

# NELSON MANDELA UNIVERSITY


## THE INFRASTRUCTURE FRAME

Nelson Mandela University's Built Environment



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**We are Nelson Mandela University**

We are **Nelson Mandela University**. We are the only university in the world to be named after Nelson Mandela. Our iconic South African statesman, humanitarian and leader is known globally for what he achieved. We are honoured as **Nelson Mandela University** to carry his name. In return, we honour our namesake by endeavouring to live his legacy. We honour him by using his name in full. **We are Nelson Mandela University.**

# Bringing Together the Infrastructure of Mandela University

Foreword by Professor Sibongile Muthwa, Nelson Mandela University Vice-Chancellor

**N**elson Mandela University is the only higher education institution in the world to carry the name of Nelson Rolihlahla Mandela. His ethos was one of ‘bringing together’ and thus, when we envision the transformation of our seven campuses with new infrastructure developments and refurbishments, we take into consideration how our spatial footprint serves our role as a socially embedded, outward-facing higher education institution.

In alignment with this mandate, Nelson Mandela University is committed to integrating our campuses with the surrounding communities, cities, and natural environment. Development spaces are intentionally designated, enabling the University to contribute meaningfully to sustainable, socially responsive local economic development.

Two examples of this are the placement of the Medical School and Education Foundation Phase on our Missionvale Campus, with the buildings reflecting striking, modern facilities and infrastructure.

The University embarked on a process of naming and renaming our buildings, spaces and infrastructure in 2017, when the University was officially renamed. This was a symbolic signalling of the institution’s commitment to transformation and changing the world in a way that gave expression to our distinctive identity – a process that continues to unfold through extensive stakeholder consultations across all faculties and campuses.

These engagements seek to address how the University, as a community, can locate naming and renaming within a set of fundamental principles and criteria that promote social justice and inclusion. As an example, our flagship engineering building is named ‘Mapungubwe’, after South Africa’s remarkable Iron Age historical kingdom in Limpopo Province, while our new Faculty of Law Extension building is named after former Chief Justice and Chancellor of the University, Pius Langa.

While acknowledging the significance of culture and heritage as catalysts of social cohesion, our Vision 2030 strategy also



Prof Sibongile Muthwa

recognises that universities need to make key decisions relating to their investment in digitalisation as compared to physical infrastructure development to

facilitate the transition to flexible, hybrid and fully online ways of learning and working. To this end, the University has been progressively investing in refurbishing and reimagining

all spaces to accommodate the increased use of “smart” venues by integrating the latest digital technologies, systems and platforms into our infrastructure planning and design.

In alignment with our vision to contribute cutting-edge knowledge for a sustainable future, Nelson Mandela



University continues to foreground responsible environmental stewardship as an integral part of infrastructure design and development. In 2022, the institution invested R750-million in energy and water-efficient campus infrastructure, which significantly contributed to the local economy and urban renewal.

It is also noteworthy that our Business School was the first building in the education sector in South Africa to achieve a 4 Green Star design rating from the Green Building Council of South Africa (GBCSA).

Through flexibly designed, optimally utilised, and fit-for-purpose infrastructure, the University seeks to distinguish itself as a higher education institution of choice,

where students, employees and communities benefit from vibrant living, learning, working, and recreational spaces across all campuses.

This publication showcases infrastructural developments that firmly position us as a dynamic, African university in the service of society.

## The infrastructure frame

Infrastructure, a strategic enabler of the Mandela University academic project

*By Lebogang Hashatse, Former Deputy Vice-Chancellor: People and Operations (2017–2023)*

**N**elson Mandela University was renamed in 2017 after South Africa's first democratically elected president, the internationally renowned statesman, Nelson Rolihlahla Mandela. Prior to this, the University was known as Nelson Mandela Metropolitan University, formed in 2005 through the merger of the University of Port Elizabeth, the Port Elizabeth Technikon, and Vista University. The first two universities were for white students, well-resourced, and located in prosperous suburbs, whereas Vista University was designed for black students, and was under-resourced and located in a township.

Naming the University after Nelson Mandela was significant in many respects. It represented a break with an apartheid past – a past that divided people of the same country based on race, class, and geography – and symbolised the creation of a renewed and inspiring future.

It meant not only confronting and undoing a history of separate and unequal development, but also actively working to achieve Mandela's vision for an equitable, accessible and sustainable education for South Africa's youth. In line with this, campus infrastructure must be experienced as a positive, vibrant environment that generates excitement. We work hard at extending this feeling to all our campuses, staff and 26 000 students.

#### **Handshake between the University and communities**

As part of our infrastructure contracts, the University supports Emerging Micro Enterprises (EMEs), and for most contracts we aim for a minimum of 30% of the contract to be subcontracted to EMEs that are majority-owned by black people who operate from premises within the Nelson Mandela Bay Municipal boundary, and who are registered in the correct CIDB contractor gradings for the appropriate type and value of the subcontracted works.

#### **Working better together**

University developments are designed and constructed in terms of how they engage with the surroundings and community. The development of our Missionvale Campus in Gqeberha and our new Medical School on the Missionvale Campus, for example, was deliberately situated in Missionvale township to make sure that all communities recognise their importance to the University.



Lebogang Hashatse

“Campus infrastructure must be experienced as a positive, vibrant environment that generates excitement”

## **Building a firm future**

As a University committed to sustainability, Nelson Mandela University is constantly working at:

- responsibly integrating its respective campuses into their social, economic and environmental location and geography, respecting and enhancing the green belts, the waterways, and the ocean
- making buildings and spaces purposeful, productive, and stimulating environments
- equalising resource distribution across all campuses
- greening and environmentally enhancing all campuses
- ensuring sustainable utilisation, deployment and management of resources and campuses.

Much has been done toward this end, some of which is described in this publication, but much more remains to be done.

## **Honouring our namesake**

Nelson Mandela University is the only higher education institution in the world to carry the name of Nelson Rolihlahla Mandela.

The name change in 2017 from Nelson Mandela Metropolitan University (NMMU) to Nelson Mandela University provided an opportunity for the institution to rebrand and position itself continentally and globally, while at the same time, usher in a new era of renewed vigour towards meaningful transformation that has made it the sought-after, diverse educational destination it is today.

The union of these institutions came about as a result of government's countrywide restructuring of higher education – intended to deliver a more equitable and efficient system to meet the needs of South Africa, the continent and the world in the 21st century.



The new Faculty of Law Extension was opened in 2022. The building is named after former Chief Justice and Chancellor of the University, Pius Langa.

Our Bird Street Campus is another example. It is an integral part of the historical inner city precinct of Central, where the University is a member of a special rates association that is responsible for enhancing the safety, security, cleanliness and urban renewal of the whole environment. Many of our students live in Central.

University entrances are also very important in terms of how they connect with the City and we design them to be inviting to students, staff and the surrounding communities. We have thought long and hard about how our entrances achieve this and harmoniously link with the City. The new access road into the University's Summerstrand Campus, which is through the nature reserve, is a prime example; it helps to create cohesion between the North and South Summerstrand Campuses.

