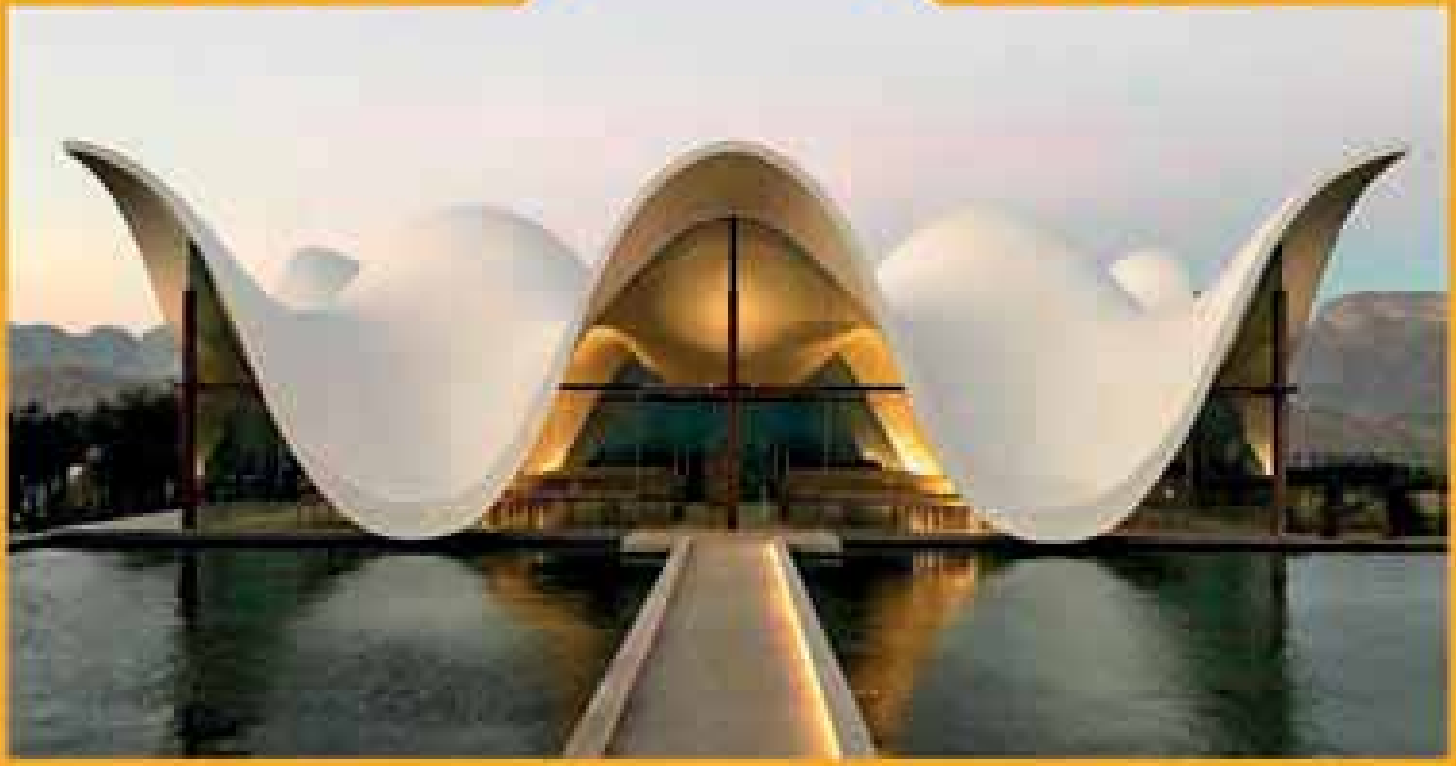
ROOFING

STRUCTURAL GLAZING

FLOORING

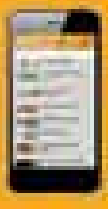
REFURBISHMENT

SEALING & BONDING



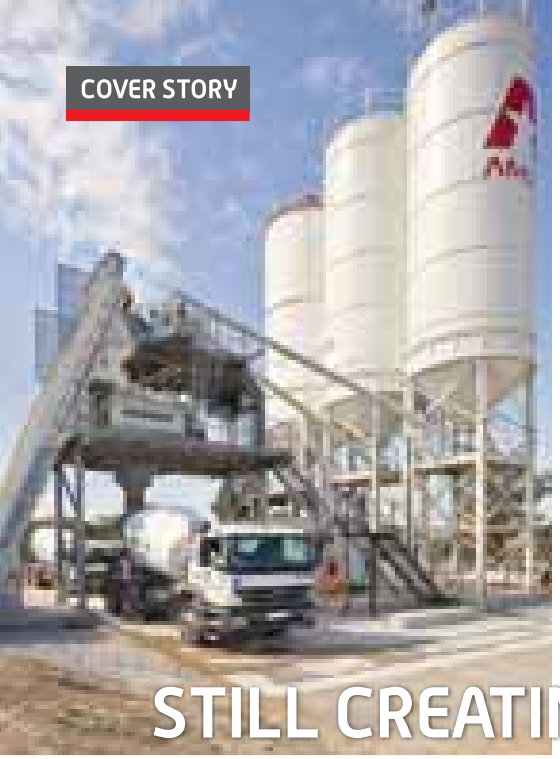
At Sika, our goal is to develop the most reliable product solutions for the construction industry. Sika provides technologies for the entire life cycle of commercial buildings, residential properties and infrastructure rehabilitation projects.

Call us for more info: **010 821 8688**
www.sika.co.za



Get the Sika app and
follow us on social media

BUILDING TRUST



STILL CREATING POSSIBILITIES AFTER 85 YEARS

This year AfriSam is celebrating 85 years as a leading diversified construction materials supplier. The company has endured various industry cycles and has withstood many tough times. *Construction World* spoke to four of its executives about the importance it has always placed on quality, having energised and motivated people to serve customers, and how this becomes the bedrock for success, particularly in tough times.

A tough cycle

"To understand the local conditions," says Acting CEO Rob Wessels, "one has to understand the global context. Cement production is highly competitive across the world with a general oversupply. China experienced a rapid industrialisation phase and therefore had a huge capacity. As development there slowed down, the focus shifted from industrial to consumer led growth, with huge clinker and cement overcapacity as a result."

Most markets in Africa have greater supply than demand – exacerbated by imports, mainly from Vietnam, Iran and China. "There are now more suppliers than we are historically used to," says Richard Tomes – Sales and Marketing Executive. "Low demand, increased competition, and tough cement conditions have led to margin squeeze and a need for businesses to be cleverly run."

Hannes Meyer, Afrisam's Cementitious Executive says that even though there are growth nodes, such as in Peru and Brazil, these are still 30% down from where they were.

"Cement is still the preferred product for infrastructure development but the local industry is faced with cheap imports from Asia," says Wessels. "Through The Concrete Institute industry is looking to engage with government and ITAC to level the playing field. We are not opposed to competition it just needs to fair competition. If we are going to advance inclusiveness and transformation and pay carbon taxes the local industry has to be viable. Otherwise we have no means to implement our social and labour plans for communities around our quarries, which are required to retain our mining rights."

The situation locally

"Spend by the government on infrastructure is a driver that has been taken out of the picture for some time now. There are slight signs of hope, but nothing substantial. The building industry maintained levels well until 2017. This is driven by the private sector. However, the building sector has experienced drops of almost 20% in two consecutive years, due to low confidence levels which has resulted in significant decline in residential and non-residential building spend," says Wessels.

Avi Bhoora, Construction Materials Executive says that South Africa witnessed this decline with the demise of big construction companies, which was due to the lack of infrastructure building."

AfriSam's maintains its resilience in 2019

In the midst of this depressed state of construction – globally and locally – AfriSam celebrated 85 years as a company in 2019. "The company has withstood many cycles and tough times," says Tomes. "As a business, AfriSam is in a good space. This year we achieved high *Voice of Customer* scores." This bi-annual research, conducted by Consulta surveys a sample of 500 customers. It tests the contact centre, the quality of products, administration, quality control, deliveries, overall sentiment and customers' repurchase intent. "Compared to competitors, AfriSam's scores were the highest," adds Tomes.

"The research was done at a time when sentiment in the country was low so the scores we achieved are encouraging. We may not be the biggest player, but we are getting good support from our valued customers and loyalty levels are high," says Wessels.

Meyer says what stands out from an operational point of view is the focus on operational efficiencies, with lower level employees also buying into it. "We focus heavily on the reliability of our equipment. The main equipment at our Dudfield plant is running at 90% Overall Equipment Effectiveness (OEE). The industry benchmark is between 77% and 85% for OEE. Overall AfriSam exceeds a combined score of 80%, which is a new record for us."

"Our approach to people and our key stakeholders makes us resilient," says Wessels. "It is vital to invest in our employees and to maintain positivity despite the tough environment. In addition, our approach to our customers has been a core part of our business for decades. We stay close to them, ensure we deliver quality products

to them and combine this with good service," he adds.

"Externally it has been tough, and has been for the better part of six years, but internally we have a team that is working well together, and this is providing a competitive advantage in terms of production and how our sales people are selling," says Wessels.

Quality: a natural part of the mix

"We have been monitoring our own and competitor quality against world standards. Our operations are ISO 9001 accredited and we are audited on a regular basis – internally and externally. Informally customers say that one of the reasons they stay with us is because of the consistency of our products. Three of the five highest scores in our Voice of Customer survey were product related," says Meyer.

Quality in readymix is particularly important for AfriSam. "For aggregate and readymix we are the only company at the moment that has both ISO and industry body accreditation (ASPASA and SARMA respectively). Because of cost pressures, readymix producers are starting to cut corners and there have been complaints of under-yielding and around strengths. SARMA's membership is dropping – we are one of the few large companies that remain," says Bhoora. SARMA members have to be audited – which is a major reason for the declining membership.

"The readymix industry is not as regulated as the cement industry and this is where the biggest risk is. Readymix companies do their own tests and companies that are not members of SARMA are not subjected to independent tests. As a company we are concerned that not enough effort is put into regulating concrete," says Tomes.

AfriSam's particular strengths

For Wessels, AfriSam's strength lies in its history and its people. "We have had the most colourful corporate history of all the players in the market. The culture is a resilient one. We felt the pain of the excess competition and the lower demand earlier than other players. Our people have proven to be resilient through a number of tough times and this sets us apart when dealing with difficulties."

He says that from an engineering, operations, maintenance and process point of view AfriSam would not be getting the quality scores it achieves if it were not good at what it does. "AfriSam gets this commitment to excellence partly from its Swiss DNA – Holcim was a shareholder for many years. It had an absolute focus on process and quality, which has stood us in good stead. The bedrock for business success is having energised and motivated people who serve customers well. In tough times this is even more important," Wessels says.

"One thing we cannot take for granted is credibility, as this gives AfriSam its brand strength," adds Tomes.

Looking towards 2020

"There do seem to be some infrastructure projects on the cards, albeit in pockets," says Wessels. Building, for the reasons mentioned earlier, will still experience tough times. "Construction materials companies will find it hard and with the inevitable casualties, some sanity should return to the business. We have had a situation where companies tendered below cost. With fewer options for contractors maybe some pressure will be relieved."

Meyer says that cost pressure will be a major difficulty in 2020. "Electricity prices have more than doubled over the past decade. We are quite reliant on imported refractory materials, and other critical elements are also all increasing. Up until now we have managed it well – we have contained price increases to levels that are acceptable, but it is getting more difficult to find ways to contain cost," he explains.

Despite the difficulties that still loom, AfriSam is wholly focused on the role it can play with in improvement of lives. "AfriSam's idea behind the concept of *building a positive African future* is not what

AfriSam's Ulco cement operation.

our materials are, but what they can do," says Wessels. "The brand promise of 'Creating concrete possibilities' takes cognisance of the fact that as a product itself cement is not particularly amazing, but what it does is incredible. The essence is that we ask what our materials can do for people, the impact it can have on their lives and back that up with staff that are inspired and motivated."

Reinvesting in its communities

AfriSam launched its Ima Nathi programme with SAFA to make a direct impact on the lives of people around its operations. AfriSam runs a number of mining operations, and the Department of Mineral Resources and Energy requires this.

"The programme has had an incredible impact on the relationship between the plant and the communities around it," says Meyer.

In addition, AfriSam runs a business development initiative in the North West. "We offer introductory courses for entrepreneurship to the local communities. AfriSam also runs a business development centre at its Roodepoort plant where small businesses operate from the old hostel area. Elsewhere the company has built a community hall in the Northern Cape and is heavily involved with HIV programmes. Our Construction Materials business recently opened the first Health Post in Nkanyezini village near Pietermaritzburg in partnership with the KZN DMR and Department of Health, local communities and municipalities. Two of our aggregates quarries and readymix businesses operate in the vicinity of the Health Post.

"We are involved the communities not only for our own existence but also for the possibilities we create," says Meyer.

Significant industry support

AfriSam supports SARMA, ASPASA, TCI, CMA, CSSA and ACMP. It also supports sustainable construction with its involvement in SAIA and *Construction World's* Best Projects. "We are the only company that still does all of it – due to cost pressures, competitors are selective in what they support," says Tomes.

"AfriSam is an endorser of bringing the industry bodies (at least four of them) into an umbrella body. This will assist in addressing quality as the industry bodies will then speak with a single voice," says Wessels.

"We met with two top academics, Prof Mark Alexander and Prof Yunus Ballum to get university funding to the levels it used to be. In the light of climate change and resultant environmental pressures, it is vital to increase research funding *with* our competitors," says Tomes. ■

BEST PROJECTS AWARDS
2019 WINNERS

The Best Projects Awards took place on 6 November at the Rand Club in Johannesburg. Some 200 guests attended these annual awards. It was the 18th year Best Projects recognised achievement in the built environment. This issue is dedicated to the winners and finalists.

The Best Project Awards is one of *Construction World's* brand extensions and is the only award in South Africa that recognises excellence across all disciplines in the built environment.

They are independently judged by Trueman Goba, Nico Maas and Rob Newberry, stalwarts in the South African construction industry, and who between them have a wealth of experience and knowledge.

Started in 2002, the awards have grown to become a prestigious recognition of excellence. Despite the challenging times the construction industry is experiencing, the awards attracted 51 entries.

At its height – in the period 2010 to 2012 – Best Projects attracted more than 70 entries annually. The fact that it has, since then, managed to still attract 50 to 60 entries is proof that the construction industry regards this award as significant and supports it well.

The Awards are made possible by AfriSam (the main sponsor), Den Braven (bronze sponsor) and CCS and Sika South Africa (both associate sponsors).

Building Contractors

This category was won by *Oxford Parks Phase 1* (main contractor Concor Buildings) while *Hi Hotel, Montecasino* (Tiber Ohlhorst Modular) received a Highly Commended award and *Rosebank Link* (WBHO Construction) received a special mention.

Specialist Contractors or Suppliers

This category had Joint Winners: *Bundu Reservoir* (Corestruc) and *The Leonardo* (AfriSam). A Special Mention award was given to *Christian Revival Church on Witkoppen* (Fortem Consulting Engineers and Creative Engineering).

Consulting Engineers

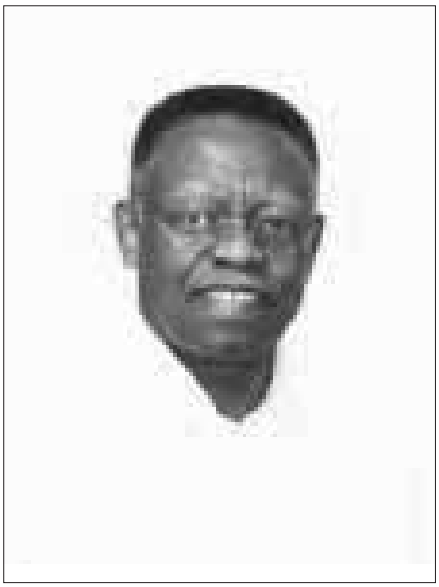
This category had a healthy 16 entries and was won by SMEC South Africa for the *Construction of Main Road 118 in Namibia.* AECOM received a Highly Commended Award for the *Growthpoint Lakeside Offices* while Special Mentions were awarded to *Azambi Hydropower Project* (Knight Piésold) and *Rosslyn Brewery Cogeneration plant* (Hatch).

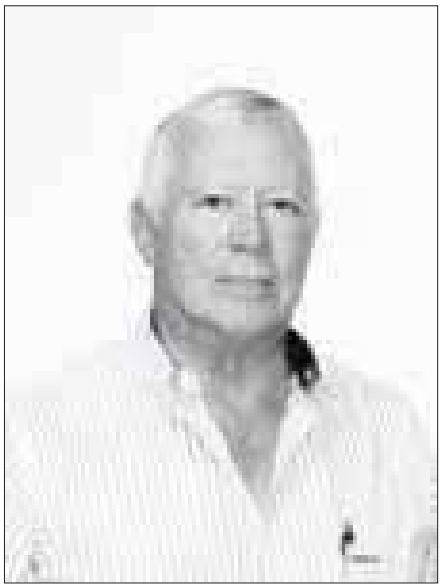
Architects

In the Architects category two projects received awards. It was won by *The Leonardo* (Co-Arc International Architects Inc.) while GLH Architects was Highly Commended for *2 Pybus Road.*

AfriSam Innovation Award for Sustainable Construction

Growthpoint's Lakeside Offices (AECOM) was the winner in this category. *The Leonardo* (Co-Arc International Architects Inc.) was Highly Commended while Witklipfontein Eco Lodge (GLH Architects) and *Oxford Parks Phase 1* (Concor Buildings) received Special Mention awards. ■





Best Projects is independently judged by (from left) Trueman Goba, Nico Maas and Rob Newberry, stalwarts in the South African construction industry, and who between them have a wealth of experience and knowledge.

GEOBRUGG

Safety is our nature

Geobrugg Southern Africa (Pty) Ltd
[redacted]
T +27 11 794 3048 | www.geobrugg.com

A company of the BRUGG Group
ISO 9001 certified

Your local Geobrugg specialist:

BEST PROJECTS: 2019'S WINNERS

The Best Projects Award ceremony took place in Johannesburg on 6 November. Here are the winners.

Category: Building Contractors

WINNER:
Oxford Parks Phase 1 – Concor Buildings
Rui Santos (left) and Danie Pretorius.
Concor Buildings also received a Special Mention for the AfriSam Innovation Award for Sustainable Construction.