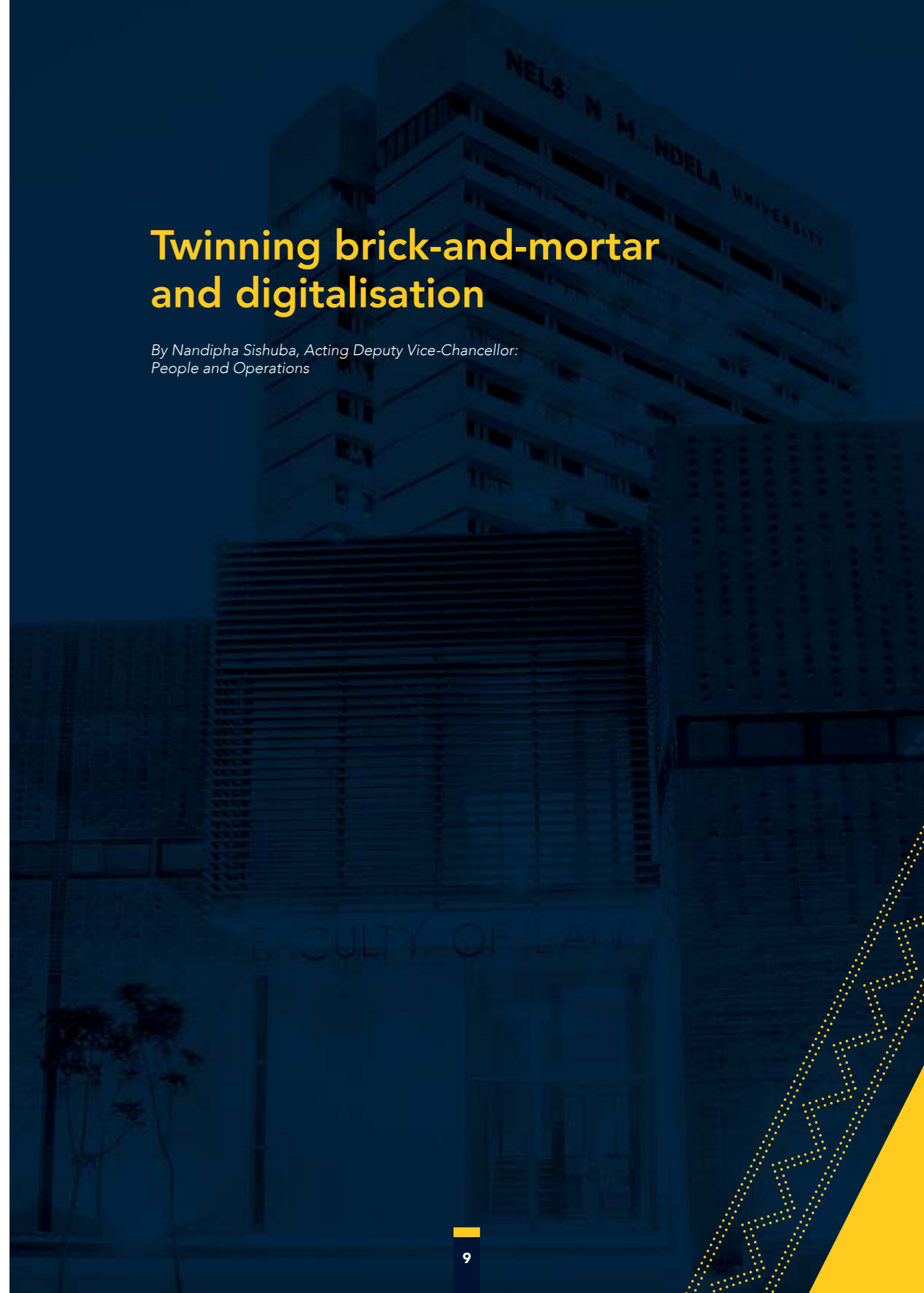
Another aspect of this cohesion is the new pedestrian boulevard between our North and South Campuses, linking the two and creating an inviting space for people, in which

they can walk and relax. These areas were previously dominated by vehicles. The transition from vehicle traffic to foot traffic brings people together and creates a collegial atmosphere.

#### **The ICT space – a key investment**

Our digitalisation strategy was turbo-charged by the pandemic and it has taught us how to use physical infrastructure differently. We work jointly in multidisciplinary teams to decide how best to construct new buildings or renovate existing infrastructure. The construction and digitalisation process has become completely integrated, hence we have merged technical services with infrastructure services to create Infrastructure Services and Space Optimisation (ISSO).

We are constantly thinking about the impact of occupying seven campuses and how to manage infrastructure and the estate sustainably, including our use of water and electricity. Again, this is part of an integrated approach.



## **Twinning brick-and-mortar and digitalisation**

*By Nandipha Sishuba, Acting Deputy Vice-Chancellor:  
People and Operations*

**A**s the Acting Deputy Vice-Chancellor: People & Operations, I salute my predecessor, Lebogang Hashatse, for the superlative brick-and-mortar and digital infrastructure delivered under his leadership. He describes that 'Infrastructure Frame' in this publication.

The twinning of brick-and-mortar with digital infrastructure development is key for expansion and continual improvement of Mandela University. It also contributes to the region's economic development, with spin-offs for local SMMEs, employment and learnerships during projects.

Despite construction industry challenges, we are committed to growing our regional SMMEs and upskilling both women and young people during the construction process. We look forward to welcoming more people with disabilities into the fold, too.

Underpinning new and retro-fitted infrastructure is the green economy. We are lowering our carbon footprint, accelerating renewable energy delivery and sustainably managing critical ecosystem services, including water.

Two recent brick-and-mortar developments to celebrate are the Science Dome and new Summerstrand North Campus residences – the latter using the novel 'Peri Uno' turnkey building method.

Along the Garden Route biosphere, our George Campus extension plans are well underway to meeting increasing enrolments and growing this flagship of the University's sustainable futures project.

The Department of Higher Education has recognised the critical need for digital transformation funding, and across all seven campuses, digitalisation infrastructure projects are underway – a pivotal development enabling core functions of learning, teaching, research and engagement, while enhancing efficiency and sustainability.

A strategic priority in Mandela University's Vision2023 is to improve efficiencies and value creation through digitalisation, integrated systems, agile service delivery and modernised infrastructure. To achieve this, we are, inter alia:

- Progressively investing in upgraded ICT infrastructure and technologies, WiFi densification and cybersecurity enhancements to facilitate the migration towards digital transformation and cloud computing
- Strengthening the University's capacity to support hybrid and fully online educational delivery through widening access to mobile devices and data connectivity for students and employees



Nandipha Sishuba

“Smart classrooms and offices are the ideal solution to our physical lecture and staff space shortages”

- Repurposing and modernising flexibly designed physical and virtual spaces in support of learning, research, engagement and creativity in a multi-campus context.

Smart classrooms and offices are the ideal solution to our physical lecture and staff space shortages on campus, enabling blended or hybrid learning and flexible work schedules.

We are blessed with highly-skilled collaborators involved in these projects, including Infrastructure Services and Space Optimisation, Support Services, ICT Services, the Faculty of Engineering, the Built Environment and Technology, the Computing Sciences Department, and Strategic Resource Mobilisation and Advancement.

This publication offers a window into the impressive diversity of infrastructure development at Mandela University.

## Infrastructure: a reflection of institutional culture

*By Dr Denver Webb, Senior Director: Strategic Resource Mobilisation and Advancement, is currently researching the history of the University. He discusses the context of the infrastructure and architecture that Nelson Mandela University inherited.*

The layout, infrastructure and architecture of all university campuses have a profound influence on their institutional culture. Nelson Mandela University has massively invested in architecture, infrastructure and infrastructural changes that reflect the culture and values of the only university in the world named after Nelson Rolihlahla Mandela.

In order to create and establish the identity of Nelson Mandela University, the reimagined design framework was conceived together with the University's distinctive branding, signs and symbols. Some background is required to understand the transformation from the merger of the University of Port Elizabeth (UPE), PE Technikon and Vista University Port Elizabeth campus into Nelson Mandela University today.

The PE Technikon had its roots in the country's oldest art school, the PE Art School founded in 1882; UPE was the country's first dual-medium residential university, which came into being on 31 January 1964; and the Port Elizabeth campus of Vista University, established in 1981, was established for urban black South Africans to access higher education within the townships, rather than at the segregated 'white' higher education institutions.

#### Dismantling a legacy

On the positive side, we inherited some solid infrastructure - but it carried a legacy that needed dismantling through the very deliberate positioning of Mandela University as a diverse, humanising, social justice-focused, engaged, sustainable institution. It was thus critical for Mandela University to break the mould inherited from these former institutions, as part of the transformation of our institution.

If we look back to the origins of UPE's Summerstrand Campus, a team was sent to look at universities overseas to decide on the educational philosophy that would underpin what they wanted to achieve, namely, to educate a new generation of predominantly Afrikaans-speaking graduates who would compete with English-speaking people in the economy. The dual medium aspect was added when it was realised that a purely Afrikaans institution would not be viable.

Rand Afrikaans University (RAU) owed its origins to a similar drive to produce modern Afrikaners who could compete in the economy. The apartheid planners chose a modernist style of architecture known as Brutalism for both UPE and RAU - now the University of Johannesburg (UJ) - with large,



Dr Denver Webb

“Over the years, the new infrastructure ... has significantly contributed to breaking the apartheid architecture mould”

The new and refurbished buildings ... are welcoming, attractive and innovative; they are humanising, they invite people in and at the same time, are designed and built with sustainability in mind.”





imposing concrete buildings, such as the 18-storey building on the Summerstrand Campus. This modernist approach was adopted across other Afrikaner institutions, such as Sanlam, Santam and Trust Bank, all of which were developed to advance Afrikaners in the economy.

The PE Technikon and Vista, by contrast, were made from facebrick, which I facetiously call 'public works facebrick' and were very utilitarian in design.

Over the years, the new infrastructure built during the NMMU and Nelson Mandela University eras has significantly contributed to breaking the apartheid architecture mould. The education building on the Missionvale Campus, the business school on the Second Avenue Campus, and the new engineering buildings on the Summerstrand Campus are good examples.

### **Establishing our identity**

The new and refurbished buildings, access and layout of Mandela University's campuses today play an important part

in the pollination and growth of our Mandela brand. They are welcoming, attractive and innovative; they are humanising, they invite people in and at the same time, are designed and built with sustainability in mind.