HIGHLY COMMENDED:
Hi Hotel, Montecasino – Tiber Ohlhorst Modular
From left: Kevin van Aardt, Rui Lavarinhas, Jose Carreira, Ryan Hesketh, Daniel Aarons and Hein Papenfus.

SPECIAL MENTION:
Rosebank Link – WBHO Construction
Brandon Hobden (left) and Tinus van Zyl.

Category: Specialist Contractors or Suppliers

JOINT WINNER:
Bundu Reservoir – Corestruc
From left: Sarel Holtzhausen, Hans Fouche, Tian de Jager, Cllr James Makwiting, Johan de Jager, Lunga Nkosi, and Sibusiso Jiyane.

JOINT WINNER:
The Leonardo – AfriSam
Mervin Govender, Debbie Harvey, Ebeth van den Berg, Randal Chetty, Vincent Erasmus, Avi Bhoora, Amit Dawneeranjen, Nithia Pillay, Maxine Nel and Mike McDonald.

SPECIAL MENTION:
Christian Revival Church on Witkoppen – Fortem Consulting Engineers and Creative Engineering
From left: Hans Koorn, Carl White and Andrew Skudder (CCS).

Category: Consulting Engineers

WINNER:
Construction of Main Road – SMEC South Africa
Kostas Rontiris and Anne van Vliet.

HIGHLY COMMENDED:
Growthpoint Lakeside Offices – AECOM
From left: Martin Smith, Jean-Pierre Kitshoff, Kim Timm, Michael Sykes and Xolani Mandidi. AECOM was also the winner of the AfriSam Innovation Award for Sustainable Construction for this project.

SPECIAL MENTION:
Azambi Hydropower Project – Knight Piésold
Vicci Schoeman, Kevin Stols and Janice Zhang.

SPECIAL MENTION:
Rosslyn Brewery Cogeneration plant – Hatch
Thutakani Zulu, Noeleen Padayachee, Craig Foley, Peter Viljoen, Henko Venter, Cobus Schutte, Dieter van Rooyen, Bradley Whitehead and Itani Tshimiluni.

Category: Architects

WINNER:
The Leonardo – Co-Arc International Architects Inc.
Megan Holman, Francois Pienaar, Salomé Schonken, Catharina Atkins, Patrick McInerney, Mitchel Gibbon and Malika Walele. Co-Arc International Architects Inc. also received a Highly Commended Award for this project in the AfriSam Innovation Award for Sustainable Architecture category.

HIGHLY COMMENDED:
2 Pybus Road – GLH Architects
Mojgan Solati-Dekhordi, Kathleen Western and Candida van Dyk.

Category: The AfriSam Innovation Award for Sustainable Construction

SPECIAL MENTION:
Witklipfontein Game Farm – GLH Architects
Xavier Huyberechts.

Overall WINNER in the Contractors Building Category –
BPSA Oxford Parks

PROUDLY LEVEL 1 BEE CONTRIBUTORS

pure

STRUCTURAL, CIVIL + FACADE ENGINEERS

Witklipfontein Game Farm –
AfriSam Innovation Award for Sustainable Construction

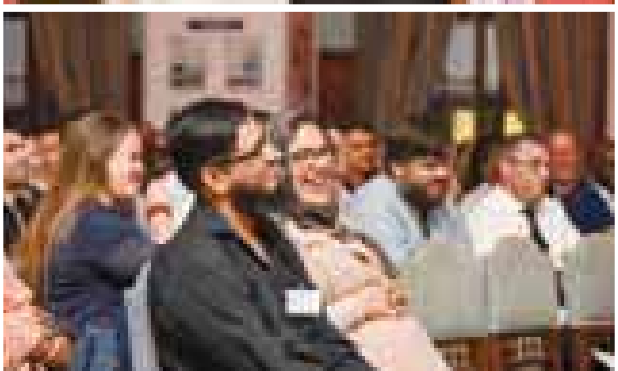
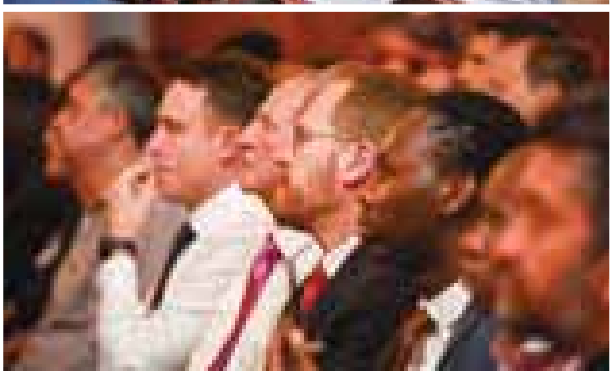


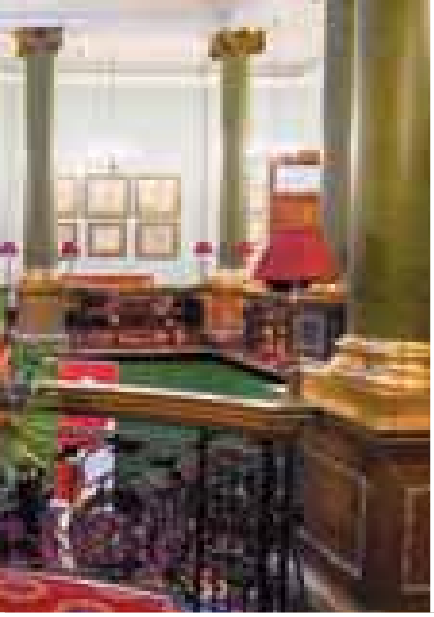








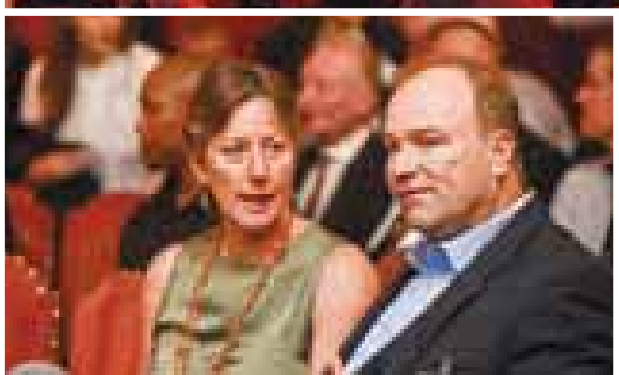




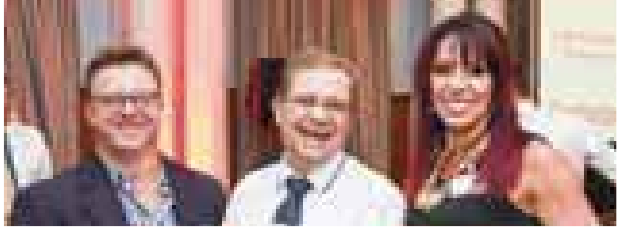






















Find our branches at www.technicrete.co.za

FINISHING *touch*

paving | mining | masonry | kerbs | erosion protection | retaining walls | drainage

SUITABLE FOR:
- Rivers, Estuaries, Dams, Reservoirs
- Areas subject to wave action
- Access roads
- Parking areas
- Stormwater drift crossings

SPECIALLY DESIGNED:
- Compressed concrete blocks
- Interlocking system
- Perfect taper of each block
- Various sizes of blocks available

Technicrete is a subsidiary of ISG, a leading supplier of innovative infrastructure products to the construction and mining markets in Southern Africa.

ISG

CMACS APPROVED

TECHNICRETE

LUCKY WINNERS

As usual, various prizes were given away at the Best Projects Awards. Here are the winners.

Tinie Bonnet from WBHO and Rui Santos from Concor Buildings. Concor sponsored a gift hamper.

Itani Tshimiluni from Hatch with Wayne Neary, the MD of the Icon Group who sponsored a Nespresso Coffee machine.

Kgomotso Motseta from GLH Architects and Lesley-Ann Rozanski, Head of Social Media at NGAGE. Ngage's prize was a R1 000 Turn 'n Tender voucher, a wine and biltong hamper and a free assessment of the winner's social media pages.

Ilze Lombard from GRO2 Consulting and Shirley McInnes from Porcupine Productions who handed over the prize on behalf on Makita. It sponsored a Makita TM3000CX2 Multi Tool with accessories in a carry case.

BEST PROJECTS AWARDS SPONSORS

AfriSam

Main Sponsor

Den Braven Sealants

Bronze Sponsor and Sponsor of the Architect category

CCS

Associate Sponsor and also the sponsor of the Specialist Contractors or Suppliers Category

Sika® BUILDING TRUST

Associate Sponsor and also the sponsor of the Architects Category

PARAGON GROUP

ARCHITECTURE AND INTERIOR ARCHITECTURE

Architects design buildings for people. So it is important to understand how we experience life. Sometimes we need to let go. See our buildings and how we celebrate.

www.paragon.co.za


01


02


05


06


09


10


03


04


07


08


11


12


13

BPSA OXFORD PARKS PHASE 1 PROJECT

The BPSA head office building, with its compelling triangular shape, is a celebration of inspired architectural design coupled with meticulous attention to detail during construction, creating a strong focus point in Rosebank, Johannesburg.

Constructed by Concor Buildings, the new GBCSA 4-Star Green-rated head office for BPSA is the first completed building in the Oxford Parks Precinct. The Oxford Parks Precinct was selected as a pilot project for the Green Building Council of South Africa to create a green precinct rating tool for public environment projects.

The site of this development is near the Rosebank Gautrain station giving priority to alternative transport systems thus potentially reducing environmental impact of the tenants and customers.

While the architectural team impressed with an iconic design, Concor Buildings' construction team excelled with innovative solutions for the challenges they faced to deliver a quality structure on time and within budget.

The project, located on the south eastern corner of the precinct, comprises a super basement structure with five buildings of which the BPSA was the first to be completed, on an elevated podium structure.

A portion of the site is located directly above the Gautrain tunnel. The foundation solution comprised a raft foundation as the bottom of the excavation was constructed just above the Zone of Exclusion. The planning grid of the basement did not match that of 199 Oxford; hence the implemented solution comprised a combination of a transfer structure and sloping columns in order to get the vertical loads of the building down to the foundation level.

During the construction phase access and egress for material and equipment on the floors posed several challenges. Given the special requirements, and to establish maximum duration for external platforms without curbing façade progress, Concor Buildings developed a cascading arrangement of loading platforms to affect only one localised area of the façade.

To mitigate risks to concrete roof leaks and to accelerate the installation of roof plant, an alternative sequence was used to construct the insulation, screeds to falls and plant room plinths.

The building's triangular shape is determined by the line of sight from Oxford Road. The efficiency of bulk is maximised by the 'L' shaped floor plates and the building provides an active façade along the pedestrian walkway. The building planning grid comprises a square parallelogram grid which results in spans exceeding 8,4 m.

In order to optimally use construction materials and respecting the load restriction over the Gautrain tunnel and servitude, a thinner post tensioned slab solution was designed from the first floor upwards with an edge thickening to accommodate the longer oblique spans. The innovation and essence of the scheme lies as much in the principles set out for the Oxford Parks Precinct as much as the building itself. ■

This project also received a Special Mention in the AfriSam Innovation Award for Sustainable Construction.

PROJECT INFORMATION

- **Company entering:** Concor Buildings
- **Client:** Oxford Parks
- **Start date:** 2 August 2017
- **End date:** 30 November 2018
- **Main contractor:** Concor Buildings
- **Architect:** GLH Architects
- **Principal agent:** Morta Project Management
- **Quantity surveyor:** Gro2 Consulting
- **Consulting engineer:** Pure Consulting

HI HOTEL MONTECASINO – MODULAR CONSTRUCTED HOTEL

This project was constructed using modular construction methods and technology. Simply put, the bulk of the building is constructed in modules off site in a factory, transported to site on trucks and then rigged into final position off the truck.

The modules are completed to the extent that they have gone through a rigorous test, inspection and quality process during factory assembly and before being sent to site. Apart from the interior of the module being complete and de-snagged, it also contains items which are usually carried out just before completion of the building such as furniture and fittings.

This method of construction is used extensively in Europe and the USA but has not been used in South Africa to the extent of this project yet. There are many benefits in the design of modular buildings, however there are also many challenges. The method chosen for the construction of Hi Hotel Montecasino has allowed for an accelerated construction process as well as the ability to have regimented quality control methods in place, to ensure that the rooms arrive on site fully fitted and finished.

However, the design of a modular building is not simply a number of individual units, but should rather be thought of from the outset as needing to fulfil the same various and rigorous criteria which combine to make good architecture.

The thinking on this design has been driven equally by the intricate detailing required to facilitate the prefabrication as well as the larger urban landscape in which the building will finally stand. Situated in the Montecasino precinct, Hi Hotel Montecasino has taken design visual cues from the overall precinct while remaining contemporary in its essence. Upon approach one is greeted by a triptych of large glazed archways mimicking the façade details seen around the precinct. This façade is textually rich with elements of firebrick, spray plaster, copper, fabric and glass. Key to the success of the architecture comes from defining the module, the correct module size is critical to achieve spaces which are both practical, ergonomic and experientially rich. While at the same time need to be seamlessly integrated to form architecture which is culturally and contextually appropriate.

Externally the modules have been expressed achieving both a functional resolution for the placement and movement of units. While simultaneously through careful detail this provides a façade which is cohesive and visually pleasing, placing special interest to the atrium at its core.

The cost of this construction method is substantially lower than comparative traditional construction methods, while the cost of design also has the potential to be substantially lower when replicating this hotel on another project as the module design need not be redone. ■

PROJECT INFORMATION

- **Company entering:** Tiber Ohlhorst Modular
- **Client:** Tsogo Sun
- **Start date:** March 2019
- **End date:** February 2020
- **Main contractor:** Tiber Ohlhorst Modular
- **Architect:** Nsika Architecture & Design
- **Principal agent:** Abland
- **Interior designer:** Blacksmith Africa
- **Quantity surveyor:** Theba Consultants & Quantity Surveyors
- **Consulting engineer:** L&S Consulting

SPECIAL MENTION

WBHO ROSEBANK LINK

Rosebank Link, developed by Redefine Properties, is situated in the heart of Rosebank at 173 Oxford Road and is one of the city's latest iconic sky-scraping landmarks. With a total of 46 000 m², the building consists of 15 storeys above ground floors and two basement parking floors.

The featured pedestrian walkway connects the Rosebank Gautrain Station with shopping centres, including The Zone and Rosebank Mall, hence the suitable name: Rosebank Link. Rosebank Link is within walking distance to gyms, hotels, public transport and shopping centres

The north facing atrium was constructed from the walkway to the first soft roof, and is an impressive 12 storeys high. The atrium allows natural light to flow throughout the building and feature multiple roof and atrium gardens creating a relaxing atmosphere. The parkades and office space are divided by a podium level and integrate the two spaces with the atrium. The top six storeys of the atrium houses office space and sit six floors above the street level, overlooking the Johannesburg and Rosebank CBDs and giving access to the first group of tenants. A soft roof divides the first group of tenants with the second group of tenants and consists of three additional floors.

A shuttle lift transports visitors and tenants from the walkway to podium, the top part of the lift shaft has been constructed from steel and glazed with glass to give visitors spectacular views of the belly and atrium when traveling from one floor to another. This will then enable visitors to use a scenic lift from podium to each office module. The scenic lift that consist of three glass sides will travel up and down in an open end shaft and will punch through the soft roof and give a remarkable view of the Rosebank CBD.

The site and its immediate built context, gives Rosebank Link the ability to capitalise on the visibility from the busy Oxford Road. The East and West façades consist of an aluminium clad shell with articulated strip windows to allow light and views to filter into every office module.

The faceted East and West façades have a visual quality emphasised by the articulated strip windows which transform from day to night. The flush glazed North and South façades allow for interrupted views over the greater urban area of Rosebank. Construction commenced in January 2017 and practical completion was achieved in October 2018.

The area in which the project is situated is considered highly developed and as such, the environmental sensitivity of the surrounding land is considered low. However, Rosebank Link will be a four-star Green Star SA Office V1.1 design rated building that will soon be undergoing a rating for as-built status. ■

PROJECT INFORMATION

- **Company entering:** WBHO Construction
- **Client:** Redefine Properties
- **Start date:** January 2017
- **End date:** October 2018
- **Main contractor:** WBHO Construction
- **Architect:** Paragon Architects
- **Project manager:** Betts & Townsend
- **Quantity surveyor:** MLC Quantity Surveyors
- **Consulting engineer:** Sutherland Engineers

144 OXFORD ROAD

144 Oxford Road Joint Venture was formed by Tiber Construction and WBHO Construction in order to construct this prestigious project.

The site is located in Rosebank, off Oxford Road. Construction started in November 2017 and final handover is planned for November 2019.

The construction includes six floors of basement, a ground/podium level, and eight office levels with a concrete roof. The overall construction area isapproximately 90 000 m².

A total of 3 300 tons of high tensile reinforcing was fixed and approximately 36 000 m³ of concrete was poured in to the structure. Due to the programme and sequence of the construction, a total of four tower cranes were erected to distribute material across the site.

The main entrance atrium has been the biggest challenge with structural steel spanning across the façade and an 11 ton structural steel main girder supporting the weight of the entire atrium façade. The main contractor had to bring in a 500 t mobile crane in order to lift the main girder into position.

A total of 400 tons of access scaffolding was utilised within the building while 1 500 m³ of polystyrene void formers are being installed underneath the landscaping in order to create a landscaping embankment, and minimise the weight of the soil on the structure.

This has required some innovative methods of construction, which included finding methods of tying down the polystyrene in order to prevent the polystyrene floating when wet, as well as finding methods to minimise the risk of soil slipping down the embankment of polystyrene, which meant that geocells had to be installed over the polystyrene to hold the soil in position.

The building has nine passenger lifts, three circulation stairs and two fire escape stairs, while two generators will keep the building running when the power goes out, with 20 000 ℓ of diesel stored in the diesel storage tank.

The project has achieved a 5 star GreenStar v1.1 Design rating, and is targeting a 5 star GreenStar v1.1. As-built rating. ■

PROJECT INFORMATION

- **Company entering:** 144 Oxford Road Joint Venture (Tiber/WBHO)
- **Client:** 144 Oxford Property Investments
- **Start date:** 15 November 2017
- **End date:** 1 November 2019
- **Main contractor:** 144 Oxford Road Joint Venture
- **Architect:** Paragon Architects
- **Project manager:** Origin Project Management
- **Quantity surveyor:** RLB Pentad Quantity Surveyors
- **Consulting engineer:** Sutherland

DINOSAUR INTERPRETIVE CENTRE

It is said that the oldest dinosaur nesting site was discovered in the Free State's Golden Gate Highlands National Park when, a few years ago, palaeontologists found 10 nests containing 34 eggs and skeletons which are thought to be over 190 million years old. With a new species of giant dinosaur also recently being found nearby, the area's Jurassic roots are now being immortalised with a dedicated dinosaur education centre in the National Park, near Clarens.