The Deputy Vice-Chancellor of People and Operations, Lebogang Hashatse, and his predecessors since 2005, have done outstanding work in changing the ethos and atmosphere of the University through infrastructural development, layout, planning and design. The distinction between the former UPE, PE Technikon and Vista campuses is dissolving, and Nelson Mandela University is proactively creating a campus that invites the public onto campus through facilities like the Science Centre and planetarium dome currently being built on the Ocean Sciences Campus.

The city and suburban skyline is visibly changing as a result of the University's growth, with attractive new residences adding to the clear message that five years into its renaming, Mandela University is rapidly becoming the educational institution of which its namesake would be proud.

## **Urban Design Framework**

In 2011, the University commissioned the Urban Design Framework from consultants DLMM Urban Design Association, with whom the University has collaborated over the years.

DLMM Urban Design Association wrote the following in *An Approach to Campus Planning and Design*:

It is essential for every university in Southern Africa to have a well-thought-through spatial plan. There are a number of reasons for this:

- Universities are amongst the most important institutions of society.
- Universities are like metabolisms in their own right, in that they have inputs, throughputs and outputs. Sustainability requires that inputs are drawn over as small an area as possible and, wherever possible, are renewable; that throughputs are resource-efficient (land, water, energy, finance); and that, in terms of outputs, recycling is encouraged to the greatest degree possible. Where this is not possible, wastes should be disposed of in an ecologically responsible way; and local, on-site, resource capture (for example, energy and water) should be maximised.

In a situation of increasing budgetary constraints, it is essential to ensure that all investments, including historical investments in infrastructure and space, are used as efficiently as possible. Integration, both between and within campuses, is an essential part of efficiency. It will not come about automatically: it must be carefully designed.

Universities have a responsibility to be role models in terms of environmental sustainability and appropriate responses to place, as well as in their approach to inputs, throughputs and outputs. This has significant implications for the form of the plan. Responsible university planning is based on a number of central realisations. Campus design is not unlike designing a small town: it needs to take into account all dimensions of life (teaching, learning, research, recreation, sport, housing, ceremony, social life, and so on). The appropriate approach, therefore, is that of urban design.



The solar farm on the University's South Campus.

# Infrastructure and democratisation

*By Melvin Syce, Senior Director: Infrastructure Services and Space Optimisation*



**A significant aspect of the funding of Nelson Mandela University's infrastructure has to do with the historical merger, including dealing with a backlog of maintenance issues, plus special challenges such as spalling – rust-related damage that significantly affects concrete buildings – exacerbated by our location on the ocean.**

**S**everal of our buildings are almost 50 years old, and this is the age at which we see the real impact on infrastructure from age and deferred maintenance.

Funding is also critical for the democratising of higher education, where, since 1994, the student numbers have exponentially grown, with black students being given opportunities they did not have historically. This required an increase in all sorts of infrastructure – from labs to residences.

#### **Attractive living and learning spaces**

In the last three years (2020 – 2022), for example, we have increased student residence accommodation by 2000 new beds - 180 of these on our George Campus and the rest on our North and South Summerstrand Campuses. We also needed to upgrade and modernise our existing residences, incorporating the latest technology and developing them into attractive living and learning spaces. Upgrading has been ongoing since 2010, when we completed the first condition assessment for residences and received R2-7million from DHET for this purpose.

Special growth areas for which we received money from the Department of Higher Education and Training (DHET) include the purchase in 2016 of the former CSIR building, which has been converted into an attractive, multi-use complex that includes the Ocean Science Campus. Another new addition to the University is the establishment of the Medical School on the Missionvale Campus, which required substantial renovation and re-design of existing buildings.

#### **Making us proud as a University**

Infrastructure is so much bigger than a space for lectures; it is about making us proud as a University and ensuring that we achieve our purpose of sustainability and being in the service of society.

Flagship buildings are very much part of this. At the Second Avenue Campus in Summerstrand, for example, the building of the green-star-rated Business School was very much part of



Melvin Syce

“Infrastructure is ... about making us proud as a University and ensuring that we achieve our purpose of sustainability and being in the service of society”

“To optimise space on all seven campuses, we assess how many people go into each building, per week and per month to determine how the building is used, what is best use and what is poor use.”

revitalising this dated-looking campus into a vibrant Nelson Mandela University hub of which people can be proud.

The same applies to the George Campus, with its metamorphosis from the former Saasveld Forestry College to Nelson Mandela University's sustainability sciences hub.

### Fitting people into spaces

To optimise space on all seven campuses, we assess how many people go into each building, per week and per month to determine how the building is used, what is best use and what is poor use. We use this to manage space effectively through a time-tabling and scheduling process.

We presented DHET with a comprehensive plan for space optimisation and the practicality of reshaping building use, such as adapting underused teaching space to add to our chemistry labs.

Brand plays a strong role in all infrastructure and space optimisation developments and it is a complex process to bring all the buildings from the merger into the 21st century under the Nelson Mandela University brand.



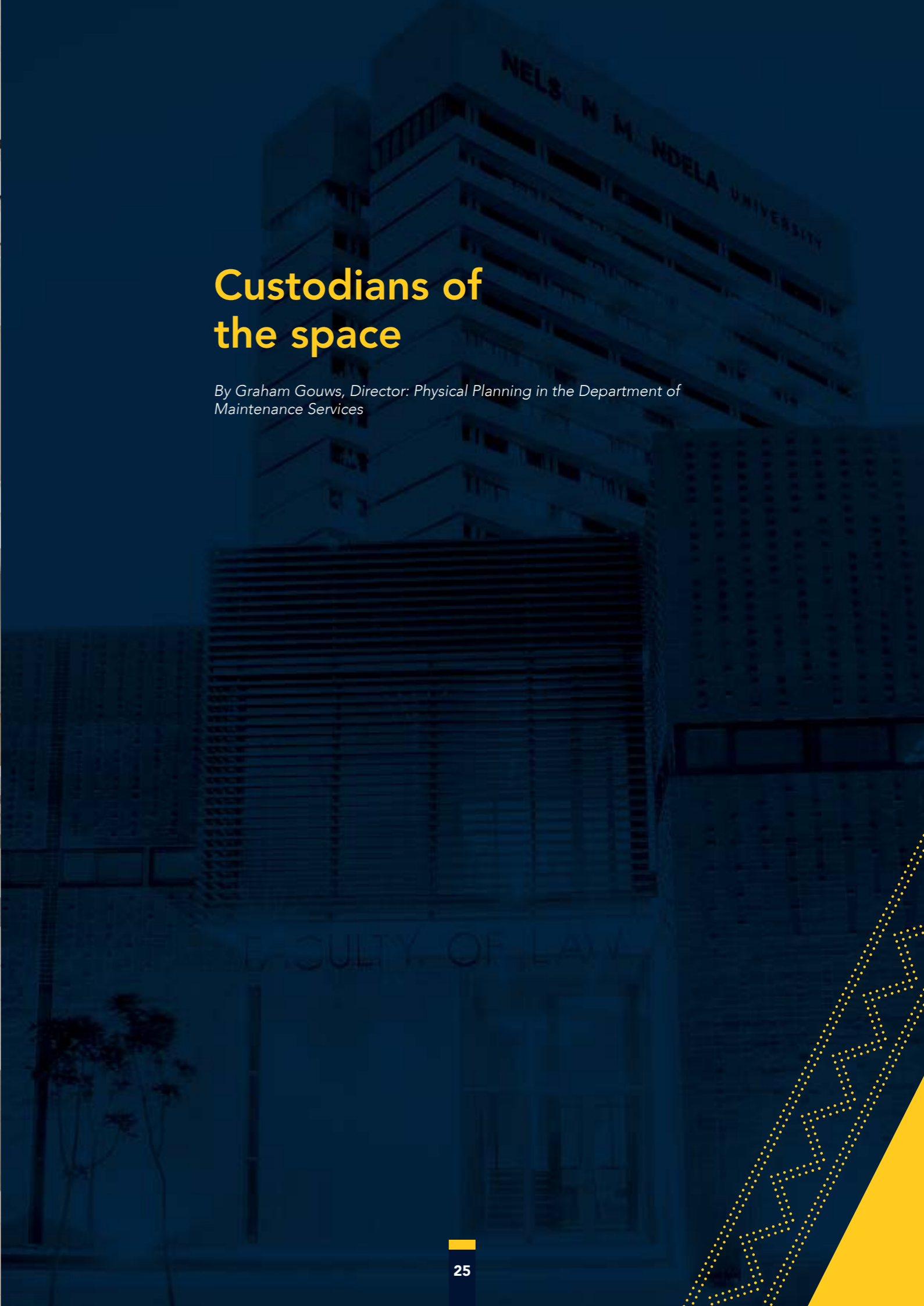
Canteen facilities on the Ocean Sciences Campus in Summerstrand.



Ulwazi (Building 123) on the South Campus which houses lecture halls.

## Custodians of the space

*By Graham Gouws, Director: Physical Planning in the Department of Maintenance Services*



We are the custodians of the space that is Nelson Mandela University, with the Urban Design Framework guiding the process for the University's infrastructure development on all our campuses.