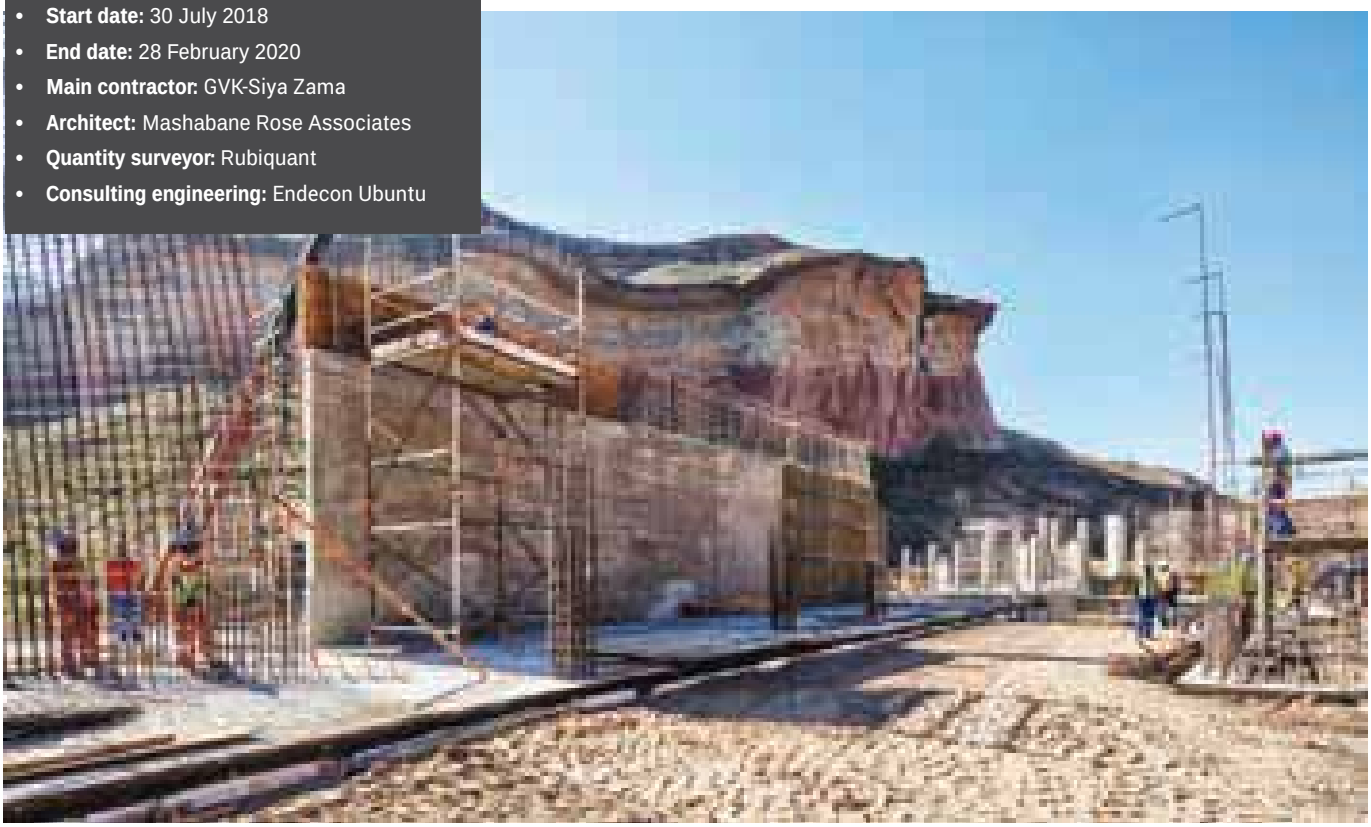
The project includes construction of an interpretive centre, activity node, look-out point and exhibition areas. The visitors' centre will feature a lecture hall, class rooms, laboratories, offices and a café, together with temporary, permanent and community displays. Exhibition areas will enable visitors to see the spot where the nesting site and eggs were found and, as these were discovered in a strip of rock, guests can also learn via displays about the secrets that rocks can reveal and what fossils are. A 3-D printed egg, replica of a nest (complete with life-size dinosaur models) and 'dinosaur bush safari' is set to attract numerous visitors to the area while a special extinction area will also be erected where guests will be taught all about the link between birds and dinosaurs.

Construction complexity on the project includes the remote location near Clarens, the high levels of finish required due to design specifications of the decorative concrete work and the anticipated local and international public interest which the facility is likely to attract.

The team on site has to achieve this through significant upskilling and training of local tradesmen and SMMEs. ■

PROJECT INFORMATION

- **Company entering:** GVK-Siya Zama
- **Client:** South African National Parks
- **Start date:** 30 July 2018
- **End date:** 28 February 2020
- **Main contractor:** GVK-Siya Zama
- **Architect:** Mashabane Rose Associates
- **Quantity surveyor:** Rubiquant
- **Consulting engineering:** Endecon Ubuntu




WE ARE BUILDING
STRENGTH
GVK-SIYA ZAMA
CONSTRUCTION
www.siyazama.co.za

Category: Building Contractors

FOURWAYS MALL

Fourways Mall is currently South Africa's second-largest retail development, and significantly also the country's largest precast concrete installation.

This achievement follows a substantial expansion programme that has utilised 24 016 precast concrete elements, 135 000 m^3 of in-situ concrete and 11 000 tonnes of reinforcing steel, increasing the precinct by 260 000 m^2.

A key challenge defining the expansion process was that it had to be carried out alongside the busy and fully operational existing mall facility, requiring an innovative and daring approach to concrete construction methods.

This approach had to accommodate not only the public interface, but the sheer scale and complexity of the overall project, its logistics and its tight timeframe.

To give some indication of its intensity, the Fourways Mall expansion necessitated working a 24-hour work cycle for seven days a week over 24 months, with 1 300 personnel and 21 tower cranes on site at its peak. The project was in design for 10 years. Concrete work began in March 2016, structural work was completed in November 2018 and final mall completion was April 2019.

To work in the site's confined space while dealing with the range of challenges described above, the project team selected a unique precast solution for the vast majority of the concrete work. This solution involved large structures such as 10,5 metre beams, 8,75 metre slabs and 24 metre columns to be cast off-site. These were then transported to site as required and efficiently installed, with a range of benefits, including speeding up the project.

By adopting precast concrete, the project team highlighted the benefits of a largely unused construction method in South Africa, and in so doing has challenged the status-quo with its inventiveness.

In the process, a range of valuable skills and knowledge have been transferred to local stakeholders, to the benefit of the industry and economy more generally. The planting of precast columns in this project was a first for South Africa, using experience gained internationally.

Applying the precast system also allowed the project to run with fewer workers on site, an important benefit given the space constraints. Much of the concrete-related labour was effectively deployed off-site in the precast yards.

In short, the Fourways Mall expansion provided an environment conducive to skils transfer. ■

PROJECT INFORMATION

- **Company entering:** AfriSam
- **Client:** Azrapart
- **Start date:** 2016
- **End date:** April 2019
- **Main contractor:** Mota-Engil Construction
- **Principal agent:** SIP Project Managers
- **Subcontractor:** Scribante Concrete

NEWCASTLE CORNER SHOPPING CENTRE

The project is situated on the corner of two main roads leading in and out of Newcastle. The positioning of the shopping centre is ideal for any individual entering or exiting Newcastle. The project consists of a main building with 27 shops, of which 80% are national tenants, a Sasol garage and four free standing restaurants.

There are three entrances from the main roads and the shopping centre is a split level project, which is accentuated with steel canopies, a glass lift, three water features and a large outside seating area. The project had numerous challenges which were, but not limited to environmental control, safety control and a limited project duration. Despite all the challenges, the project was completed successfully, within the baseline program and without any safety incidents.

Newcastle Shopping centre is accentuated with three outstanding design innovations. The first is the louvered canopies, which overhangs the front walkways. These louvered canopies are designed with splayed lip channels which assist in keeping the walkways dryer on rainy days. The second design innovation is the scenic lift installed for access to the first floor tenants. This lift has a 180° view, with floor tiling and stainless steel interior installations. The third innovation is a 10 000 ℓ steel water tank that had to be installed to assist with the water distribution from the constantly rising water table.

The water tank was submerged into the ground and connected to the subsoil drain installed to the back, running parallel with the boundary line. There was a pump with a float switch installed inside the water tank, which disbursed the water out into a constructed V drain. The V drain then allowed the water to flow into the municipal stormwater drain. ■

PROJECT INFORMATION

- **Client entering:** Belo and Kies Construction
- **Project start:** 3 April 2017
- **End date:** 24 November 2018
- **Main contractor:** Belo and Kies Construction
- **Architect:** LVDW
- **Principal agent:** Novis & Benson
- **Consulting engineer:** DHP

PROJECT INFORMATION

- **Company entering:** Stefanutti Stocks KZN
- **Client:** Nedport Development
- **Start date:** January 2017
- **End date:** November 2018
- **Main contractor:** Stefanutti Stocks Building
- **Architect:** MAP Architects
- **Principal agent:** Focus Project Management
- **Quantity surveyor:** Mbatha Walters & Simpson
- **Consulting engineer:** Arup

PARK SQUARE

Park Square, Mhlanga's newest business and lifestyle development, opened its doors in November 2018 and offers a future-forward, people-centred destination where communities and professionals can shop, work and connect. When the team at Map Architects were approached in 2015 by Nedport Developments, a subsidiary of Nedbank, to design a space that would accommodate their KwaZulu-Natal team, the brief was to create a structure that would allow the easy flow of people through the development but also accommodate a 17 500 m space to house their staff in addition to general commercial and retail space.

Conceptualised after spending some time pinning down the vision, the architects set about conceptualising an off-the-ground design that would see the commercial elements 'hovering' above a perfectly activated retail arcade and square which people could use for shopping and simply enjoying the city's unique, outdoor lifestyle. The idea to create a connected community that would simultaneously be a business destination for professionals to work and socialise and a dynamic urban space to activate the local community, was born. The emphasis at Park Square is undoubtedly on transparency. The simple and modular design features raw concrete slabs, steel beams, generous concrete overhangs and glassed infills. Column placements, exposed ramps and staircases are optimised to allow for easy foot traffic throughout the building.

An integrated multidisciplinary offering such as this allowed Arup to realise the many benefits of working in a BIM-centric environment. These benefits also extended to the client and main contractor. Another benefit of working in a 3D virtual environment is that design decisions can be communicated to other non-technical members of the team. Virtual walk-throughs of the model were done with the client on a periodic basis to gain a better understand of the building. Walking through the building in this manner also allowed the client to make recommendations to the design team around facilities management issues etc. The main contractor, Stefanutti Stocks, also embraced the virtual design space and models were shared with the site team to understand the building better. Virtual walk-throughs were conducted with the site teams in order to address various queries on the project. The adoption of BIM on the Park Square development has allowed the design team to deliver a technically challenging building on a tight construction schedule in an efficient and coordinated manner.

Park Square was awarded a 4-star Design rating by the Green Building Council of South Africa. Nedport have subsequently committed to targeting a more ambitious 5-star As-Built rating. In addition to this Arup have also been appointed to assist the anchor tenant, Nedbank, in targeting a 5-star Interiors Fit-Out rating. Features that helped achieve the 4-star Green Star design rating: Preliminary calculations show that the project will achieve a 36% reduction in energy consumption over the Green Star benchmark. ■

PATERSON PARK

The construction entailed a multi-purpose sports and recreation complex at Paterson Park, Orange Grove, Johannesburg. The project comprises completion of the construction of new single and double storey buildings and the renovation of an existing single storey heritage building for a multi-purpose sports complex, including an administration building, a swimming pool with related facilities, sports pavilions, a gym/multi-purpose hall, library, craft centre and external works.

Paterson Park has a rich heritage, which is evident in the structures found on site. The existing single storey heritage building, adjacent the recreation hall, will be renovated to ensure it is conserved. The area is also in close proximity to the Bowling Club, opened in 1931 and the Radium Beerhall, which is the oldest surviving bar and grill in Johannesburg, founded in 1929.

The design of the project is multi-faceted and interesting, and incorporates a complex combination of face brick, off-shutter concrete and structural steel elements. In a nod to the diverse and talented community which the facility will serve, the work of several local artists will be showcased on the façades of the various buildings and will include street art, graffiti and unique metal art.

This is a community-driven project and in addition to its mandate to deliver resilient, sustainable and liveable urban areas to its residents, the project includes a significant training and upskilling component of local unskilled residents and SMMEs. ■

PROJECT INFORMATION

- **Company entering:** GVK-Siya Zama
- **Client:** Johannesburg Development Agency
- **Start date:** 12 November 2018
- **End date:** 28 February 2020
- **Main contractor:** GVK-Siya Zama
- **Architect:** HolmJordaan Meagro Architects
- **Principal agent:** Threshold Project Management
- **Quantity surveyor:** Theba Consultants
- **Consulting engineer:** Thembakele Consulting

RIVER CREEK DELOITTE

The site is located in Waterfall, Midrand. Construction started in March 2018 and final handover is planned for February 2020.

The construction included four floors of basement, a ground/ podium level, and six office levels with a concrete roof. The overall construction area is approximately 125 000 m^2.

A total of 4 900 tons of high tensile reinforcing was fixed and approximately 50 000 m^3 of concrete was poured into the structure.

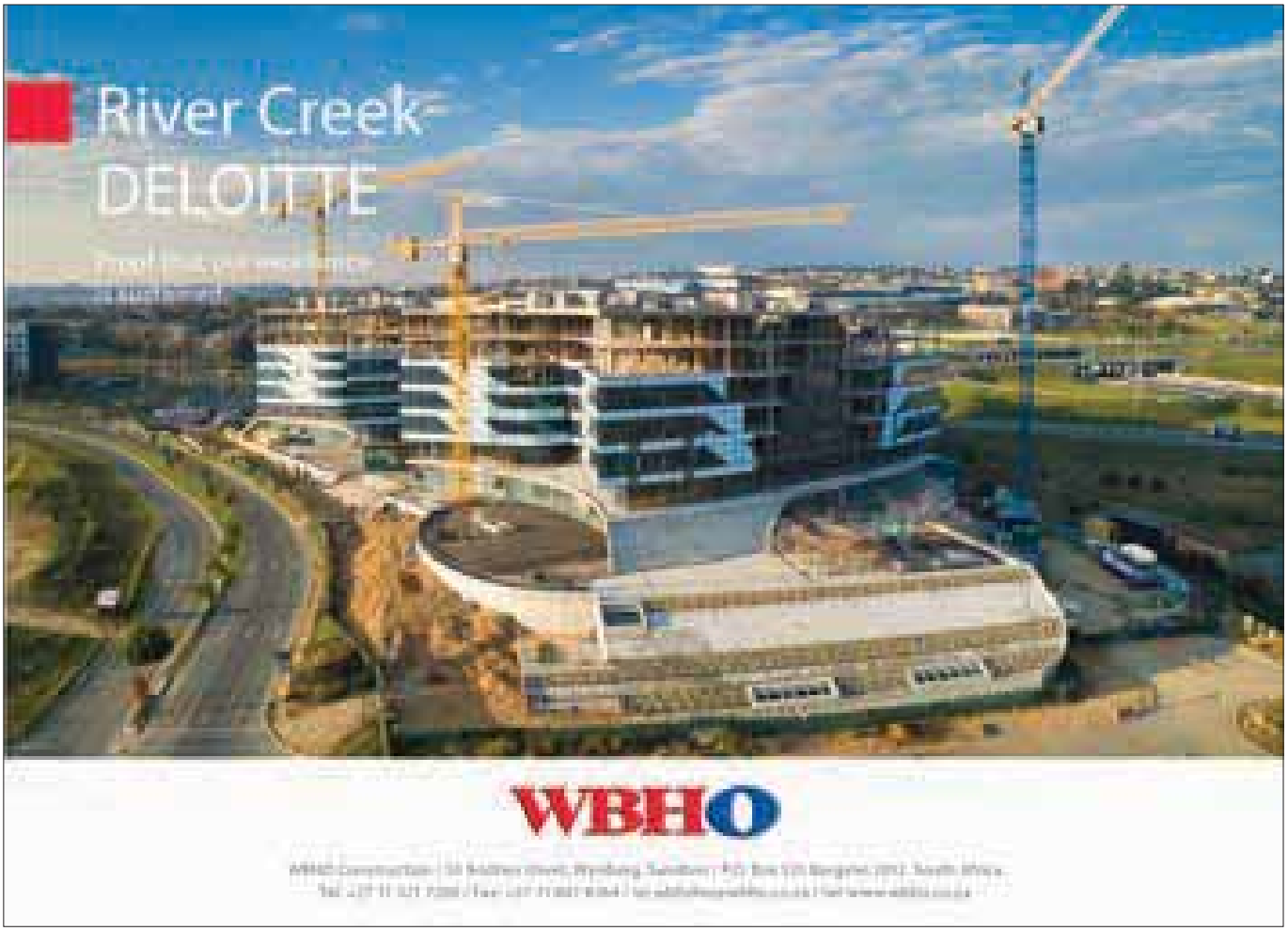
Due to the program and sequence of the construction, six tower cranes were erected to distribute material across the site.

The three atriums were a challenge with structural steel spanning from edge to edge. The six levels of bridge links in the center of the building all hang from the roof with 57 mm diameter steel rods.

A total of 600 tons of access scaffolding was utilised within the building.

WBHO Construction employed staff and subcontractors from the local community in an effort to ensure the local and surrounding communities benefitted in terms of employment and skills development over the duration of the project.

Raking concrete slabs were used on the podium levels in order to allow for sloping landscaping leading up to the building. The soffit of the podium level has roof sheeting fixed to the underside, and over water sensitive areas, to allow for a backup solution in the event of any water leaks. Three generators will keep the building running



when the power goes out, with 20 000 ℓ of diesel stored in the diesel storage tank. Construction only took place during specified hours and neighbours were informed of any noise generating activities which would have a higher impact. Contamination of soil from accidental spills was prevented by ensuring that the correct storage, handling and refueling procedures were followed. Soil protection measures included the use of drip trays, ground sheets and mixing trays. River Creek Deloitte aims to achieve LEED Silver Certification. Features of the new building which contribute to the certification include the following:

- Location and transport
- Sustainable sites
- Water efficiency
- Energy and atmosphere
- Materials and resources . ■

PROJECT INFORMATION

- **Company entering:** WBHO Construction
- **Client:** River Creek Joint Venture
- **Start date:** 16 March 2018
- **End date:** 3 February 2020
- **Main contractor:** WBHO Construction
- **Architect:** Aevitas
- **Quantity surveyor:** Norval Wentzel Steinberg
- **Consulting engineer:** DG Consulting Engineers

TOYOTA VRYBURG

The project entailed the construction of a new 3 000 m² Toyota and Hino Dealership with 102 parking bays in Vryburg, North West. The building was constructed using a concrete and steel frame with brick infill panels which was to receive plaster and paint.

Although not new to the construction industry, the project team did successfully use a tile levelling spacer as preferred in Europe and America to counter tiling quality issues on the sales floor that it encountered on previous projects. This reduced material wastage and the all-important PONC (Price of non-conformance).

Belo and Kies Construction invested and trained local community members during the project with the project labour component peaking at 127 workers on site.

Some 71% of these were local workers. For Belo and Kies Construction senior management commitment is key, and it utilises SACPCMP registered safety officers to ensure it complies with processes and legislation. The company implements and believes in site visible field leadership and capturing problems in a report format. The project was completed on time and within budget with the quality being of such a high standard that the snag list as issued by the architect was completed in two weeks due to very few items being recorded as a snag.

The project's risk was managed using internal process and policy whereby Belo and Kies Construction continuously updates the programme against the baseline program and ensuring the project team is aware of any of the appointments that was required and outstanding information that needs to be issued for the project to be completed on time. ■

PROJECT INFORMATION

- **Company entering:** Belo and Kies Construction
- **Client:** Aquarella Investments
- **Start date:** 29 November 2018
- **End date:** 30 August 2019
- **Main contractor:** Belo and Kies Construction
- **Architect:** Palin & Smit Architects
- **Quantity surveyor:** Isibani Quantity Surveyors
- **Consulting engineers:** VSI Consulting Engineers

BUNDU RESERVOIR

Thembisile Hani Local Municipality is the first municipality in South Africa to use Coretruc's new innovative precast-concrete reservoir wall system.

It was deployed in combination with the company's tried-and-tested precast-concrete reservoir roof structure system to build two new 10 Mℓ reservoirs in record time.

The first reservoir was constructed in KwaMhlangu as part of a trial phase and the second in Bundu. By the time that the professional team, including main contractor, Mbako Trading & Projects, as well as consulting engineer, Monde Consulting Engineers & Project Managers, and sub-consultant, Ceenex, commenced work on the latter structure, it merely had to perfect the process. This included refining the grouting and post-tensioning processes, a key component of Corestruc's water-retaining wall system.

Monde Consulting Engineers & Project Managers and Ceenex suggested Corestruc's water-retaining wall technology to their client to significantly accelerate the delivery of the reservoirs in an extremely short timeframe.

This new command reservoir in Bundu is part of a large water-

PROJECT INFORMATION

- **Company entering:** Corestruc
- **Client:** Thembisile Hani Local Municipality
- **Start date:** October 2018
- **End date:** March 2019
- **Main contractor:** Mbako Projects & Trading
- **Principal agent:** Monde/Ceenex Consulting Engineers
- **Consulting engineer:** Monde Consulting Engineers & Project Management

supply scheme in severely water-stressed area of the country. It also comprises a weir, abstraction works, five mega-litre per day water-treatment plant, pump-booster station and 9,5 km of associated pipeline. Reservoirs are notoriously complicated and time-consuming structures to build. The construction of the wall demands absolute precision to ensure water-tightness. This slow and meticulous process is followed by the construction of the roof, which entails erecting and installing tons of scaffolding and formwork inside the structure. On most of these projects work can, therefore, only take place at one or two faces at any given point in time.

Alternatively, Corestruc's technology enables the construction of the floor, walls and roof to be undertaken simultaneously to significantly accelerate the process. Corestruc builds the roof and wall at its factories while the principle contractor completes the earthworks and the reservoir floor. This means that the critical path of the programme runs through the earthworks and foundations.

With the project located in very rocky terrain, the contractor had to undertake extensive and time-consuming blasting just to establish the reservoir platform. By the time its team had completed excavating for the pipeline, it had undertaken well over 1 300 m^3 of blasting.

It also had to use expansive grout to remove the many large boulders located close to the roof structure to avoid damaging it during the construction of the chambers and pipeline.

Based on the success of these two project, Corestruc is now preparing to manufacture another two 10 Mℓ precast-concrete reservoirs, and the company is hoping to be appointed to work on a 30 Mℓ reservoir project by a leading South African civil engineering contractor shortly. The principal contractor will undertake the earthworks, as well as construct the reservoir floor, pipeline and inlet works. Corestruc, as the specialist subcontractor, will be tasked with the swift manufacture and installation of the wall and roof of the structure.

While the cost of the system is comparative to in-situ techniques on smaller structures, it provides a more affordable means of constructing larger reservoirs.

This is where the real value of the company's technology will be realised, considering the growing backlog in water infrastructure and the pressure municipalities are under to better manage their dwindling budgets. ■

THE LEONARDO

The Leonardo in Sandton, being constructed by Aveng Grinaker-LTA for 75 On Maude is a partnership between Legacy and Nedbank. This mixed-use high-rise development will, on completion, be the tallest building in Africa. The achievement on this project has greatly contributed to the knowledge and skills set of the South African construction industry for high-rise buildings.

Specialised hydraulic climbing formwork was used for construction of the main lift core, together with state-of-the-art GPS technology to control the plumb. AfriSam's specialist team came to the rescue after the initial material supplier had to be changed when failures occurred in critical elements, resulting in poor quality and blocked pump lines. The AfriSam Wynberg team met the challenge head-on and with very little delay to the construction schedule, the concrete casting was back on track within specification.

To counteract friction stresses in pumping concrete at the heights required on this project, the aggregate size was reduced from the conventional 22 mm to 13,5 mm and 9,5 mm. Individual columns were cast in a single pour of 55 m^3 of concrete and 19 tons of steel reinforcing was placed inside the 11 metre-high walls. Hi-tech sonic vibrators were successfully used for optimum compaction.

Specific accolades go to the concrete team for producing quality concrete consistently, always on-time to guarantee uninterrupted construction.

One of the greatest challenges on this project was the vertical concrete pumping height of 257 metres. To overcome this challenge and to avoid any blockages in a 200 metre plus pipeline, specially formulated concrete mixes were used for optimal performance. A superplasticiser was used to ensure a five-hour workability of the concrete mix, which also allowed for potential traffic delays delivering to site. While this mix increased workability, more precautions had to be taken to counteract friction stresses in the placing pipes and between the concrete/formwork interface. To this effect the normal aggregate size of 22 mm for structural concrete was reduced to 13,5 mm and 9,5 mm. Concrete for this project was being supplied on a 24-hour basis to achieve the very tight seven-day floor-to-floor cycle, placing extra demand on the supply team.

To control the vertical alignment of The Leonardo state-of-the-art specialised GPS technology was used. This technology is based on a series of automated sensors employed to deliver precise and reliable coordinates on demand, not influenced by wind loads, crane loads, construction sequence or other factors. These coordinates are used to control the position of the hydraulic climbing and slab edge prior to each concrete pour.

This project, more so than many others, called for continuous discussions between the developer, architect, engineer and the contractor. ■

PROJECT INFORMATION

- **Company entering:** AfriSam
- **Client:** 75 On Maude
- **Start date:** 2015
- **End date:** December 2019
- **Main contractor:** Aveng Grinaker-LTA
- **Principal agent:** Legacy Group
- **Concrete supplier:** AfriSam

CHRISTIAN REVIVAL CHURCH ON WITKOPPEN, JOHANNESBURG

The new Christian Revival Church (CRC) on the corner of Witkoppen and Riverbend Roads is an architectural and structural-engineering feat that showcases excellence in the design and application of steel and concrete technologies.

It also bears testament to the skills and capabilities of DBM Architects and Fortem Consulting Engineers, as well as the principal contractor, Mike Buyskes Construction, which executed the technically complex design with meticulous precision.

The principal contractor was also supported on site by a highly competent team of specialist subcontractors and suppliers.

Among these companies were United States-based Spray-Lock Protection, as well as its South African agent, Creative Engineering, and approved applicator, Concrete Junction. They played an instrumental role in assisting Fortem Consulting Engineers devise a unique means of waterproofing the large elevated parking area to provide construction cost-savings for the client.

Despite the extremely complex nature of the project, it was completed on schedule.

The new flagship church will serve as a blueprint for other CRC churches in the country.

Built to accommodate as many as 6 000 churchgoers, the church includes a world-class auditorium, a church for children and youth centre, as well as facilities for the recording and broadcasting of sermons and a dedicated administrative wing.

Complementing the open parking area is an 8 000 m² elevated parking facility that is able to accommodate 1 100 additional vehicles on this highly congested site.

The public face of the structure was designed to have a landmark value, while also being clearly legible and transparent to the public.

DBM Architects designed a structure that celebrates certain elements of the building, such as the triple-volume glass façade which is transparent and welcoming, allowing southern light to flood into the entrance atrium and public space. It also provides arresting internal views of the building, including the striking spiral ramp in the entrance hall.

Constructing the roof structure was an extremely complex undertaking. The curved 'Toblerone' main support structures that span an opening of 68 m were fabricated from circular tubular sections of varying diameters and wall thicknesses. This ensured that they matched the varying spans required as a result of the intermediate curve in the plan and the concrete support beam that heads the back wall of the main auditorium. To ensure that all of the trusses were of the same rounded shape, they were fabricated incrementally by Tass Engineering in a layout jig of about 30 m in length.

Adding another level of complexity to this aspect of the construction programme, walkways in the lower portion of the V-shaped trusses also had to be mounted on welded brackets on the bottom chord at about 920 mm.

The trusses were fabricated in transportable lengths according to their shape and curvature and bolted together with stiffened pipe flanges of varying thicknesses.

Mobile cranes were used to lift and place them in areas where the on-site tower crane was unable to provide the necessary reach. Considering the close tolerance between the perimeter ring beams, the suspended sections had to be carefully manoeuvred onto the holding down bolts.

The spiral ramp at the car park entrance was fabricated in a specially-designed jig framework to accommodate the various unsymmetrical support locations. ■

PROJECT INFORMATION

- **Company entering:** Fortem Consulting Engineers and Creative Engineering (Spraylock Concrete Protection)
- **Client:** Christian Revival Church
- **Start date:** September 2017
- **End date:** March 2019
- **Main contractor:** Mike Buyskes Construction
- **Architect:** DBM Architects
- **Project manager:** CRC
- **Quantity surveyor:** Mellet Partnership
- **Consulting engineer:** Fortem Consulting Engineers

DURBAN POINT PROMENADE

Durbanites are in for a treat with the multi-billion Rand renovation of the Durban Point Waterfront. Dubbed the 'Modern reincarnation of the old Durban', the developers are using words like 'breathtaking, unimaginable, and magnificent' to describe just how the new Durban Point Waterfront will be.

The Point Promenade was designed with a suspended ground floor slab, with ground beams supported on CFA piles, pile caps and associated connections. In the very unlikely occurrence of a massive storm surge breaching the high tide mark, the foundations together with a sheet pile wall would ensure the structure remains intact. To mimic the habitat of waves gently caressing the shoreline, the cantilever on the front (sea facing) side of the promenade was designed with lines and curves.

All concrete was cured using Sika Antisol E curing compound. Separol GU ZA shutter release oil was used to provide an excellent off shutter concrete finish on all concrete columns.

All expansion joints on walls and facades on the lower club level were primed and sealed using Sika Primer-3N and Sikaflex Construction. For the expansion joints in the lower club and promenade level Sika's closed cell polyethylene backing cord was used as a joint former, followed by Sika Primer-3N as a joint primer to the face of the joints followed by Sikaflex Pro-3i-cure.

Given the importance of the joints and the requirement for a total waterproof seal; Sika Combiflex SG bandage system was used as the primary seal. On the Promenade level a two-step waterproofing solution was required to ensure water tightness on the upper deck due to the Point Watersport clubs being below. Sikadur-52 ZA, which is a low viscosity crack injection resin, was used to permanently fill all shrinkage cracks. Sikalastic-152, was reinforced using the Sika glass fibre mesh #155, ensured a watertight barrier over all these shrinkage cracks. All the stainless steel handrails along the Promenade were anchored using SikaGrout-212. In addition to the wide range of products used across the site, SikaTop Armatec-110 Epocem bonding primer was used with our Sika Monotop range of mortars for general concrete defects.
To counter the possibility of graffiti, and facilitate its removal, Sikagard-850 AG, a single component anti-graffiti coating, will be used on the northern and southern side of the promenade including all signage. Sikagard-705 L Silane was used as a concrete protection treatment on the front face of the structure below the cantilever, against the ingress of chlorides from the marine environment.

A great achievement for the Steffanutti Stocks team was to complete a project of this magnitude, from demolishing existing structures to completion in 18 months, without any delays. To keep to such a tight deadline the team worked exceptionally hard. They managed to cast 20 000 m^2 of concrete to suspended slabs in 6 months – a total of 8 600 cubic metres. ■

PROJECT INFORMATION

- **Company entering:** Sika South Africa
- **Client:** Durban Point Waterfront Development Company
- **Start date:** 17 January 2018
- **End date:** 30 September 2019
- **Main contractor:** Stefanutti Stocks Coastal
- **Architect:** Iyer
- **Quantity surveyor:** MLC Quantity Surveyors
- **Consulting engineer:** Nako Iliso

MANUFACTURE OF PRECAST CONCRETE INVERTER STATIONS BASES

CoreSlab was appointed by Elettronica Santerno South Africa to manufacture precast-concrete inverter station bases for two new utility-scale solar power stations that are being built in the Northern Cape.

Elettronica Santerno South Africa is a subsidiary of Italian Elettronica Santerno SpA, a leading international designer and manufacturer of, among other products, high quality modular inverter stations for the solar industry. The company currently has more than 850 MW of inverter-based solutions in its 2019 portfolio.

In February this year, Elettronica Santerno South Africa was selected to design, manufacture, install and commission 34 inverter stations, as well as the associated supervisory control and data acquisition system on behalf of the engineer, procure and construct contractor of the two solar farms. These turnkey contracts, which are jointly valued at about EUR11-million (R160-million), further cement the company's strong presence in South Africa where it has already installed inverter stations with a total capacity of about 435 MW.

CoreSlab has benefited immensely from the training and support it has received from Elettronica Santerno South Africa, especially in terms of record keeping for quality assurance. The company was one of a few precast-concrete specialists that were willing to adapt to the extremely onerous traceability and quality assurance requirements for these high profile projects.

The precast-concrete bases are critical components of Elettronica Santerno's 'plug-and-play' solution. ■

PROJECT INFORMATION

- **Company entering:** CoreSlab
- **Client:** Elettronica Santerno South Africa
- **Start date:** April 2019
- **End date:** September 2019
- **Main contractor:** Elettronica Santerno South Africa

MAURITIUS MULTISPORTS COMPLEX

The Mauritius Multisport Complex was the venue for the 2019 Indian Ocean Island Games. Franki Africa was appointed as the geotechnical contractor responsible for the design and construction of the foundation piling for the Stadium, Skydeck, Aquatic Centre and Multi-Purpose Arena.

Ground improvement and a variation of piling solutions best suited for each structure were proposed for the site. The combination of the techniques was not only economic but efficient too as all the plant required was readily available on the island, ensuring an early start to the project and resulting in a predicted cut down in production time under normal circumstances.

The construction of the Driven Cast In-situ, enlarged-base pile entails bottom driving of the tube to a specific depth, formation of the base and casting of concrete whilst withdrawal of the casing. For this project in particular, the pile hole will be predrilled to reduce heave during driving. Once the predrilling was complete, the casing was advanced by driving on a plug of gravel or sand which arches between the tube at the toe of the tube. The founding depth was either predetermined or based on a driving set criteria which indicated suitable founding material. Large diameter cased auger piles were socketed into the basalt rock at varying depths corresponding to the different sites. The pile hole was drilled by advancing the casing and the auger flight simultaneously in the soil section. Once the rock was encountered, the socket was then drilled using rock drilling flight whilst the casing remained at rock level. The pile hole was cleaned using a cleaning bucket and concrete was placed using the tremie as per standard methods. The project facilitated community involvement during the construction phase; Franki employed between 90% of its labour force from local communities.

Following geotechnical investigations, it was discovered that the ground conditions were worse than expected and deep foundations were required. Franki gave diversified solutions best suited for each structure and its conditions. The introduction of a combined solution of ground improvement (rigid inclusions) and mixed piling solutions really had a positive impact on the budget and programme. ■

PROJECT INFORMATION

- **Company entering:** Franki Africa
- **Client:** Mauritius Multisport Infrastructure
- **Start date:** June 2018
- **End date:** November 2018
- **Main contractor:** China State Construction Engineering Company
- **Architect:** Ruben Reddy Architects
- **Project manager:** Hooloomann & Associates
- **Quantity surveyor:** MLC Quantity Surveyors
- **Consulting engineer:** Mott MacDonald

SA AIRLINK BONAERO PARK

The client, SA Airlink, refurbished existing premises, and planned additions, including simulators, advanced training facilities with elegant corporate offices, new and improved passenger direct boarding and dis-embarkment lounges outside of the main O.R Tambo domestic departures area. This was all constructed on grounds owned by the Airports Company South Africa.

SA Airlink's existing hangers and administration block were started on first in an attempt to keep the essential business core operating with the least amount of disruption.

Phase 2 commenced before phase 1's practical completion in an attempt to achieve deadlines specific to the aviation industry. It consisted of the innovative introduction of two flight simulators, designated to offer aspiring young pilots across Africa the chance to be trained in and on the SA Airlink carriers.

Besides the simulators, refined corporate management areas were added, placing the chain of command directly within the entire training facility as well as the business at hand, allowing the SA Airlink team a total hands-on management approach.

The project was constructed within an operational international airport, so simple tasks such as material delivery, importing fuel for plant, daily crew access through the security cordons with tooling and litter control after crew, and rest times all became important and required dedicated supervision and a planning strategy.