**M**y team does all the infrastructure planning for the University and we oversee the building projects, from concept to construction to handover.

All consultants must consider how any new build or renovation links into the campus and its surrounds, and through that process, we guide the architects to deliver sustainable 21st-century design. All design has to have maintenance top of mind. Several of the new buildings are designed with a lot of glass, as it has an infinite lifespan, although it needs to be cleaned.

#### Which projects to prioritise

The first part of any new build is to do the scoping with the University's internal stakeholders to assess their needs. Once the University has decided which projects to prioritise, we interpret these into spatial plans and costings, based on the building rates in the Eastern Cape.

We then submit these to the Deputy-Vice Chancellor: People & Operations for scrutiny and he submits them to the Department of Higher Education and Training's (DHET) to apply for the Infrastructure Efficiency Grant (IEG), which includes new builds, renovations and maintenance.

We submit audited quarterly and annual expenditure reports on all infrastructure and maintenance to the DHET. The current grant cycle – Cycle 6 – for the IEG from DHET has been significantly reduced due to COVID-19 and the general decline in government subsidy for universities. This has required us to significantly increase third-stream income.

Each grant cycle is normally a three-year period. The University's grant in this cycle included a significant amount of technology for digitalisation and upgrading of lecture halls to increase hybrid teaching capacity, plus increased security systems on all campuses and the completion of the Medical School.



Graham Gouws

“All consultants must consider how any new build or renovation links into the campus and its surrounds”

#### Integration and pedestrian corridors

Given the historical separation of our campuses, we are working on integrating them physically and in the minds of our students, staff and communities. We want to unify the campuses and blur the boundaries between them by creating green belts and a pedestrian-only University Boulevard, which will be completed in 2023.

## Using infrastructure smartly

All University spaces are recorded on our ITS platform. We are focusing on enhancing this more comprehensively, in terms of including key sustainability issues such as energy and water usage.

This way, we can holistically audit all University spaces, deciding how to optimally use them – particularly pertinent since the pandemic shift, when we changed how we perceive space and its use.

For example, a number of staff members can work three days a week on campus and two days from home. We are therefore reassessing the need for individual offices and migrating, where appropriate, to hot desks, offices and boardrooms, where staff can book the space they need online.

#### SMME and training

We have a 30% SMME compliance factor with which all contractors must comply. As the DVC: People & Operations said in his opening message, this requires the use of emerging contractors within the metro. We monitor and measure this throughout the building process, and report back at meetings. Skills training and learnerships are part of the range of infrastructure projects especially when specialised jobs and there is a learnership intervention put in place.

University Boulevard will link the Summerstrand North and South Campuses and the Ocean Sciences Campus with attractive, landscaped spaces that serve as both a social and transit area between the residences, buildings and campuses.

Part of this integration is the closure of University Way, which has historically been the main entrance and traffic artery through the middle of the Summerstrand Campus. We have moved the Summerstrand South Campus entrance to Strandfontein Road, on the periphery of the campus and nature reserve, so that South Campus traffic enters this way, while the North Campus entrance is from Marine Drive, and has been upgraded.

We are also considering creating pedestrian corridors that link our campuses, such as our Second Avenue Campus to our Summerstrand Campus. This is part of a bigger, city-wide improvement plan in the Nelson Mandela Bay Metro.

### **Collaborative input and approval**

In all our projects, we collaborate with the whole University community to get their input and approval. People need to be comfortable in the space and designs are evaluated by a team within the University, including representatives from People & Operations, architecture, finance, procurement and independent external architects who are not part of the application.

We have a rating matrix where we look at the design, greening, local sourcing of materials, planning and connection to existing buildings, as well as sustainability systems including energy saving, dual water piping, and rainwater and stormwater catchment.

The matrix is very much budget-orientated and in the design briefs, the SANS 10400 building regulation code for South Africa is the minimum requirement and equivalent to the Green Building Council of South Africa's Green 3-star rating in terms of building materials and processes used.

We challenge all consultants to include interventions to improve the building's performance, as the more energy efficient the buildings are, the more long-term sustainability the University achieves. All our new buildings are dual piped for water so borehole and return effluent (RE) water can supplement potable water for toilet flushing and showers. We continuously and strictly monitor the water quality.



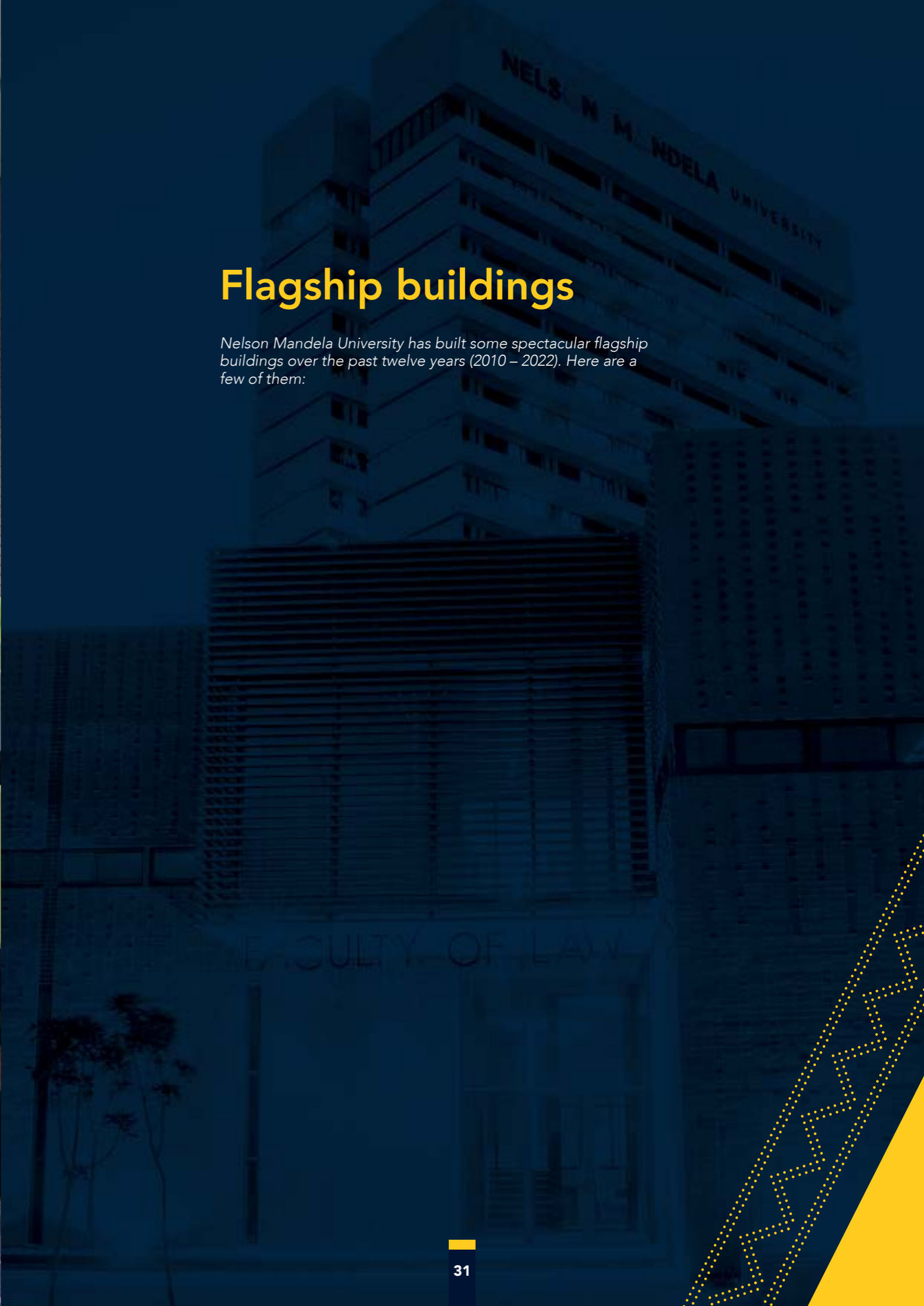




Lecture hall in the new Science building, Inkanyezi on South Campus.

## Flagship buildings

*Nelson Mandela University has built some spectacular flagship buildings over the past twelve years (2010 – 2022). Here are a few of them:*





## Mapungubwe (Engineering building – Phase 1)

This was one of the first major buildings to be built following the merger. The briefing to the architects, Imbono FJA Architects and ADA Architects, was to produce a building that created a new face for the University – a face that communicated its position as a dynamic, leading 21st-century academic institution on the African continent.

**Campus:** Summerstrand North Campus

**Total Project Cost:** R60-million

**Completion:** 2012

**Description/Purpose:** New engineering class laboratories, alterations and refurbishment of buildings, new equipment.

**Special facilities:** The façade is clad with about 800m<sup>2</sup> of RHEINZINK tiles, which acts as a thermal buffer to the 200-seat auditorium located behind it.