The attention to detail ranged from basic logistics to serious design considerations encompassing noise reduction suitable for the proposed SA Airlink corporate, administrative and training unit that is situated approximately 100 m from the main north bound exit runway.

From a practical perspective, the noise reduction was a challenge for Thanda Gubha, as the perimeter of the first floor training and corporate offices around the concrete core were constructed in a structural steel carcass clad in IBR or equal and approved alternate roof sheeting, with a loose insulation blanket behind the IBR fitted by the roofing contractor.

To get to an approximate 85%-90% noise reduction, Thanda Gubha opted to clad the inside of the corporate area and senior pilots offices in a combination of flush plastered ceiling grid and heavier mild steel insertions to overcome the design which was not vertical to horizontal, but a shallow vertical parabola.

Thanda Gubha finished their portion of the works on time, paying particular attention to quality in-build and again during a strict de-snag process leaving a proud product behind. ■

PROJECT INFORMATION

- **Company information:** Thanda Gubha Projects
- **Client:** SA Airlink
- **Start date:** June 2017
- **End date:** January 2018
- **Main contractor:** Belo and Kies Construction
- **Architect:** Skylan Architect
- **Quantity surveyor:** Quanticost
- **Consulting engineer:** CKR Consulting Engineers

CHRYSO VERTICART AT THE LEONARDO

The Leonardo rises majestically above the Sandton skyline, its iconic stature demanding to be noticed. What will also be noticed is the series of large-scale artworks throughout the Leonardo that The Trinity Session, a contemporary creative production team, was commissioned to install. These showcase statement pieces from local artists and crafters.

This creative approach followed in the footsteps of Leonardo, the visionary inventor, with the visitor being exposed to a series of artworks creatively depicting the four elements – earth, fire, wind and water. Orchestrated by The Trinity Session the aesthetic journey starts in the ground floor entrance, with the movement of the earth's surface represented by the sculpted rock layers that wrap the staircase vertically, taking the visitor through time as he ascends the stairs. The visual creation of the impact of tectonic shifts, shaping the landscape we now inhabit, called for an earthy, robust medium using the very materials that man has extracted from earth.

CHRYSO, a global specialist in the chemistry of building materials, has been helping construction professionals by providing innovative techniques and technologies, which allow greater creativity within the built environment.

VerticArt, a specialised CHRYSO product, presented the ideal medium for this project. VerticArt is a cementitious mortar specifically designed for application to vertical surfaces, to create reliefs and textures which can be sculpted and carved, allowing architects and designers to explore the decorative potential of concrete. This project, which used 4,5 tonnes of VerticArt covering

140 m^2 and scaling a height of 15 metres (three storeys), required the specialised skills of eight individual artists, in conjunction with the CHRYSO technical team. It also called for extensive laboratory testing and experimentation. The VerticArt mural took seven weeks to complete by a dedicated team of artists.

The scale, innovative material, product methodology and conceptual approach of The Trinity Session ensured that the programme was not just a financial prospect for the materials supplier and the artistic team, but also an opportunity for upliftment and growth for many of the artists, including young emerging creative talent.

This massive and bold artwork is a first for CHRYSO's VerticArt, both in South Africa and worldwide.

VerticArt is a specialised cementitious mortar specifically formulated for vertical application. The chemical make-up of the product allows for a vertically applied maximum thickness of 150 mm, making it ideal for relief three-dimensional (3D) artwork.

Specialised retarding chemical admixtures in the product allow for a zero to 48 hour carving window, ensuring that the artists had enough time in which to perfect the application and sculpting processes necessary, to create the required 3-D effect.

The off-shutter concrete substrate was prepared by affixing a stainless-steel mesh to the vertical wall as reinforcement. A skim key coat was applied to this mesh before application of the VerticArt.

To create the required relief work depicting a cross-section through earth, showing the strata formed by tectonic plates shifting and colliding, with its intricate patterns of geological formations, the VerticArt was applied in various thicknesses and then carved and textured to the exact creative brief. The required textures were carved and formed using palette knives, trowels, chisels, straight edges and wire brushes. ■

PROJECT INFORMATION

- **Company entering:** CHRYSO Southern Africa
- **Client:** 75 On Maude
- **Start date:** 2015
- **End date:** December 2019
- **Main contractor:** Aveng Grinaker-LTA
- **Principal agent:** Legacy Group
- **Specialist supplier:** CHRYSO Southern Africa
- **Art:** The Trinity Goup

CONSTRUCTION OF MAIN ROAD 118 BETWEEN ORANJEMUND AND ROSH PINAH, NAMIBIA

The construction of Main Road 118 exhibited ingenuity, originality and innovation in several instances.

The first 25 km out of Oranjemund lie in the storm-swept belt of the Skeleton Coast proper, an area of shifting sand dunes subject to the power of three or four wind and weather changes in a day and not accommodating of a stably positioned road.

The concept of cladding in wind-blown sand desert originated in the mind of the engineer as the development of the theory that sand particles, once airborne, stay suspended as long as a critical velocity is maintained. A sudden change in ground profile will affect airspeed and will result in the dominance of gravity over the sand particle. In a road, the relatively sharp changes in profile at the toe of fill, shoulder break points, side drains and the top of cutting are enough to change air velocity enough to cause extensive sand deposit on the road surface: certainly enough to be dangerous for speeding vehicles.

The first requirement in achieving a sand-free road is to smoothen

PROJECT INFORMATION

- **Company entering:** SMEC South Africa
- **Client:** Namibian Roads Authorities
- **Start date:** January 2014
- **End date:** August 2018
- **Main contractor:** Raubex
- **Principal agent:** VKE Namibia Consulting Engineers
- **Quantity surveyor:** VKE Namibia Consulting Engineers
- **Consulting engineer:** VKE Namibia Consulting Engineers

the profile. This was done by constructing slopes rounded to a radius of 30 metres between the shoulders and natural ground.

It had not escaped the notice of the Engineer that the surface of the vast gravel plains in some areas of the Namib Desert is devoid of sand. This is because tyre tracks, slightly depressed below the surrounding level, never fill with sand. The simulation of this cladding on the rounded road profile has the effect of keeping the road verges free of sand.

Part of the original road crossed the Gomtsawib River three times, and it was the engineer's specific aim to rectify this hydraulic inconvenience at a river that showed signs of recurrent violent activity. The ingenuity of the cladding was surpassed by the toil of the Orange River Defile. The defile between river and mountain was a narrow passage too tight for a modern road and sometimes flooded.

Having chosen the option of upgrading the mine road for solid economic advantages, it now fell to the lot of the engineer to finalise the precise alignment of the route bearing in mind the expected environmental requirements, the usual geometric and hydraulic constraints and also the three recognised areas of physical difficulty, namely the 26 km dunes traverse, the triple crossing of the Gomtsawib River in Niklaas Pass and the Orange River Defile.

The exceptionally tight schedule between appointment of VKE Namibia and the contractor being on site did not allow sufficient time for a complete design which needed a materials investigation, a terrain survey, affected public participation especially the mining authorities, a full hydrological study, intense examination of alignment and cost options, and the preparation of contract documents and bills of quantities.

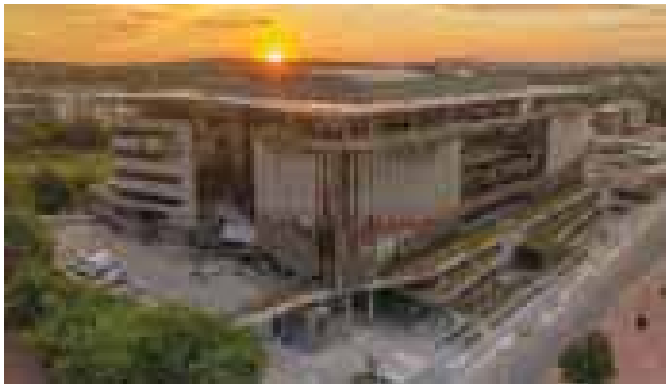
However, the project was completed under this fast-track schedule and in the face of enormous technical, administrative and financial difficulties.

Techniques in material management were employed to reduce the deleterious effects of salt and clay, both of which can be harmful in pavement layers. Constant vigilance was required at the crushing plant to avoid clay-contaminated material being taken to the crusher, and the careful isolation of products unavoidably containing fine concentrations of clay.

The Roads Authority places a lot of emphasis on quality control and expects its appointed consultants to ensure that the contract specifications are met. ■

GROWTHPOINT'S LAKESIDE OFFICES

The Growthpoint Lakeside Office is a nine-storey commercial office development in the Centurion CBD, with a 5 Star Design Green Star rating. It stands on Inherent Hazard Class 8 dolomite, the most critical dolomite hazard class within South Africa.



The site posed severe geotechnical challenges that have impacted previous developments. This building is evidence that, with sufficient site information and knowledgeable experts, a cost-effective solution can be found to overcome severe challenges whilst addressing the client's needs.

The construction process of the 82 m x 68 m x 2,25 m thick raft is extremely complicated, necessitating the placement of 13 200 m^3 of concrete, and 1 500 t of reinforcement steel. The raft was divided into nine main continuous concrete pours of 1 400 m^3 each, with a smaller 10th pour thereafter.

The entire pouring system was coordinated between the design team and the contractor to ensure the requirements of the project programme and the technical difficulties were balanced while casting the raft.

Thermal progression of each concrete pour segment was tracked to determine the appropriate time to strip and cast the next segments as well as ensuring the heat of hydration stayed within the predefined limits. The results were used to adjust the concrete mix where necessary.

Attention was paid to curing methods and relative settlement monitoring. Weather warning systems were put in place to ensure safety of personnel and the pour, especially during the Gauteng summer afternoon thunderstorms.

The engineering design was state of the art, with the latest in available software ensuring that the designs were fully integrated across all disciplines. Revit was used as the basis modelling program for all disciplines, with 4D and 5D compatibility to facilitate with construction and measurement. The building shape and

This project also won the AfriSam Innovation Award for Sustainable Construction.

primary structure was determined based on the feasibility of the foundations. The entire concept of the structure, its basic footprint, overall number of floors and GLA were dictated by a process of engineering optimisation in conjunction with cost assessment in order to develop a system that was feasible. Once a solution was found that was viable, AMA Architects took the engineering solution and created from it the beautiful aesthetic statement that currently stands.

Dolomitic ground is a severe problem from a civil engineering perspective. Changes in water level is the primary cause of dolomite sinkholes. This is frequently caused by leaking services, excessive dewatering and non-maintained systems.

Numerous innovative techniques were implemented here:

- During construction a slope was maintained on all surfaces to ensure that no ponding occurred. This needed to work in conjunction with the environmental considerations that no polluted runoff would enter the adjacent lake
- Weekly inspections were conducted by a dolomite risk manager to ensure that all dolomitic considerations were being adhered to
- Double sleeved pipes were used between manholes with float switches in manholes linked back to the BMS system to trigger a warning in the case of leaks
- A subsoil monitoring system was implemented to ensure that if the municipality services experienced leaks, an alert would sound on the Building Management System (BMS) and the municipality could be notified. ■

PROJECT INFORMATION

- **Company entering:** AECOM
- **Client:** Growthpoint Properties
- **Start date:** February 2017
- **End date:** March 2019
- **Main contractor:** WBHO
- **Architect:** AMA Architects
- **Principal agent:** GladAfrica
- **Consulting engineer:** AECOM
- **Mechanical engineering, Environmental and Green Star:** Aurecon
- **Earthworks contractor:** Stefanutti Stocks

AZAMBI HYDROPOWER PROJECT

The 11 MW Azambi Hydroelectric Project is located in a remote area of the Orientale province in the Democratic Republic of the Congo. The Kibali Gold Mine, a subsidiary of Barrick Gold Corporation, has developed and is operating the project to support the increasing power demands of one of the largest gold mining operations in Africa.

Knight Piésold worked closely with Kibali Gold Mine to develop a purpose-built, low-impact, and cost-effective run-of-river hydroelectric project that produces approximately 64 GWh of renewable, reliable electricity each year to power the mine.

A portion from the mine's power grid capacity is provided free to local communities, reducing their reliance on deforestation for energy supply. The project will ultimately become a legacy asset for local communities once the mine has reached its end of life.

Knight Piésold provided all engineering services up to the successful completion of the project. A summary of the key innovations incorporated into the project components included:

- The overall project concept was optimised to deliver a low-impact, continuous power by run-of-river operation, utilising local materials, labour, and contractors. This included optimising the location of the diversion weir in order to reduce its height and cost and to allow for the construction of a rubble masonry concrete (RMC) dam that would promote labour intensive construction (i.e., local training, community involvement and employment).
- The intake structure was designed to facilitate bed load sediment removal by including a forebay sediment trap and vortex desander to provide both continuous sediment removal downstream of the trash rack and a guaranteed continuous ecological flow release.
- The headworks were positioned on the left bank of the river, which has gentler topography and a westerly river curvature, resulting in a shorter length of the power canal to attain the required head drop for the turbine rated conditions.
- The 185 m-long RMC diversion weir with adjacent radial gate allows large flood discharge capacity. The RMC weir construction was selected for its low cost and to allow unskilled labour to be trained and work on the project.
- The 1,1 km-long power canal with emergency spillway was designed for the required flow capacity and positioned on the topography so that it did not require additional canal lining, thereby reducing costs and promoting the use of local materials.
- A surface powerhouse was configured for the two horizontal axis pit Kaplan type turbine-generator units.
- Overall optimisation of the project increased the project's initial average annual energy estimation by approximately 5,3 GWh/year, equivalent to USD19-million per year in energy savings

Azambi HPS became the first hydropower station on Kibali Gold Mine that was awarded exclusively to Congolese construction enterprises, with the main role players comprising Inter Oriental Builders, Trinco and Top Engineering Services.

The social benefits that construction of the hydropower scheme brought to the local, rural population of the Watsa village were integral in the design premise adopted and particularly the weir type finally applied.

Despite the station becoming a legacy asset to the community in the longer term, community involvement during the short-term construction activity itself allowed a source of income and upliftment and an opportunity to facilitate transfer of skills into the local community.

Construction methods that would maximise the local labour content were accordingly given preference.

At the peak of construction, over 700 people were working directly on the project, with over 95% being residents. Safety performance was high, and no serious injuries were recorded. ■

PROJECT INFORMATION

- **Company entering:** Knight Piésold Consulting
- **Client:** Kibali Gold Mine (a JV between Barrick Gold, AngloGold Ashanti and Sokimo)
- **Start date:** May 2015
- **End date:** July 2018
- **Main contractor:** Inter Oriental Builders
- **Consulting engineer:** Knight Piésold Consulting

Category: Consulting Engineers

SPECIAL MENTION

ROSSLYN BREWERY COGENERATION PLANT

AB InBev identified the need for an alternative source of reliable and affordable energy to support its Rosslyn Brewery.

This included the need for process steam, hot water and electrical generation in a Combined Heat and Power (CHP) plant. Hatch was appointed to provide EPCM services for the design and construction management of the entire CHP plant. The facility is powered by a gas turbine and associated Heat Recovery Steam Generator (HSRG) that provide the following:

- 4 MW of electrical power
- 28,5 ton/hr of saturated steam, and
- 40 ton/hr of hot water (90°C)

Included in Hatch's scope was the upgrading of the gas supply from the existing Sasol natural gas line to the Rosslyn Brewery, full integration with the current electrical reticulation system as well as planned provision for a future Solar PV installation.

The project includes cutting edge technology involving virtually all aspects of engineering. In addition, the plant was constructed in a very confined space within an operational plant using Original Equipment Manufacturers (OEMs) who were unfamiliar with South African legislation, codes and standards. As the EPCM, Hatch was responsible for co-ordinating all aspects of the design, procurement, construction, installation and commissioning of the plant.

The additional hot water recovery system, which reheats the cold process stream and integrates it with the existing process, was a completely new and unique design. It involves a closed loop hot water circuit, recovering heat from the turbine exhaust gas via a Heat Recovery Steam Generator and heating up one of two process streams depending on plant requirements.

Although the gas turbine and heat recovery steam generator technologies are well established, this project was the first for the OEM suppliers in South Africa. They were totally unfamiliar with the local legislation, codes and standards. The Hatch team successfully guided all international contractors and suppliers throughout the design and construction phases.

PROJECT INFORMATION

- **Company entering:** Hatch
- **Client:** AB InBev
- **Start date:** May 2017
- **End date:** August 2018
- **Main contractor:** SMEI
- **Principal agent:** Hatch
- **Quantity surveyor:** Kaofela Quantity Surveyors
- **Consulting engineer:** Hatch

Despite the original budget being slightly exceeded due to scope increases and unplanned delays due to unseasonal rain, the project still has a payback period of less than four years, thus providing an extremely beneficial IRR to AB InBev.

Hatch has provided the Rosslyn Brewery with a state of the art plant that provides the same amount of steam that was produced in its original boilers while at the same time producing 4 MW of electricity and 40 ton/hr of hot water. This is achieved through a far more efficient process that uses the same amount of gas and resulted in a project that has a financial payback of only four years. As a result, AB InBev are considering installing similar cogeneration plants in a number of their other breweries. ■

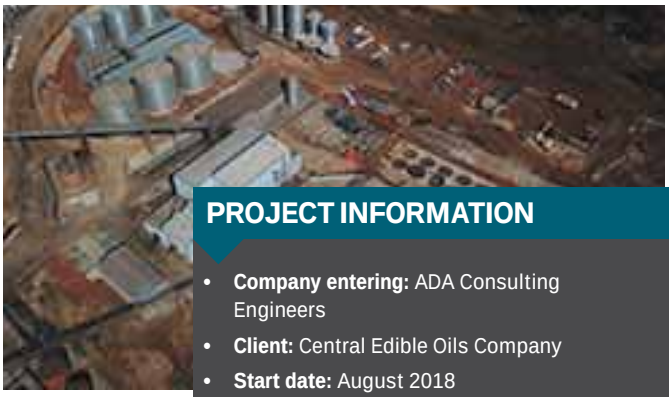
CEOCO EDIBLE OILS PLANT IN BOKSBURG,GAUTENG

Central Edible Oil Company (CEOCO), is a privately-owned company situated in SA's Gauteng region, and was established in 2010. The manufacturing plant produces large volumes of high-quality crude sunflower oil for use in the manufacture of cooking oils, margarines, and other edible products. In 2017 CEOCO embarked on an expansion project to grow their business while reducing their overall environmental impact.

In September 2017 ADA Consulting was appointed as the civil and structural consulting engineers for the CEOCO Boksburg plant upgrade, the civils construction cost being R150-million, set to be completed by November 2019. The upgrade includes roads, concrete work, civil services, structural steel works and warehouses, connectivity to the local grid, buildings and construction of the silos for storage of raw materials, as well as the end-products.

CEOCO will be 100% self-reliant on completion of the upgrade. A total of 33 storage silos and tanks have been procured for the project, and will be used to store the raw ingredients, as well as end- and by-products on site.

On completion the Boksburg plant will be one of the first in the area to run its own boilers using the by-products or husks from the sunflower seeds. In addition, the project provides much needed jobs for local communities with skilled people being employed at the plant both during and post construction. The value of the project amounts to approximately R150-million for the civils, over and above that CEOCO are purchasing boilers as well as 33 silos and tanks. The full spend including all silos, conveyors, tanks, boilers, weigh bridges, control automation etc. is approximately R450-million. ■



PROJECT INFORMATION

- **Company entering:** ADA Consulting Engineers
- **Client:** Central Edible Oils Company
- **Start date:** August 2018
- **End date:** December 2019
- **Main contractor:** Iguana
- **Architect:** MDS Architects
- **Project manager:** Proafrica Property Services
- **Quantity surveyor:** Proafrica Property Services

LOERIESFONTEIN BULK WATER SUPPLY PROJECT

Loeriesfontein is a small town in the Hantam Karoo. The town has a population of approximately 3 800 persons and is wholly dependent on groundwater for its water supply.

When the towns' existing boreholes started to fail due to lack of rains to recharge the groundwater, BVi Consulting Engineers got involved in May 2013. From May 2013 until November 2015, extensive groundwater exploration was conducted within a radius of 40 km in efforts to find sustainable groundwater sources for the town.

While the exploration drilling was continuing, BVi sourced funding from the Department of Water & Sanitation which was used to construct an emergency water supply system.

On completion of drilling and determination of sustainable yields and water quality, nine boreholes were selected for future production wells. The wellfield was located approximately 30 km south of Loeriesfontein in a deep valley, known locally as the Rheeboksfontein valley, through which the Koppieskraal River flows. The Koppieskraal River is ephemeral and only flows when rainfall occurs.
The successful boreholes are all located within this valley and along the Koppieskraal River.

The elevation of the Rheeboksfontein Valley is 660 m above mean sea-level while the Loeriesfontein reservoirs are located at 948 m above mean sea-level. This requires that all water from the boreholes must be pumped to the town. ■

PROJECT INFORMATION

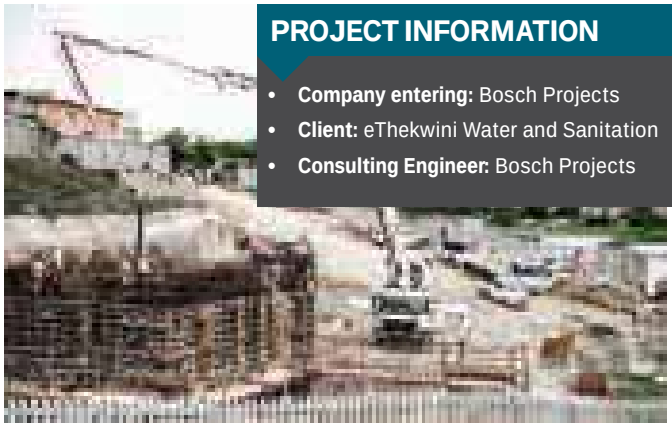
- **Company:** BVi Consulting Engineers
- **Client:** Hantam Local Municipality
- **Consulting engineer:** BVi Consulting Engineers (Northern Cape)
- **Consulting hydrogeologists:** Geoss South Africa
- **Environmental:** Consultant ENVIROAFRICA
- **OHS consultant:** Safe Working Practice
- **Principal contractor:** ASLA Construction

THE MALUKAZI PUMPSTATION PROJECT

The design and construction of the Malukazi Bulk Sewer project including Malukazi Pumpstation, was completed in February 2019 within the allocated R32-million budget. The project entailed civil design including the Pumpstation design review, a temporary Pumpstation, bulk and reticulation sewer infrastructure, roads and stormwater rehabilitation and the environmental management of water course. The electrical and mechanical components included pump and pipework design, ventilation design, lighting and electrical supply, lightning protection and telemetry.

The construction of the pumpstation was governed by the concrete superstructure which was previously partially completed in Phase 2 of the Sanitation Project considering the complexities due to the excessive ground water ingress. In addition, interim communal ablution facilities sewer flows had to be dealt with through the introduction of a temporary pumpstation, then converted into the overflow chamber at completion of the pumpstation. Despite the numerous challenges affecting the continuity of work and contractual issues with Contractors, the project was successfully completed within budget and to the highest level of quality.

There was a large co-ordination management component for coordinating the sub-specialists on the project, together with the contractors (e.g. mechanical, ventilation, fire, geotechnical, electrical, roads, and earthing contractors). ■



PROJECT INFORMATION

- **Company entering:** Bosch Projects
- **Client:** eThekwini Water and Sanitation
- **Consulting Engineer:** Bosch Projects

MPACT – FULLY AUTOMATED PAPER ROLL STORAGE FACILITY

This is the first ever automated paper mill and storage handling facility that was built in the southern hemisphere. The project comprised the design, engineering and construction of the fully automated paper reel storage facility, roll transportation system, inbound and outbound traffic logistics, vehicle weighing stations and all related mill services such as power, water, air, steam, etc. to accommodate the project.

The complete facility was designed to increase the production output of paper from waste paper recycling from 160 000 tonnes per annum to 215 000 tonnes per annum.

It should be understood that LNW Consulting Engineers and Project Managers was appointed as civil and structural engineers to the entire Khulisa project where a magnitude of other design and engineering work had to be done and executed in the existing plant area to accommodate the rebuild and modifications.

Numerous floor slabs had to be strengthened and penetrated to accommodate the equipment. Structural modifications to structures to accommodate a new starch plant and storage tank facility also formed part of the appointment.

All structures within the paper reel storage facility were laser aligned and the post tensioned floor slab was ultimately ground and finished to comply to its stringent tolerance requirement.

The paper reel storage facility was designed by LNW's in-house architect to aesthetically blend with the existing plant. ■

PROJECT INFORMATION

- **Company entering:** LNW Consulting Engineers & Project Managers
- **Client:** MPACT Operations
- **Civil and structural engineers:** LNW Consulting Engineers & Project Managers
- **Cost engineer:** LNW Consulting Engineers & Project Managers
- **Mechanical engineer:** GES Consult
- **Fire engineer:** Crossfire
- **Contractors:** Leomat Construction, Franki Africa and Terex MHPS

RECONSTRUCTION OF TWO FLOOD DAMAGED BRIDGES AT GA-NTATA

The *Sowetan* of 17 September 2013 reported: "Every summer the villagers of Ga-Ntata in Bo-lobedu near Modjadjiskloof become prisoners in their own homes, schools shut down, local entrepreneurs close shops and the villagers cannot access basic services".

This was as a result of two low level bridges that have been washed away during heavy rains that occurred between 2000 and 2005 and was not repaired. The village of Ga-Ntata is situated between two rivers which were previously only provided with low-level bridges to provide the community with access and mobility.

Roads Agency Limpopo (SOC) appointed Nyeleti Consulting at the end of 2013 for the planning, design and construction supervision of the above project. The construction phase only started in October 2015 and was completed in May 2018. The client's objective was to provide a long-term solution for the community of Ga-Ntata with continuous access and mobility, even during heavy rainfall.

The result was the construction of two new high-level standard bridges over the Motlatswi River on the north, and from the south crossing the Molototsi River. The solution also allowed for easy future upgrading of the existing gravel road network. ■

PROJECT INFORMATION

- Company entering: Nyeleti Consulting
- Client: Roads Agency Limpopo (SOC)
- Consulting engineer: Nyeleti Consulting

A Benchmark of Excellence

Nyeleti Consulting is a firm of consulting engineers that was established in July 1999. The word Nyeleti, meaning star, symbolises the high aspirations of the firm to deliver excellent service to its clients.

This majority Black owned South African company specialises in civil engineering infrastructure and is also committed to addressing the engineering needs of developing communities.

Fields of expertise:

- Road and bridge design
- Road rehabilitation and maintenance
- Dams and bulk water supply
- Flood and stormwater management
- Water and wastewater treatment
- Municipal infrastructure
- Water retaining structures
- Building structures and wet services
- Project management
- Traffic and transportation engineering
- Economic evaluation
- Construction management
- Occupational health and safety services
- Forensic investigations, including non-destructive testing
- Silo, cooling tower and chimney design
- Business process re-engineering.

Offices in Tshwane, Ekurhuleni, Polokwane, Ehlanzeni, Mbombela and Mogale

Engineered to Excel

Nyeleti
Engineered to Excel

Tel +27 12 361 3629 Fax +27 12 361 3525 E-mail info@nyeleti.co.za

https://www.facebook.com/Nyeleti https://www.linkedin.com/company/nyeleti-consulting-pty-ltd

www.nyeleti.co.za

SANI PASS PHASE 2A STRUCTURES

The KwaZulu-Natal Department of Transport is in the process of upgrading the existing Sani Pass Road (P318), which transects the uKhahlamba Drakensberg Park World Heritage Site near Himeville.

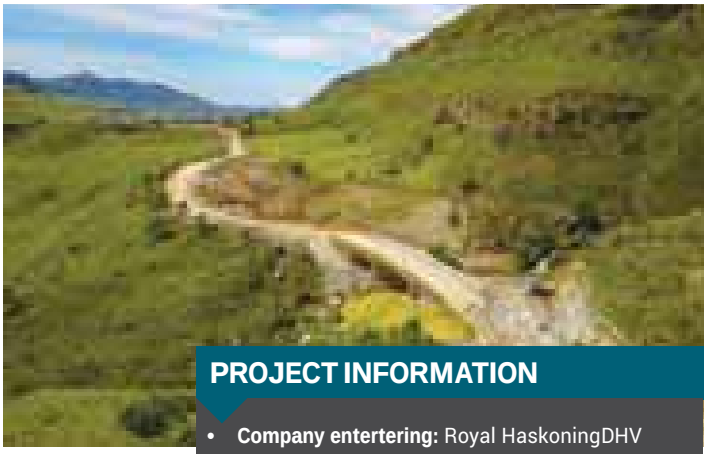
This project consists of three phases. Phases 2 and 3 have been combined into one phase now referred to as Phase 2. Phase 2a extends from km 13,6 at the old Good Hope Trading Post, which is also the boundary of the World Heritage Site, to km 25 at the South African Sani Border Post. Phase 2b will extend to the summit of the Sani Pass at the Lesotho Border post at km 33.

The construction of Phase 2a has been broken up into two separate contracts namely, one contract for the structures and another one for the roadworks. The structures contract consisted of the construction of seven culverts, one bridge and one Mechanically Stabilised Earth Retaining Wall (utilising gabion cladding) structure which incorporated a large box culvert. The construction contract for the structures has been completed, but the construction contract for the roadworks is still in progress.

This multi-disciplinary project involved the services of traffic engineers, geometric engineers, structural engineers and geotechnical engineers. The primary concerns were; safety (strength, stability, robustness), serviceability, economy, constructability, and low maintenance.

Once the structures were sized based on the hydraulic requirements, the software package Prokon was then used for the structural analysis and design of the structures and Autodesk AutoCAD was used for the preparation of the working drawings.

The existing geotechnical conditions are complicated and thus the project needed a specialist geotechnical engineer to be appointed. ARQ Consulting Engineers was appointed to facilitate the geotechnical foundation investigations and designs. ■



PROJECT INFORMATION

- **Company entertering:** Royal HaskoningDHV
- **Client:** KwaZulu-Natal Department of Transport
- **Main contractor:** Chris Africa Civils
- **Consulting engineer:** Royal HaskoningDHV/SFC Engineers/Ndizani Civil Works Joint Venture
- **Sub-consultant:** Leporogo Specialist Engineers
- **Geotechnical expert:** ARQ Consulting Engineers
- **Contractor:** Chris Africa Civils

SAPPI TUGELA TREATED EFFLUENT PIPELINE REPLACEMENT

The project involved the replacement of an existing 3,5 km gravity 1 000 mm diameter steel treated effluent pipe with an 800 mm diameter HDPE Class 10 butt-welded pipeline. The pipe route runs from the mill, adjacent to and crossing the Mandeni Stream before discharging into a dedicated discharge point along the Tugela River.

Additionally, the project involved four road crossings and the main Mandeni stream crossing. In addition to replacement of the pipeline and required valve chambers, the contract also involved the rehabilitation and protection of two concrete structures at the pipe inlet, within the mill.

The primary objective of the project was to replace the existing gravity pipeline which had reached it design life and was showing signs of fatigue and potential failure due to degradation of the steel pipe wall. A secondary objective was the refurbishment of concrete inlet structures which required rehabilitation in order to function efficiently alongside the new pipeline. A stringent requirement of the project was to ensure the continued operation of the existing treated effluent pipe as this the operation of the treated effluent discharge was a requirement for the manufacturing process at the mill.

Operational shut downs of the pipeline could be accommodated but required two weeks notification and were limited to nine hours. To accommodate for this, a two-phased approach was used whereby, in the first phase, the pipe was constructed and commissioned in its entirety above-ground.

This ensured no detrimental effects on the existing pipeline. Once the above-ground pipe was commissioned, the existing pipeline could be excavated, and the above-ground pipeline could be lifted into the existed trench during smaller three to four hour shut-downs from the mill. Pipelines of this diameter are not a common occurrence in the water engineering field, and generally are only found in bulk water and sewage operations. ■

PROJECT INFORMATION

- **Company entering:** JG Afrika
- **Client:** Sappi Tugela
- **End date:** May 2019
- **Main contractor:** Leomat Construction
- **Consulting engineer:** JG Afrika
- **Pipe contractor:** NRB Piping

DESIGN AND CONSTRUCTION OF THE 1 400 MVA SEBENZA SUBSTATION

A large portion (eastern third) of the City of Johannesburg has for many years been supplied with bulk electrical power at 88 kV from the Kelvin Power Station (Kelvin), via a bulk power line corridor consisting of 16 power line circuits. Over the years the load has grown to the present ± 450 MVA.

Kelvin is an old power station and the generation is greatly dependent on the performance of their aging generation fleet.

The integration of the planned new Modderfontein development into the Johannesburg Metro, with an ultimate load of ±450 MVA, would also increase the demand on the City Power network considerably. The need for the urgent development of an additional bulk infeed point from Eskom, in close proximity to Kelvin was identified in the City Power Electrical Masterplan of 2005.

In brief, Eskom needed a 12 bay, 400 kV, double bus-bar transmission station to cater for their long-term planning. While City Power similarly identified the need for a 1 000 MVA, 132 kV, double bus-bar substation with a minimum of 22 outgoing circuits to cater for future needs. In addition, Kelvin, in terms of their PPA with City Power, were contracted to supply 450 MVA generated power in an N-1 configuration to the City via the new Sebenza substation with the option to upgrade to two 250 MVA supplies in the future.

PSW Consulting Engineers (PSW), as a strategic partner of City Power of Johannesburg (City Power), was appointed in 2007, to conduct a feasibility study on the optimal positioning for such a new infeed substation. Several alternative positions and substation configurations were considered during this study, such as physical position, traditional outdoor layout versus compact configurations, as well as full indoor alternatives. To accommodate the reduced land area the PSW design engineers had to utilise their 40+ years of experience to produce a solution that met all the client's and stakeholder's requirements, was implementable, of a high quality standard and as compact as possible.

The most critical engineering challenge of the Sebenza project was to balance and integrate the needs of all the related parties into a single bulk infeed substation, on a relatively small site. ■

PROJECT INFORMATION

- **Company entering:** PSW Nyeleti JV
- **Client:** City Power of Johannesburg
- **Main contractor:** Consolidated Power Projects

SOUTH POINT JORISSEN STREET STUDENT ACCOMMODATION

Situated in densely populated Braamfontein, Southpoint Jorissen Street is the first greenfield project to be constructed in downtown Johannesburg in the last 20 years, making this project unique.

With this serious lack of suitable student accommodation in close proximity to tertiary institutions, Southpoint Jorissen Street has been built to provide student accommodation that is situated across the road from Wits University on Jorrisson Street.

This 18 storey building has been designed to provide the maximum amount of student accommodation units while remaining aesthetically pleasing, by employing the latest in space saving design technology and fittings while ensuring optimal quality of life for the students.

The site chosen for the development had a few very old 2 and 3 storey uninhabitable buildings in a very bad state that had to be demolished. The 18-storey building with a floor of basement parking provides 2 000 beds on 16 floors with common areas that include spaces for recreation, communal study areas and with the ground floor being a defined retail area focused on the needs of these students.

The Southpoint Jorissen Street Student Accommodation project commenced in February 2018 and is expected to be completed in November 2020 in time for the 2021 academic year, the first greenfield project in the downtown Johannesburg area of Braamfontein to be built in the last 20 years.

The primary structure has an insitu reinforced concrete frame with masonry perimeter cladding. The building is supported on 370 section precast reinforced 350 x 350 mm cross section concrete piles. These were driven to an average a depth of 26 metres deep into the underlying graben geological formation. The weak graben geology and the proximity of the existing adjacent buildings dictated the use of continuous flight auger (CFA) soldier piles to be used around the perimeter of the property to enable the construction of the basement. Apart from the challenging geology of the area and the limited site access due to the nature of construction in a city environment, ADA Consulting employed a number of innovative technologies on the project, one of which is the Hebel Block.

Due to the size and weight saving provided by the utilisation of Hebel block there is also a substantial saving on crane time. ■

PROJECT INFORMATION

- **Company entering:** ADA Consulting Engineers
- **Client:** South Point Property Investments
- **Start date:** November 2017
- **End date:** November 2020
- **Main contractor:** WBHO Construction
- **Architect:** LYT
- **Project manager:** LYT
- **Quantity surveyor:** EthiQS
- **Consulting civil and structural engineers:** ADAConsulting Engineers

THE DOCKLANDS – 70 PRESTWICH STREET APARTMENTS

Situated in the scenic De Waterkant in Cape Town's sought after Prestwich Street and located less than 200 m from the V&A Waterfront Marina, The Docklands is a nine-level, mixed-use building that consists of 200 m retail, 134 apartments and 160 parking bays.