## Newtonian (Engineering building – Phase 2)

**Campus:** Summerstrand North Campus

**Total Project Cost:** R35-million

**Completion:** December 2016

**Description/Purpose:** The building was designed by Afriplan Architects to add additional lecture and workshop space for the extension and growth of the Engineering Department.

**The interior had to facilitate the following areas:**

- Workshop area, particularly for the development of the Megatronics and Automotive sections
- Link to the existing buildings
- Main auditorium – 160-seater
- Multi-purpose tutorial rooms, which can be divided up into smaller areas or expanded into larger areas
- Office area
- Ablutions and pause areas.



## Business School

**Campus:** 2nd Avenue

**Total Project Cost:** R116-million

**Completion:** 2014

**Description/Purpose:** The architects – GAPP Architects and The Workplace Architects – were briefed to create a new Business School that incorporates cutting-edge teaching facilities, including video-conferencing facilities, a 137-seat auditorium, multiple classrooms seating for up to 90 people, syndicate rooms, an expanded Business School Library, a Computer Lab and a modern café with indoor and outdoor seating.

**Special facilities:** This building was the first in the education or public sector in South Africa to achieve a 4 Green Star design rating from the Green Building Council of South Africa (GBCSA). The 5500m<sup>2</sup> building uses “green” materials, such as “smart” glass and timber that is approved by the Forestry Stewardship Council, an international body promoting the sustainable management of forests. The smart glass assists in reducing unnecessary heat gain, keeping lecture rooms and offices naturally cooler.

### 100 aspects rated

The GBCSA applies rigorous, objective rating measures that assess more than 100 aspects of the building design. Nelson Mandela University’s vision and values promote a deep commitment to environmental and social sustainability. Building Africa’s first Green Star rated business school facility helps the University to illustrate the importance of these values and the need to implement them in practice.

The GBCSA 4 Green Star rating followed months of rigorous planning and implementation in the areas of energy efficiency, materials, water usage, indoor air quality, transport, ecology and lighting to ensure the stringent green standards were achieved.

The building incorporates a computerised building management system that measures air quality and controls airflow in the building, managing temperatures and air quality indicators such as carbon dioxide levels. Rooftop photovoltaic cells feed electricity into the national grid. Special systems manage lighting and other energy use, reducing energy use by up to 65%. A weather station helps manage rainwater harvesting for use in toilets, and to water specially chosen carbon-hungry indigenous plants using drip irrigation.

“The Green Star SA rating tool plays a key role in ensuring an integrated design approach with better environmental outcomes, which are clearly evident on this project, where the project team worked closely together to achieve an excellent design outcome for this facility,” said Manfred Braune, Technical Manager for the GBCSA at the time.

Though “going green” adds up to 20% on initial building costs, the University reaps savings of at least R45 000 a year from efficient lighting, the use of occupancy sensors and solar energy (photovoltaic cells contribute 5% of these savings) and a further ±R69 000 in water savings. The buildings uses about 60% less energy than a similar non-green building, and 75% less water due to low flow fittings, the use of air cooled chillers, water-wise irrigation and rainwater harvesting for toilet flushing. The new building has six rainwater tanks each with a capacity of 5 000m<sup>3</sup>.

“This certified rating is representative of best practice in green building design,” said Andy Feldman of the sustainable design consultants Arup.



## Masakhane (BEd Foundation Phase building)

**Faculty:** Education

**Campus:** Missionvale

**Total Project Cost:** R56,1-million

**Completion:** January 2016

**Description/Purpose:** The Bachelor of Education Foundation Phase building close to the Johnson Road entrance on the campus was completed in February 2016.

It has teaching facilities and offices that are tailor-made for students studying Foundation Phase (Grade R to 3) teaching. Special teaching facilities offer flexibility, allowing objects in the room to be moved around to suit the student teachers' needs.

The imposing three-storey edifice with both administrative and training sections overlooks the surrounding township as a beacon of hope to learners who themselves might be called to pursue a career in teaching.

The administrative block includes a security office, bulk storage, a conference room, open plan offices, closed offices and ablution facilities.

A novel bridge links the administrative arm to the training building, which was designed to address the changing needs of the teaching profession.

The training building, which covers two of the three floors, comprises five lecture venues, a resource centre, a special area for postgraduates, a discussion space, storage areas, ablution facilities and opens spaces with loose furniture.

## Inkanyezi (New Science Building)

**Campus:** Summerstrand South Campus

**Total Project Cost:** R57-million

**Completion:** February 2016

**Description/Purpose:** New laboratories, offices, lecture facilities and auditorium.

Inkanyezi, with its triple volume windows, dedicated life science laboratories and distinctive staircase is a thriving centre for both undergraduate and postgraduate Science students.

Completed in 2016, the newly named building offers a 200-seater lecture hall, two other lecture facilities of 64 and 103 seats each on its ground floor, along with office space for administrative staff and a general commons area for students.

The first floor has an extensive 176-station biology laboratory, as well as an adjacent lab tech area where the lab technicians prepare the relevant materials before wheeling them across to the individual stations. There is also a second smaller laboratory.

The second floor is home to the Science Faculty Executive Dean and other staff members. There is also a 59-station microbiology lab, two smaller labs, a computer lab and seminar board room.

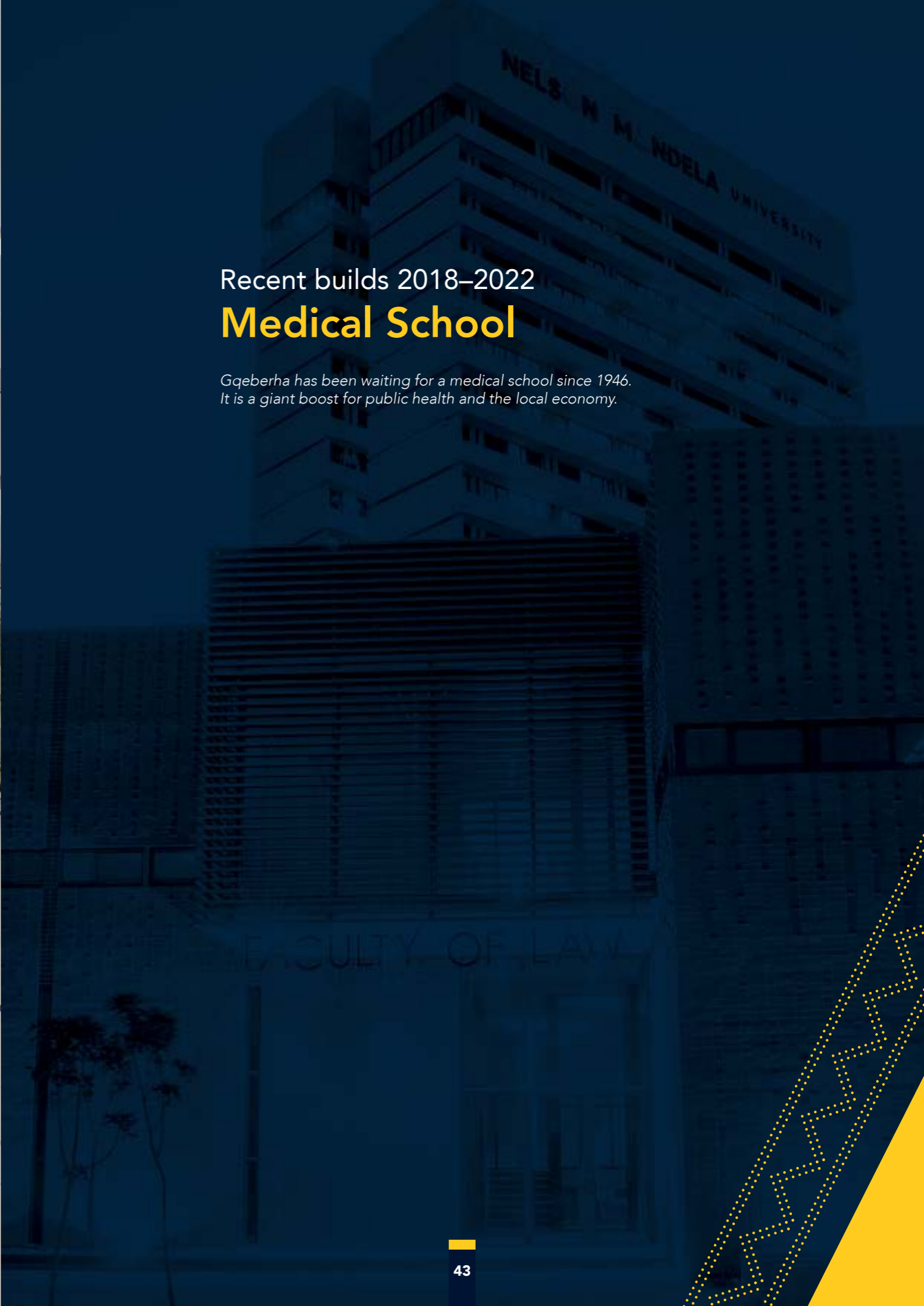
Much of the standalone building overlooks the University's 840-hectare nature reserve thanks to the use of a massive, glazed wall. The fritted glass used reduces heat penetration in keeping with South African safety standards. This standout feature also introduces natural light into the building.