Aurecon was appointed as the structural engineer to help realise the client's vision for an affordable, yet upmarket apartment building within walking distance of the prestigious Cape Town V&A Waterfront.

The site housed an existing office building with one level of semi-basement parking, ground floor parking and three levels of offices above that. The proposed new development required three levels of parking and six levels of apartments over the full footprint of the property.

Tight budget and time constraints meant that the construction programme needed to be fast-tracked. This negated the option to build from scratch. In response to this, the project team came up with an innovative conceptual design that incorporated the existing building. This solution required an additional two basement levels to be constructed below the existing four-storey structure, while simultaneously constructing four levels above.

The project team's technical prowess enabled them to design an innovative engineering solution that would enable the centre of the building to be kept in place while excavating and constructing new basements below and adding new floors on top.

The luxury development is destined to become an architectural icon in De Waterkant, with its cutting-edge architecture and hi-tech interior finishes – a modern new addition to Cape Town's city skyline. Most importantly, the successful completion of this project marks a significant paradigm shift in what is possible and achievable in terms of structural engineering in South-Africa. ■

PROJECT INFORMATION

- **Company entering:** Aurecon
- **Client:** FWJK Developments
- **Architect:** FWJK Architects
- **Project manager:** FWJK Project Management
- **Quantity surveyors:** FWJK Quantity Surveyors
- **Structural and civil engineer:** Aurecon
- **Main contractor:** JLK
- **Piling contractor:** Franki Afrika
- **Structural steel contractor:** LJ le Roux Steel

THE LEONARDO BUILDING, 75 ON MAUDE STREET, SANDTON

The Leonardo building is to be the tallest building in Africa, 233 m from street level . Initially the consulting engineer had no idea how many levels the building was going to have until about mid-way.

PROJECT INFORMATION

- **Company entering:** Wingrove Consulting Engineers
- **Client:** Legacy Development Management
- Start date: November 2015
- **End date:** End of 2019
- **Main contractor:** Aveng Grinaker-LTA
- **Architect:** Co-Arc International Architects Inc
- **Project manager:** Legacy Development
- **Consulting engineer:** Wingrove Consulting
- **HVAC:** Improvair

In the end, it was decided to go with a Samsung Variable Refrigerant System (VRF). This system is designed in such a way as to use the building's orientation and heat load to its maximum advantage. The heat recovery system provides the heat which is rejected from the air conditioning system to the building's hot water system, making it extremely energy efficient. The entire system is monitored externally through a building management system which helps with the maintenance and quick response to any breakdowns.

In addition to the system's various smart technologies aimed at reducing environmental impact, the project has helped to create jobs for the many individuals who helped to plan, install and commission the system, with the job creation component being highly sustainable since routine maintenance in the future will continue to provide employment opportunities.

In order to successfully be able to use a VRF system on a building like The Leonardo, plant areas needed to be created for the outdoor units. It was decided to have double volume plantrooms located on approximately 50% of the floor area at various intervals up the building. This enabled the building to increase in height without having to change the AC plant. The building's final height became flexible and the client could decide what he wanted without having to incur major costs. Moreover, thanks to the system's clever and compact design, installation was greatly simplified and ultimately helped the client to save on commissioning costs.

With a growing global consciousness around protecting the environment and reducing the carbon footprint careful consideration was given to selecting a system that would perform optimally while minimising its impact on the environment thanks to superior energy efficiency. Each plantroom has its own dedicated fresh air system which filters the required amount of outside air into each part of the building thus making the occupants as comfortable as possible. The plantrooms are also separated from the rest of the building in a protected environment which won't affect the rest of the building. The VRF System has been designed with safety in mind, especially when it comes to wiring, with the outdoor unit protecting itself should the communication cable accidentally be connected to a power terminal. The selected HVAC subcontractor had a dedicated person on site daily to ensure quality work is carried out and a very high standard is maintained at all times. The site was run like a well-oiled machine; each worker had a specific job and had to work day and night to ensure that everything was installed and working on time. But, in the end, all the hard work paid off. Needless to say, there had to be strict cost control and every little thing had to be accounted for to make sure nothing was lost or discarded along the way. ■

THE LEONARDO

The first major tower building to be constructed in South Africa in decades, The Leonardo, is a complex mixed-use high-rise building which in these troubled times, has been termed a beacon of hope. It epitomises the success possible when a strong vision of a potential future drives collaboration and energy in the construction industry. Remarkably, the 55 storey building was built on the brownfields site of a previously failed development.

The design and construction of the fast track project had to account for existing excavations and foundations from a previous failed development project. The excavation had been abandoned for several years, exceeding the temporary design life of the lateral earth support system.

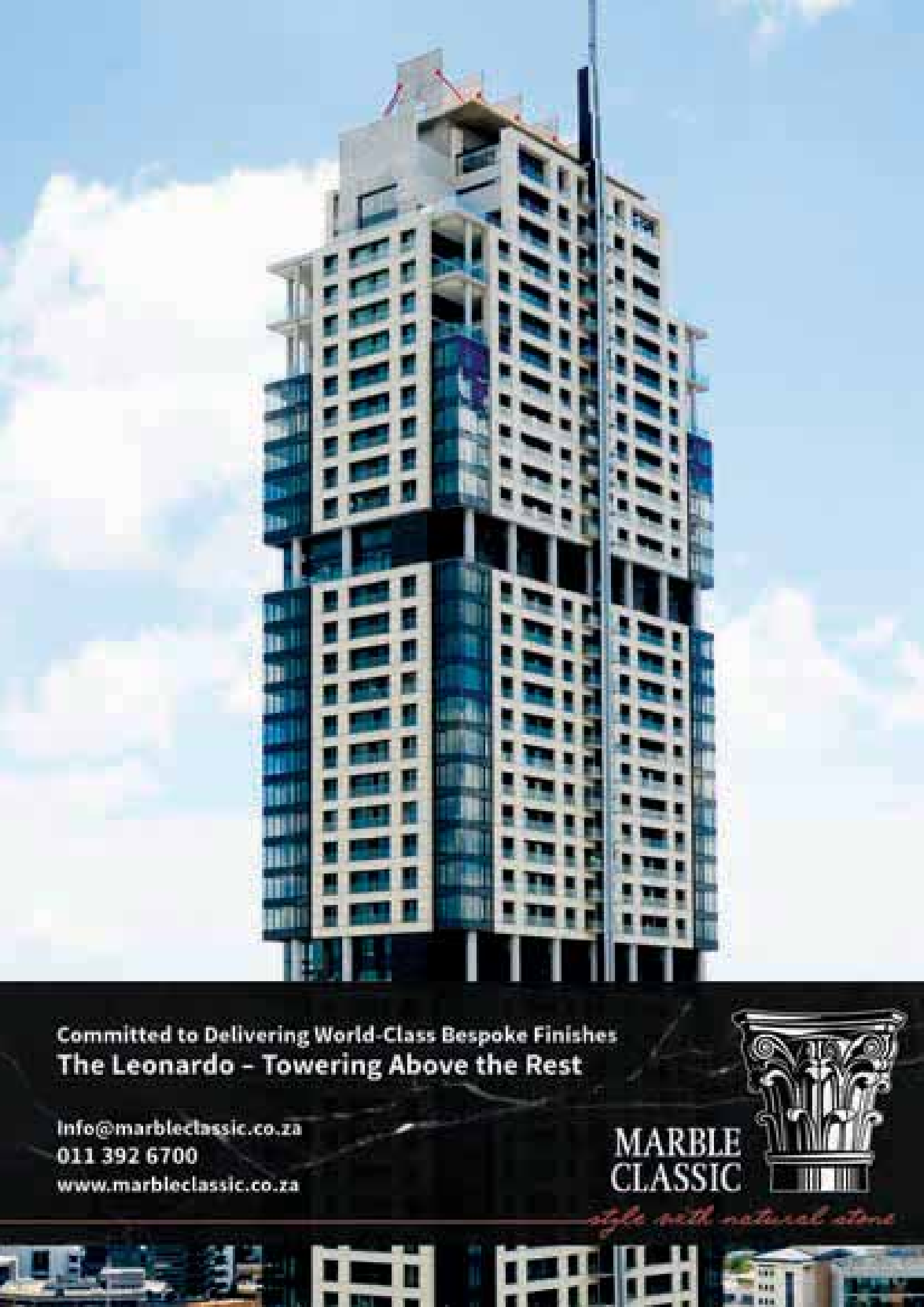
The geology of the site also proved to be problematic, with a diabase dyke traversing the site and groundwater seepage through rock fissures.
The Leonardo design accounted for the retention of the existing bases, limiting the demolition of existing foundations and where possible incorporating these into the structural and architectural design.

This provided significant constraints. Therefore, the core of The Leonardo is orientated in an east-west direction and is designed to straddle the relic core foundation that was orientated north-south.

The solution enabled a largely column free tower plan, with perimeter columns on the predominantly north and south facing facades. The northern façade of the tower is carried by transfer columns which were designed to be the key architectural feature within the main public space at the top of the podium. ■

PROJECT INFORMATION

- **Company entering:** Co-Arc International Architects Inc.
- **Client:** 75 On Maude
- **Start date:** November 2015
- **End date:** End 2019
- **Main contractor:** Aveng Grinaker-LTA
- **Architect:** Co-Arc International Architects Inc
- **Principal agent:** Legacy Development Management
- **Quantity surveyor:** SM Schneid Quantity Surveyors
- **Consulting engineer:** Richie Midgley Consulting Engineers



Committed to Delivering World-Class Bespoke Finishes

The Leonardo – Towering Above the Rest

Info@marbleclassic.co.za
011 392 6700
www.marbleclassic.co.za

MARBLE CLASSIC

style with natural stone

2 PYBUS ROAD

2 Pybus is located in the hub of the rapidly redeveloping CBD of Sandton, Johannesburg. Well-served by freeway access, major road arterials, public transport including the successful Gautrain, and a range of support amenities, this area is a nucleus of significant growth for blue-chip tenants.

PROJECT INFORMATION

- **Company entering:** GLH Architecs
- **Client:** Redefine Properties
- **Start date:** June 2017
- **End date:** December 2019
- **Main contractor:** WBHO Construction
- **Architect:** GLH Architects
- **Principal agent:** SIP Project Managers
- **Consulting engineer:** WSP

The building represents the pursuit of legal practice with transparency, equity, and humanity. Individual advocates chambers with their own identities are gathered within a collective whole where strength stems from unity with diversity. The building comprises rentable office area of 14 000 m² in nine office floors, with support amenities including ground floor meeting suites, a coffee shop, and entertainment areas, and a beautiful north facing elevated garden, with six floors of parking.

The building has a striking presence on the Pybus/Rivonia intersection, where the architecture is articulated to draw visitors in and address the street corner. The strong L-form opens to the angled Pybus frontage, setting up an efficient and flexible modular building form on the north-western and south-eastern boundaries, and presenting a welcoming face and generous garden to the northern edge. As part of the best-practice good business journey, the 2 Pybus building is a sustainable one which achieved a 4-star GBCSA Green Star rating, enhancing the experience of working in and visiting the building. Post-tensioned slabs in the basements improved construction speed and efficiency where it was most practical and reliable to do so, removing deflection concerns.

A combination of glazed façade types has ensured efficient climatic responsive design and thermal performance.

The façade design combines performance glazing specifications, double glazed framing, and integrated aerofoils to provide shading. More expensive curved glass is prioritised on concave radii, and rationalised to facetted glass on tighter convex radii.

The narrow floor plan, is efficiently planned in an L-shape, set back against the more regular edges of the site opening the property to a generous north-facing garden. The wings of the building stretch out to the street edges giving the building a street presence and address the property didn't previously capitalise on. ■

AXIS

Residential development Axis is the latest addition to blossoming Bridgeways Precinct in Century City, Cape Town. Designed by dhk Architects for Rabie Property Group, the complex occupies a prominent corner position in the precinct boasting enviable views of the entire Table Mountain range, Robben Island and the Atlantic Ocean and forms a striking front face for the suburb. The building comprises 85 luxury residential apartments and penthouses, supplemented with small-scale commercial and retail space at ground level.

Elements of Axis are embedded in abstract narratives paying homage to classic literature; from the crown-shaped crescendo to the 'three urban courts', while conversely responding to the contentious aspects of the realities of apartment living. For example, the large gestural cuts and gashes in the building offer views of Robben Island, Intaka Island and Tygerberg Hills; allowing for outward views even from the innermost crevices of the building.

One of the main challenges with many residential projects is that they are quite rigid in their functional structure and are designed to facilitate the minutiae of human inhabitation. A major element of the design concept was the idea of a floating monolith. To achieve this, the architects and engineers devised a 'belt beam' detail that wrapped around the entire building on the first floor. This consisted of a 500 mm deep slab thickening around the edge of the building and a 1 000 mm upstand that doubled up as the balcony balustrade on level one. This difficult detail resolution allows the 10-storey block to appear to rest on glass. Another major challenge was the façade system which was designed very specifically to appear as an overscaled tiling system. Each panel had to be scheduled and coordinated with the window openings; to achieve this, the building was scanned, and the panels were individually placed in their exact position. Contributing to the contemporary aesthetic of the building, dhk utilised 2 500 mm x 1 200 mm sheets of satin off-white aluminium composite panels (ACP) to wrap the façade. The panels were bent and pressed to form 20 mm cassettes used to create the profile of a large format tiled finish. The cladded panels have been staggered, making the fenestration appear random. ■

PROJECT INFORMATION

- **Company entering:** dhk Architects
- **Client:** Rabie Property Group
- **Start date:** March 2017
- **End date:** November 2018
- **Main contractor:** WBHO Construction
- **Architect:** dhk Architects
- **Project manager:** Rabie Property Group
- **Quantity surveyor:** RLB Pentad
- **Consulting engineer:** Aurecon

BARLOWORLD EQUIPMENT CAT SHOWROOM

Barloworld Equipment currently operates out of various sites and offices across sub-Saharan Africa. It was decided that the corporate head office in Sandton, Johannesburg be relocated to the Isando site. Here the building had to provide sufficient space to consolidate all corporate staff, while promoting employee well-being.

The building also had to facilitate a productive but agile working environment, taking into account efficiency with regard to water use, energy consumption, and waste management. Another important criterion was that the look and feel had to reflect Barloworld Equipment's corporate identity and culture, PASA Project Architectural Technologist David Cloete highlights.

A feature of the project was its prime location adjacent to the busy R24 highway very close to OR Tambo Airport. It was key to maximise the available frontage. Apart from housing offices for Cat Rental and Used Equipment, the design had to showcase the brand via internal and external areas.

The state-of-the-art 4 500 m² head office consists of two elongated, north-facing buildings: A two-storey north building, and a three-storey south building, linked by an enclosed, glazed bridge

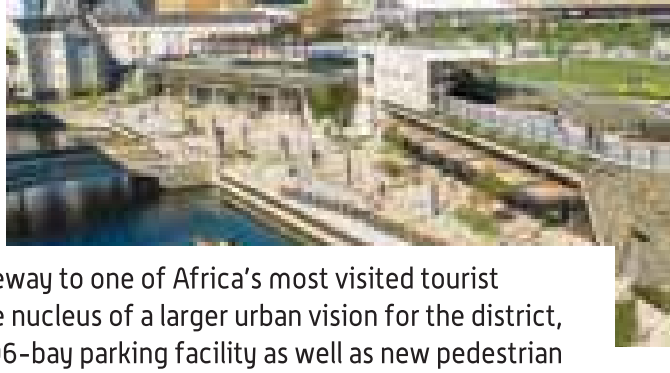
The 3 200 m² showroom is the first of its kind in South Africa – a bubble-like structure dedicated to large earthmoving equipment. The building is split into two specialty areas, namely equipment defined by a 'tyre' or 'track' category, open and enclosed showroom area. The space also includes two floors of office space to the rear.
PASA came up with the unique bubble-like concept as the main driver of the design. "It was an interesting challenge to visualise and design an architectural space that not only houses people, but which also caters for earthmoving equipment on a large scale," Cloete comments. "Our intention was not only to make the equipment the hero, but to accommodate interaction with the equipment itself, promoting its presence so that users could appreciate the shape of the space. This was achieved by means of subconscious similarities with key elements taken from the form of the equipment itself," Cloete explains.

Challenges faced during construction included heavy rains which affected soil conditions. The structure is set on a concrete raft bed some two metres deep into the ground and acts independently of the surrounding soil surface. Large spanning trusses that carry a simplified roof were incorporated, sitting on a grid that can accommodate the Barloworld's Showroom,

The project, which broke ground at the end of 2018 is on track for completion by the end of 2019. ■

PROJECT INFORMATION

- **Company entering:** Paragon Architects South Africa
- **Client:** Barloworld Equipment
- **Developer:** Eris Property Group
- **Start date:** September 2018
- **End date:** December 2019
- **Architect:** Paragon Architects South Africa
- **Civil & structural engineer:** DG Consulting Engineers
- **Quantity surveyor:** Matla Quantity Surveyors
- **Main contractor:** Trencon Construction
- **Main civil contractor:** Phoenician Earthworks & Demolition



BATTERY PARK

Battery Park is a 12 000 m² urban park situated at a key entranceway to one of Africa's most visited tourist destinations, the V&A Waterfront in Cape Town. Developed as the nucleus of a larger urban vision for the district, the site includes a park and piazza that effectively conceal a 1 206-bay parking facility as well as new pedestrian routes to invigorate the precinct with activity.

The site is of archaeological importance as it contains the remnants of one of the city's oldest structures, coastal fortification the Amsterdam Battery. This provided a unique opportunity – to pay homage to the historic landmark while incorporating a parking facility and providing spaces for leisure and recreational activities.

The project forms part of an urban design framework created by dhk for the V&A's previously underutilised Canal District that facilitates the reconnection of the historical city centre and De Waterkant to the V&A. The aim was to create a publicly accessible park which lies at the nexus of a multitude of new pedestrian routes stitching the new district into the surrounding urban fabric and thereby helping to invigorate the area.

On the elevated park level, visitors can explore landscaped gardens with trees and stone-clad planters, meandering walkways with built-in benches, a concrete skatepark, basketball court and new pedestrian routes. Throughout the park and piazza cantilevered steel pergolas scale the design and provide much-needed shade.