## Recent builds 2018–2022 **Medical School**

*Gqeberha has been waiting for a medical school since 1946.  
It is a giant boost for public health and the local economy.*



The late Executive Dean of Health Sciences, Professor Lungile Pepeta, was a major driving force in getting the Medical School off the ground. He was a very special person and in terms of the construction project, inspired positivity and a belief that the project would be a success from day one. There were so many unknowns and he led the process of approval and implementation.

The University deliberately chose the Missionvale Campus for our Medical School because it is located in the township areas of Missionvale and Zwide, and close to public hospitals and clinics. This sends out a strong message that this is the people's medical school, and contributes to urban renewal and development.

Bill McLachlan was the construction project manager and the architects were Imbono FJA Architects. The Medical School's total build cost was ±R90-million.

"We started with the tender process in August 2018 and handover to Grinaker LTA was on 19 November 2018," McLachlan explained. "The project was completed on 28 April 2021. It included DHET approval and meeting the strict Health Professions Council of South Africa (HPCSA) requirements for their approval. Construction took place over the COVID-19 period, which added complications, but on completion of the Medical School, the HPCSA did the inspection and we were deeply gratified with the feedback, as they said they were highly impressed."

Eight existing buildings on Missionvale Campus had to be converted into various spaces, including lecture halls, a skills laboratory for second to final-year students, and basic science laboratories for physics, chemistry, physiology and anatomy, and 60 offices for medical staff members. Spaces also had to be created for the Medical School at nearby Dora Nginza hospital and the associated clinics.

The first 100 medical students for the six-year MBChB degree started in 2021.

### Going local

Mark Rist of Grinaker LTA said: "All the consultants, including ourselves, the architects (Imbono FJA Architects), the quantity surveyor (KWMH) and the mechanical and electrical engineers (C.A. du Toit Eastern Cape) are Gqerberha-based, as one of the project aims was to use local companies and people. We contracted local SMMEs and individuals from the local ward, such as bricklayers, carpenters and tilers, and undertook monthly training sessions with them in numerous aspects of construction projects, including financial, programme management, and quality, health and safety assurance.





"One of the biggest challenges was to meet the various classifications for different environments in the Medical School, such as the dissection labs that require a spotlessly clean environment that can be easily wiped down and cleaned to ensure there is no bacterial build up, and that is temperature controlled. This required using a lot of stainless steel and making sure we had water tight surfaces. The build was very much a team effort and all the consultants closely collaborated in the design and development to successfully achieve the requirements."

Hubert Sieg of Imbono FJA Architects said: "Architecture is about defining spaces which affect the daily lives of the people who experience them. The process of working with the team from the development of ideas, taking them through the process of design development and ultimately a completed project, is very rewarding. In each project I learn something new about myself and about the society in which we live."



### New technology a game-changer

The Medical School houses the most advanced anatomy and skills laboratories in South Africa. The anatomy lab features the most globally-advanced technology available, including Anatomage virtual anatomy dissection tables, used for interactive anatomical education, radiology, surgery and research. The skills labs features the Body Interact Table, with a simulated patient. No other university in South Africa is currently using this technology.

The Anatomage tables include:

- Full external and internal anatomy of male and female – with all the realism of living humans
- A 3D body platform enabling students to rotate the bio-digital human using their fingers trackpad-style
- The body can be 'cut' and operated on with the system's touch-interactive cutting tools. Cuts reveal internal structural detail, with users scrolling through the plane of the last cut – or cutting again to explore more anatomical features.

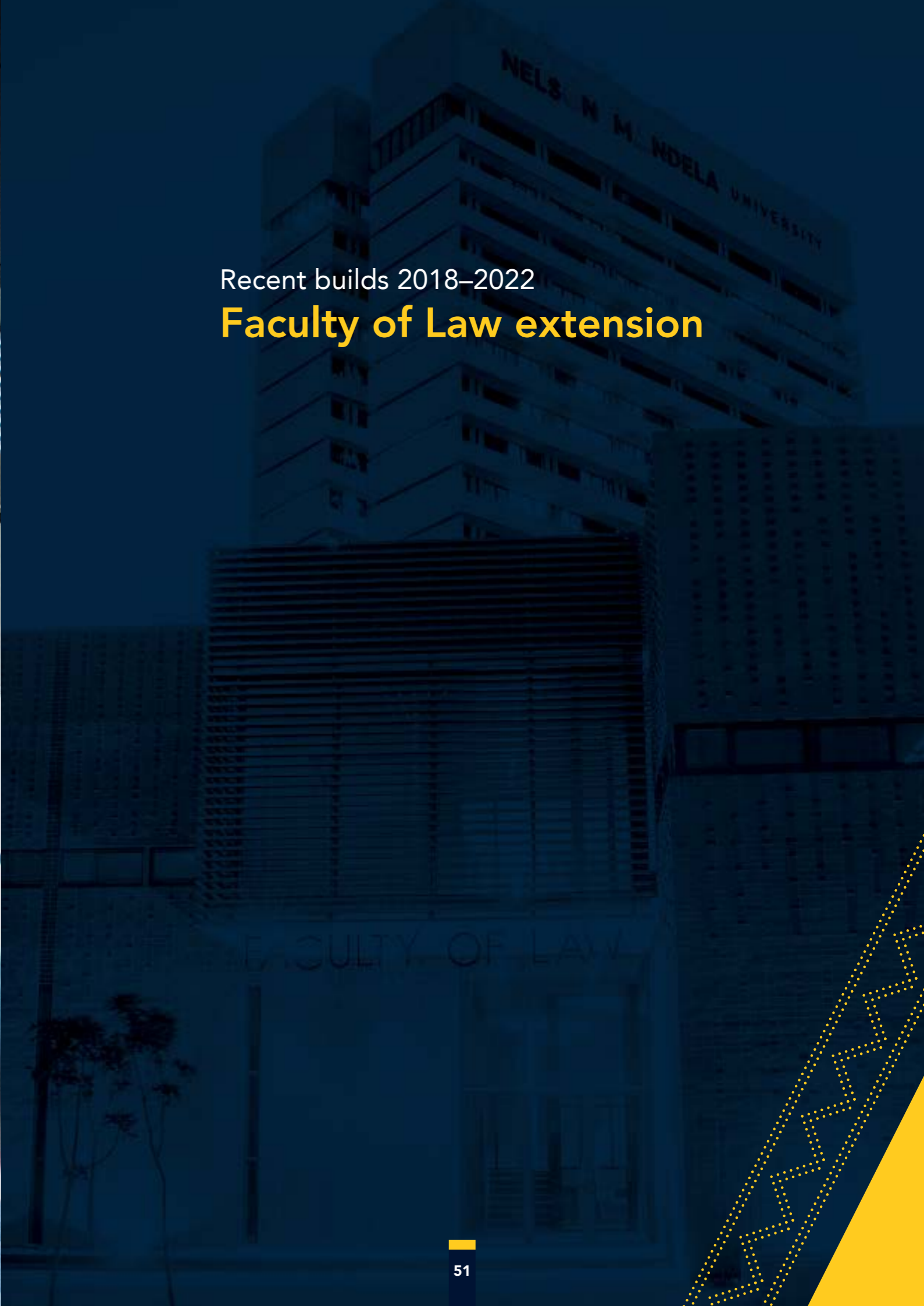
The Body Interact Table (virtual human patients) take medical students through common emergencies such as heart attacks. If, for example, the patient has a heart attack, the student responds, and the system scores them at the end and debriefs them on what they did correctly and what they did wrong. This kind of technology significantly advances medical school teaching.





Recent builds 2018–2022

## Faculty of Law extension





This project started in 2018 with applications under the former Executive Dean of the Faculty of Law, Professor Avinash Govindjee, for an R11.6-million ground floor and first floor 'clip-on' extension to the Faculty of Law infrastructure in the Embizweni building," said Nelson Mandela University Construction Project Manager: Infrastructure Services and Space Optimisation, Gerrit Smit.

"It went to procurement in early 2020, site handover was 1 October 2020 and the building was completed in July 2021. It includes new offices on the first floor for associate, visiting and lecturing professors, a large reception area, a lecture venue that can seat up to 50 people, kitchenette, and a staircase with a bridge linking it the offices on the first floor.