The lower piazza level contains 11 boutique retail units that line the splayed canal-facing walls and form an active eastern edge to the new canal pedestrian route. The intention behind the piazza was to activate the canal via a range of water sports and provide a link between the V&A and the CBD – encouraging a pedestrianised environment. The intention was to facilitate a new hub of activity within the V&A district while being respectful to the heritage of the Amsterdam Battery, once a place of exclusion and incarceration, but now a public space designed to support and engage the greater Cape Town community.

To address parking needs of the surrounding area, alleviate traffic flow throughout the V&A and allow for a more pedestrianised environment, the V&A sought to build a new parking facility within the Canal District. ■

PROJECT INFORMATION

- **Company entering:** dhk Architects
- **Client:** V&A Waterfront
- **Start date:** January 2016
- **End date:** November 2018
- **Main contractor:** Group Five
- **Architect:** dhk Architects
- **Project manager:** IGUAL Project Managers
- **Quantity surveyors:** BTKM
- **Consulting engineer:** LH Consulting Engineers

EMBASSY TOWERS

Every great city is known by its landmarks, and the luxurious Embassy Towers residential apartment building on the Sandhurst Ridge crest is set to become such a feature. Its prominent position adjacent to Sandton's central business district helps define the skyline of Africa's richest metropolis. The sleek and simple proportions of this 12-storey architectural gem ensure a seamless blend of contemporary and timeless charm with its feature pergola crowning its rooftop, now easily recognisable on the city landscape.

The development is also remarkable for another reason. Embassy Towers has achieved a rare combination of high-density city living and a high-end lifestyle, paving the way for others to follow. Oriented to maximise its northern aspect, the 90-unit building enjoys full views over Sandton and the Magaliesberg to the north, and south over the tree-lined expanse of Johannesburg.

This 12 storey residential building occupies the prestigious highpoint of Sandhurst overlooking Sandton and close to the Gautrain station. The building consists of 90 units.

Embassy Towers is a timeless blend of classical proportions with fresh and modern large glass expanses, creating a uniquely classical yet modern city icon. Large window expanses allow ample light into the building, while the extensive use of marble introduces an element of grandeur and timelessness. It is a tall building allowing for the large garden area to be retained.

The high rise also allowed for the compact footprint which reduced over-looking the neighbours site. The configuration of the apartments around the lift cores create unencumbered views and natural light to the north and south. The lift configuration eliminates passages, increasing the efficiency of floor plates.

Noble and durable materials work with the timelessness of the design and maintains classical proportions, juxtaposed with modern and sleek glass elements.

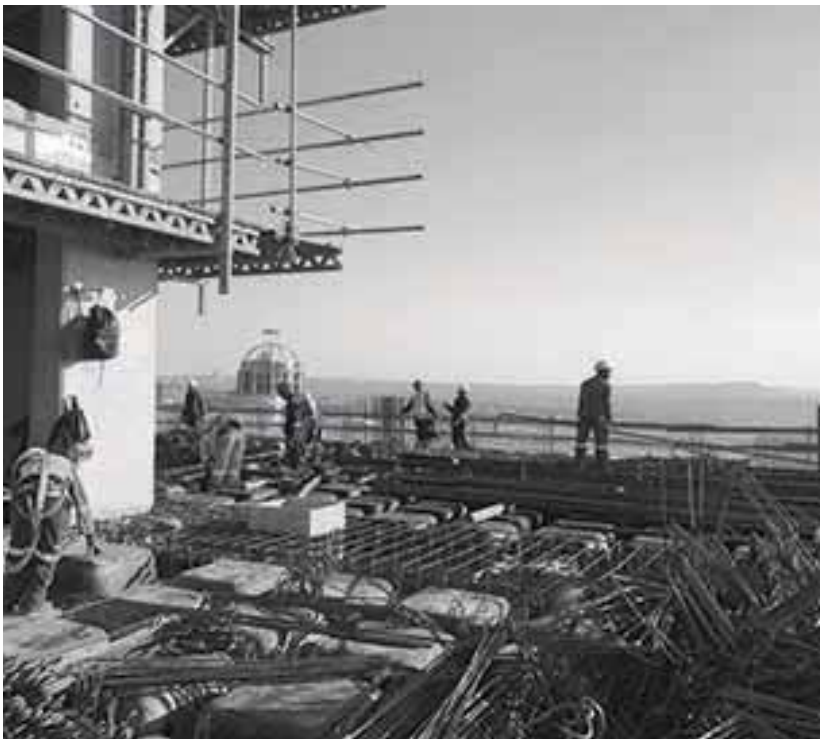
The ground floor allows for a strong human scale and openness of the ground floor amenities. ■

PROJECT INFORMATION

- **Company entering:** GLH Architects
- **Client:** New City Group and Concor Development
- **Start date:** 2015
- **End date:** 31 July 2018
- **Main contractor:** Concor
- **Architect:** GLH Architects
- **Project manager:** SIP Project Managers
- **Quantity surveyor:** CDL Quantity Surveyors
- **Consulting engineer:** MVW Consulting Engineers

THE LEONARDO

The first major tower building to be constructed in South Africa in decades, The Leonardo, is a complex mixed use high-rise building which in these troubled times has been termed a beacon of hope. It epitomises the success possible when a strong vision of a potential future drives collaboration and energy in the construction industry. Remarkably, the 55 storey building was built on the brownfields site of a previously failed development.



The design and construction of the fast track project had to account for existing excavations and foundations from a previous failed development project. The excavation had been abandoned for several years, exceeding the temporary design life of the lateral earth support system. The geology of the site also proved to be problematic, with a diabase dyke traversing the site and groundwater seepage through rock fissures.

The Leonardo design accounted for the retention of the existing bases, limiting the demolition of existing foundations and where possible incorporating these into the structural and architectural design. This provided significant constraints. Therefore, the core of the Leonardo is orientated in an east-west direction and is designed to straddle the relic core foundation that was orientated north-south.

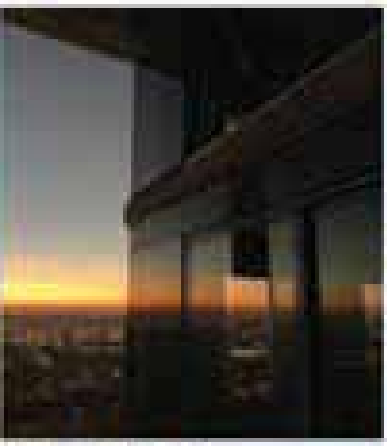
The solution enabled a largely column free tower plan, with perimeter columns on the predominantly north and south facing facades. The northern façade of the tower is carried by transfer columns which were designed to be the key architectural feature within the main public space at the top of the podium. ■

PROJECT INFORMATION

- **Company entering:** Co-Arc International Architects Inc.
- **Client:** 75 On Maude
- **Start date:** November 2015
- **End date:** End 2019
- **Main contractor:** Aveng Grinaker-LTA
- **Architect:** Co-Arc International Architects Inc
- **Principal agent:** Legacy Development Management
- **Quantity surveyor:** SM Schneid Quantity Surveyors
- **Consulting engineer:** Richie Midgley Consulting Engineers

DIRI ALUMINIUM (PTY) LTD

THE LEONARDO



We pride ourselves in the design, manufacture and installation of the following elements on The Leonardo project:

- Proprietary Flush Glazed Aluminium Systems
- Dekton Facade Paneling
- Unitized Facades
- Reynaers Door Systems

Tel: +27 (012) 666-9022 | Committed to Excellence | Web: www.diri.co.za

WITKLIPFONTEIN GAME FARM

The lodge is designed to blend and disappear into the surrounding nature. The ground carpet of the hill has just been lifted a little to slip the house under it. The architecture is a unique combination of traditional vernacular building techniques with modern minimalistic design. Overlooking the plains, panoramic views blur the boundaries between the interior and the surrounding nature allowing for a unique bush living experience.

PROJECT INFORMATION

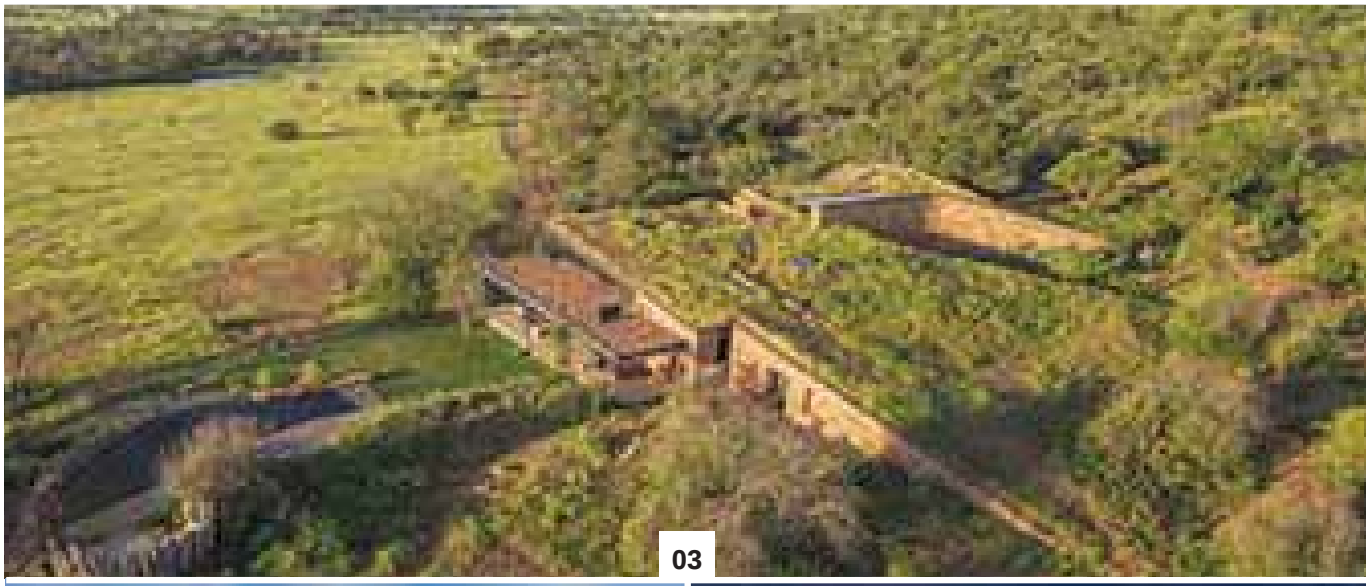
- **Company entering:** GLH Architects
- **Client:** Xavier Huyberechts
- **Start date:** May 2015
- **End date:** June 2018
- **Main contractor:** Damien Huyberechts
- **Architect:** GLH Architects
- **Consulting engineer:** Pure Consulting

The climate in the Free State region with its large thermal daily variance of 20 degrees lends itself to the use of the principle of thermal mass instead of mechanical air-conditioning. The thermal mass flattens the temperatures throughout the year by using thick stone walls, earth walls (rammed earth, adobe and sandbag) and the green roof. Other innovations and unique features include: an almost full cement-free construction, a shutter system regulating heat, recycled granite off-cut floors, a subterranean dome, natural pools, waste water treatment plant, solar water heating and photovoltaic electrical production, and earth and straw plaster. The result is a unique home that breathes the surrounding nature and blends into it.

Witklipfontein Lodge aims to embody modern sustainability and is packed with simple and forgotten basic design and building techniques making it a showcase project in the field of green building. ■

CELEBRATED PROJECTS: AFRISAM INNOVATION AWARD FOR SUSTAINABLE CONSTRUCTION

01 02



03

04 05

1. 2 Pybus Road, 2. The Leonardo, 3. Witklipfontein Game Farm, 4. Oxford Parks, 5. Growthpoint's Lakeside Offices.

CONSTRUCTION WORLD WISHES ALL OUR ADVERTISERS, CLIENTS AND CONTRIBUTORS A SAFE AND HAPPY FESTIVE SEASON.

A Golden Jubilee Celebration for Agrément South Africa!

Agrément South Africa held the 50-year anniversary celebration and the annual certificate handover ceremony at the CSIR International Convention Centre on Friday 04 October. Twenty-seven certificates of fitness-for-purpose were awarded for new innovations successfully assessed and approved by Agrement South Africa for use in the construction industry.

The 27 Agrément South Africa certificates presented to the industry players serve a critical purpose of assisting manufacturers and suppliers of non-standard and innovative building products, materials and systems in the construction market to provide products that are fit-for-purpose.
Innovation in the construction industry is increasing exponentially.

The rate of change is becoming more radical which cements Agrément South Africa's position as a vital organization that assess products to meet the challenges of the future, thus preparing the construction industry for the challenges and opportunities of the fourth industrial revolution.

Over 400 delegates from the construction industry attended the event.

Members of the Board, CEO's of Department of Public Works and Infrastructure's public entities, industry captains, former & current staff members and technical experts graced the occasion.

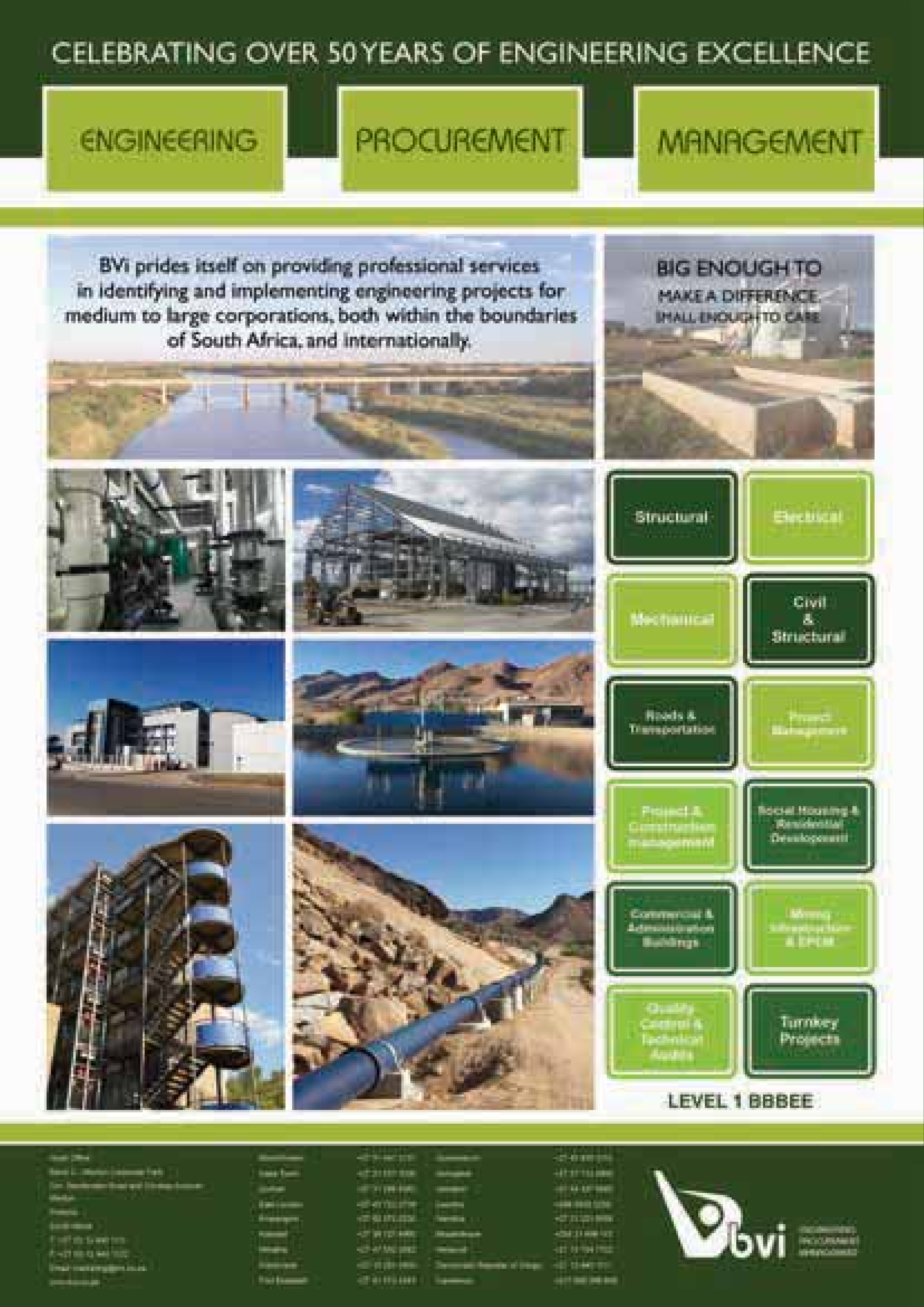
Dr Jeffrey Mahachi, the Acting Chairperson of Agrément South Africa welcomed the guest and presented the opening remarks. Mr Joe Odhiambo CEO of Agrément South Africa shared the history of the organisation.

The Guest of Honour was the Honourable Deputy Minister in the Department of Public Works and Infrastructure, Ms Noxolo Kiviet, MP who gave the keynote address as well as presided over the handover of certificates. The Acting Deputy Director General, Intergovernmental relations in the Department of Public Works and Infrastructure Mr Molatelo Mohwasa attended the event.

In his presentation, the CEO of Agrément South Africa stated that "As we celebrate our golden jubilee, 50-years – we reflect on the journey our organization has taken to grow from a small division within the CSIR to a stand-alone legal entity. We've had steady growth over the years and have diversified our range of services.
Simultaneously, the construction industry has seen a lot of changes in the last few years especially in the last five to ten years where the rate of innovation has increased exponentially."

"We are now an organisation that reports to the Department of Public Works and Infrastructure. In terms of certification, we started by looking at building systems, but now we've expanded to building products, and road products.

We have assessed several road stabilizing materials. We also look at mechanical engineering thermal assessment software and traffic monitoring devices, so we've diversified." In the last year we've also been tasked by the Department of Public Works and Infrastructure to be the Government Body to assess the Eco-Label scheme and the Green Building Council South Africa's rating tool version two for public sector buildings for and on behalf of the National Department of Public Works and Infrastructure."


CELEBRATING OVER 50 YEARS OF ENGINEERING EXCELLENCE
ENGINEERING
PROCUREMENT
MANAGEMENT
BVi prides itself on providing professional services in identifying and implementing engineering projects for medium to large corporations, both within the boundaries of South Africa, and internationally.
BIG ENOUGH TO MAKE A DIFFERENCE, SMALL ENOUGH TO CARE
Structural
Electrical
Mechanical
Civil & Structural
Roads & Transportation
Project Management
Project & Construction management
Social Housing & Residential Development
Commercial & Administration Buildings
Quality Control & Technical Audits
Turnkey Projects
LEVEL 1 BBBEE
bvi