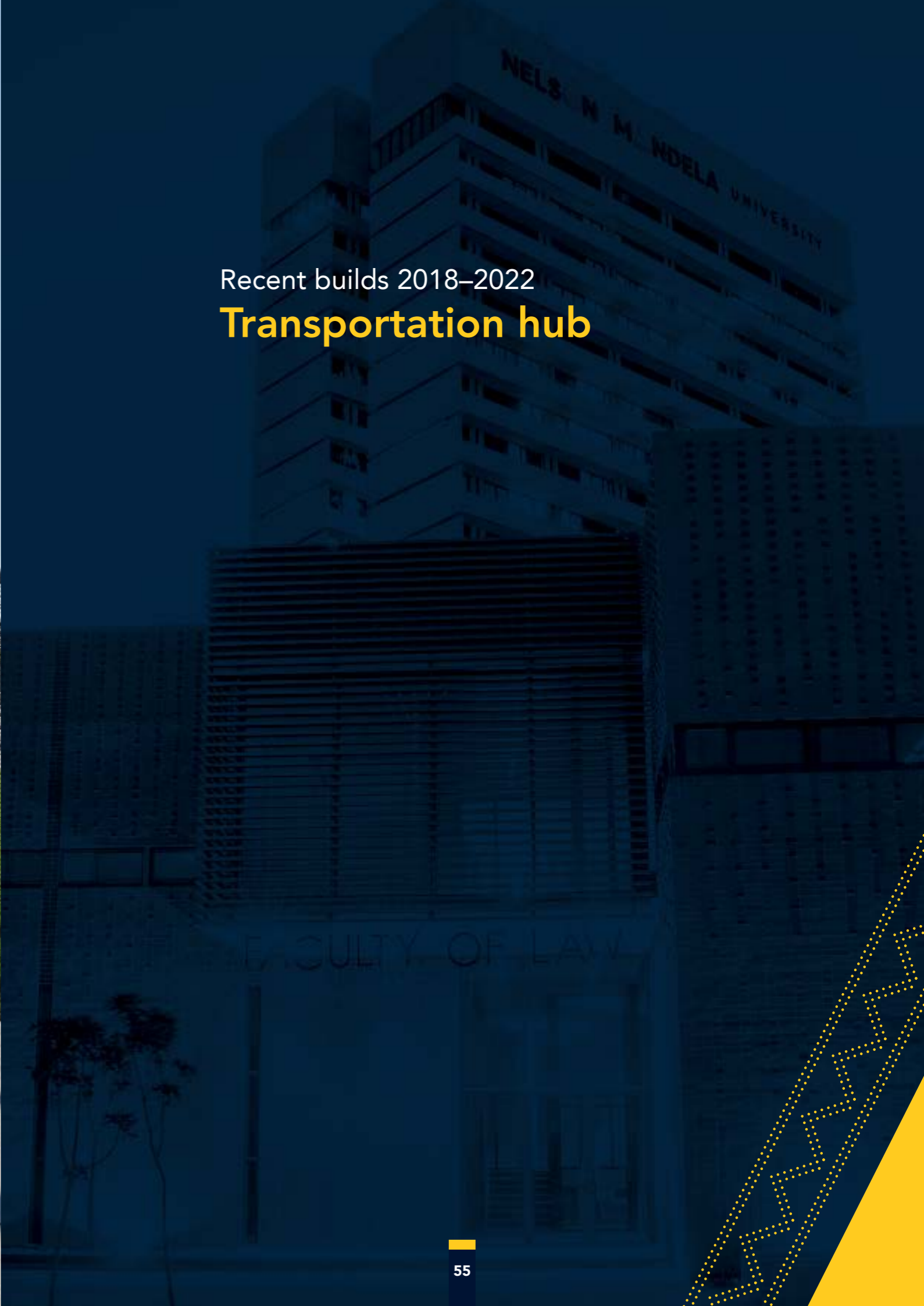
"Leading edge security and teaching and learning technology was installed so that lecturers can lecture up to 500 students via a user-friendly online or hybrid platform. All doors are magnetic locking with the SALTO System, programmed by protection services, as is access with a card reader system."

Sustainability features have been included throughout the extension, including cross ventilation window settings to enhance fresh air flow, water-saving Flushmaster toilets, low maintenance LED light fittings, low maintenance face brick and aluminium shop fronts, two small air conditioners and one large one in the lecture hall and motion sensors in all the offices.



Recent builds 2018–2022

## Transportation hub





“The R9-million Transportation Hub facility, constructed on the corner of University Way and Gomery Avenue (opposite the North Campus Entrance), forms an integral part of the University’s transportation plan, and amongst other addresses the need for a ‘holding’ area for public transporters,” explained the project manager, EAS Engineering Advice & Services, Marcus Niemand. The principal architect was Phillip Loots, Director of Muse Architects.

This facility, together with current improvements to the North and South Campus Entrances and Access Roads, is designed to alleviate traffic congestion and improve the flow of vehicle and pedestrian traffic on and off campus.

“The project encompassed the construction of the Transportation Hub, which can accommodate up to 32 minibuses, complete with abution facility, perimeter fence, access control, CCTV surveillance, and other features.”

### Emerging Micro Enterprises (EMEs)

It was an express condition of the contract that a minimum of 30% of the contract be subcontracted to a minimum of three Exempted Micro Enterprises (EMEs), who are 100% owned by black people, operate from premises within the Nelson Mandela Bay Municipal boundary, and are registered with the correct CIDB contractor gradings, for the appropriate type and value of the subcontracted works.

The Construction of the Transportation Hub was awarded to the contractor, Kayalihle Trading on 22 July 2020 and completed by them on 3 September 2021.





## New entrance for Summerstrand South Campus

Engineering Advice & Services (EAS) was appointed by Nelson Mandela University in August 2018 to provide professional civil engineering services for proposed upgrades to the Summerstrand Campus entrances. EAS conducted a traffic study to determine the requirements at each campus entrance that are necessary to accommodate vehicle and pedestrian movements while minimising delays to all road users and impacts on the adjacent community.

Based on the findings, the following phased construction approach was adopted:

- **Phase 1:** Construction of the new Strandfontein Entrance and Access Road (New South Campus Entrance)
- **Phase 2:** Upgrading of the existing North Campus Entrance and Access Road (Gardham Road), including closing of the existing South Campus Entrance at the University Way / Gomery Avenue traffic circle
- **Phase 3:** Construction of the new North Campus – South Campus link road.

Phase 1 covered the construction of an access road and entrance road link from Strandfontein Road to the South Campus through a new entrance and 1.2km tarred road via the nature conservation reserve. It includes a new gate house and associated concrete features, signage walls, access control, CCTV, security fence and gates, solar power installation, street lighting, and landscaping.

This entrance reduces the traffic on Admiralty Way, University Way and Gomery Avenue and operates from 6am to 6pm, with a sliding gate that is closed at night.

The main part of the contract was civil works, done by Engineering Advice & Services (Pty) Ltd, managed by civil engineer Marcus Niemand. The architects were DBA architects.

The seven-month project was completed in May 2022 at a cost of R17.2-million. The main expense was the roadworks at ±R12-million. A solar PV yard has been constructed adjacent to the new gate house, and supplies electricity to the gate house, and a portion of the low impact lighting along the new access road.

The recently completed Transportation Hub facility, constructed on the corner of University Way and Gomery Avenue (opposite the North Campus Entrance), together with the above Phases 1, 2 & 3 form an integral part of the Mandela University's transportation plan. It is at this stage envisaged that Phase 2, covering the upgrading of the North Campus entrance and access road, will be implemented in 2023.

## Summerstrand North and South, and George campuses **Student residences**



## Student Residences North and South campuses

In a first for South Africa, and possibly Africa, Nelson Mandela University used a novel 'Peri Uno' building method to speed up construction of much-needed turnkey student accommodation in the Sanlam Student Village and North Campus.

With the country facing a shortage of on-campus beds at tertiary institutions, Nelson Mandela University prioritised increasing its on-campus accommodation by 1800 additional beds, from 3870 beds at the start of 2020 to 5868 by the end of 2022.

### Peri Uno building model

Nelson Mandela University Construction Project Manager: Infrastructure Services and Space Optimisation Bill McLachlan said there were numerous benefits to the cost-effective Peri Uno building model chosen.

"It is urgent for us as a university to expedite the process of getting infrastructure built," he said, and Peri Uno helped to speed up the timeframe.

The new residences in Summerstrand are turnkey projects from design concept through to furniture, IT and finishes. The total cost was R660-million for 1800 beds, which is ± R300 000 per bed.

### Green infrastructure

In keeping with the University's sustainability drive, green opportunities are top of mind in all infrastructure projects. Water conservation in particular is key due to ongoing drought and intermittent power outages in Nelson Mandela Bay. Boreholes are used for the toilets via a gravity-based water system. Potable water tanks have also been installed in case of emergency.

The University's South Campus already has an R18-million green power plant with a 20-year lifespan, erected in 2018. The installation of the two-hectare solar photovoltaics (PV) power plant can produce 1740 MWh of electricity per year.





### Empowerment

Local SMMEs are an integral part of the project, working in teams in learning new skills associated with the Peri Uno building method.

Mandela University Deputy Director: Physical Planning, Graham Gouws, explained: "SMMEs were trained up to do the formwork for the Peri Uno method and get some experience on the system. This will enable them to work on any future projects that use the same method."

While budget would not allow the incorporation of photovoltaic solar panels on the new residences, the three-storey buildings have been constructed to allow for their introduction at a later stage.

### A first for South Africa

McLachlan said this was the first time the German-origin Peri Uno method was being used on a major South African project. It is a maintenance-friendly method of construction, which offers both good ventilation and insulation. It is also easy to adapt in terms of extensions or interior changes.

"There is no brickwork in Peri Uno," said McLachlan, outlining how walls, columns, slabs and beams are shuttered simultaneously and concreted using the monolithic construction method.

All the formwork elements are made of aluminium, and thus very light. The aluminium elements are prefabricated on a project-specific basis and can be assembled without a crane. Floors can be concreted in regular three-day cycles which speeds up construction.

Despite more than one stoppage due to lockdown, and other challenges, Grinaker-LTA remained on target to hand over the residences at the end of 2022.

### Blueprint for sharing

Each residence block comprises 15 or 16 pods. Special provision has been made for differently-abled students, and for dedicated living quarters for residence staff.

Each pod, or living area, accommodates eight students in four double rooms, and comes with shared kitchen and bathroom facilities, and a study room.

Special provision has been made for differently-abled students, with the inclusion of some single rooms, and for dedicated living quarters for residence staff.

The combination of this agile building approach with a creative funding model has enabled the University to expand the number of beds it is able to build, and is presently being considered as a blueprint for sharing with other institutions.

With demand for reasonably-priced student accommodation far outstripping supply, the University has also intensified its efforts to accredit accommodation in private residences. By January 2021, more than 12 000 beds, mainly in Summerstrand, Humewood, Korsten and Central, met the University's accreditation criteria. This is up from 6000 in 2019.

### Emerging Micro Enterprises (EMEs)

It was an express condition of the contract that a minimum of 30% of the contract be subcontracted to a minimum of three Exempted Micro Enterprises (EMEs), who are 100% owned by black people, operate from premises within the Nelson Mandela Bay Municipal boundary, and are registered with the correct CIDB contractor gradings, for the appropriate type and value of the subcontracted works.

The Construction of the Transportation Hub was awarded to the contractor, Kayalihle Trading on 22 July 2020 and completed by them on 3 September 2021.

## Johnny Clegg Residence (George Campus)

Architect Neal Fisher of DMV Architecture was the architect and in March 2019, the contractors, Alpha Omega, were appointed to build the 200-bed residence, which includes two rooms for disabled students. Construction was put on hold for three months during the pandemic, and so completion was in November 2020. .

The campus has grown considerably over the past few years, which called for additional student accommodation. The new residence was designed with sustainability principles front of mind, including split water reticulation with a borehole providing water for the toilets, energy-efficient lighting and low maintenance.

The residence consists of a series of pods where eight students share a kitchen and ablution facility, and is a striking departure from the original dormitory-style accommodation. Former staff houses have also been converted to provide additional student accommodation. In these, the electric geysers have been replaced with solar geysers and heat pumps.



## Why we need to give our students quality yet affordable accommodation

Dean of Students Luthando Jack outlines the value of 2000 new student beds on campus.

Until recently, government had not been assisting with infrastructure grants for student residences, which would have gone a long way towards meeting the demand. The non-funding coincided with the massification of higher education institutions, but was not accompanied by infrastructure budget allocations.

Government has since recognised that student accommodation is a pressing issue, with President Cyril Ramaphosa emphasising its importance.

Before the COVID-19 pandemic hit South Africa two years ago, the Department of Higher Education and Training (DHET) reported that there was a national shortfall of 300 000 student beds to serve the 2.5 million students enrolled across all tertiary institutions.

This is a reality in our country today, particularly at a university such as ours, which prides itself on enabling access to a wider band of applicants.

### 17 500 NSFAS beneficiaries

To put matters into perspective, at the moment we have about 17 500 National Student Financial Aid Scheme (NSFAS) beneficiaries out of a student body of 31 000 and, as with all our students, they require an environment conducive to healthy living and learning.

Studies have shown that students staying on campus perform far better, as accommodation plays a significant contribution to student success and the facilities, design and location of a residence all have an impact on student life.

In the past, many of our students would have been excluded from tertiary studies through no fault of their own. Many also are the first in their family to study after school, and it is imperative that we show this next generation of leaders that we welcome them, and will take good care of them, while they are with us.



Luthando Jack

“ ... students staying on campus perform far better, as accommodation plays a significant contribution to student success ... ”

## Mandela University's bold approach

Grinaker-LTA was contracted to construct the residences based on the Peri Uno building method. This is the first time it is being used in South Africa.

“We partnered with Peri and were most appreciative that Nelson Mandela University was bold enough to take on this novel method in South Africa,” says Mark Rist, who was with Grinaker-LTA at the time of the build. “The system we purchased was designed in South Africa, manufactured at the Uno plant in Turkey and shipped to South Africa.

“You first create a shell from aluminium panels bolted together and then put in all your services. From here you pour the 150mm thick walls and roof all-in-one into the shell and once it dries, you strip down the shell for re-use. The system lends itself to repetition and speed of construction: every four days you have a four-bedroomed apartment standing. Bricklaying the same structure would take about three weeks.

“The interior walls are then skimmed off and painted cream. We included feature walls in orange, red and mauve to add to the design, and chairs and tables that complement this. The level of the finishes, all the way to IT is of a high standard and we are very proud of the result.”



### SHIP aiming for 200 000 beds

The Department-led Student Housing Infrastructure Programme (SHIP) plans to provide 200 000 beds at universities and 100 000 beds at TVET colleges by 2030.

Against this backdrop, Nelson Mandela University's recent addition of 2000 new beds may seem small, but to those who will call these new residences home while they study, it is significant.

It has been made possible with an innovative funding model to ensure the best return on investment. Nelson Mandela University supplemented its government grant, received

once every three years with loan funding to fast-track the student residences.

This approach is being considered as a blueprint for building future residences and sharing the model with other institutions. Based on the NSFAS figures, about 14 000 Mandela University students need accommodation. Nelson Mandela University ideally needs to add 10 000 residence beds to the existing accommodation.

More student accommodation helps more South Africans access quality education, which is key to building human capital. The resultant larger pool of capable, skilled, trained

citizens – with jobs – will help to reduce income inequality and promote social mobility.

### Long term strategy

Long term, Mandela University is working on a three-pronged strategy:

1. Building new residences
2. Creating a student-friendly city
3. Working with private accommodation providers.

On-campus accommodation generally caters more to junior students to help them acclimatise to university life. The new

stock of beds in Summerstrand will therefore be mainly for first-year students.

The University's Student Transportation Strategy, or shuttle system, helps students travel easily to any of our seven Gqeberha campuses. Medical students, for example, use this transport to get to the Missionvale Campus.

### Off-campus accommodation

The University continues to source off-campus, quality accommodation and has accredited more than 11 000 beds provided by the private sector. They are required to meet the minimum norms and standards as determined by the DHET.

## Innovative funding method and social justice prioritised

By Nelson Mandela University Executive Director Finance, Mike Monaghan

The Council decision to insource previously outsourced staff in 2015 was a complicating factor for Mandela University, as it has had a huge impact on our finances.

Catering, cleaning, security, horticulture staff – and a lot of these staff work at residences – had previously been on a minimum sectoral wage for the industry and after insourcing, saw significant increases in remuneration and benefits.

This decision was rightly taken as this was a social justice priority. Bringing on board these previously outsourced services did, however, have an impact on the viability of the funding model for residences.

Hence the University worked towards developing a sustainable funding model, engaging with the Department to produce the model that we now have, which is cash-flow neutral from year one.

### Dual benefits via NSFAS

If the accommodation fees are fully covered from the DHET budget for NSFAS students (channelled through NSFAS to the University), and are used in part to fund capex, then the department gets a dual benefit out of the funding. It covers the NSFAS student's accommodation fees while increasing the asset base of the sector (number of beds on campus).

This capital funding model, where we have a percentage of university funds, grant funding and loan funding, permits us to scale up the number of beds on campus to the benefit of our students, the University and the Department.

In addition to the imaginative funding model, the new residences are being built with the innovative Peri Uno construction method, which enables floor plans to be easily duplicated easily, and gives a cost saving at scale. The residences also include various sustainability interventions and form part of the University's broader infrastructure plans.



Mike Monaghan

“This approach to pooling university and departmental funds has enabled Nelson Mandela University to get the most bang for its buck ... ”

This approach to pooling university and departmental funds has enabled Nelson Mandela University to get the most bang for its buck, and is certainly worth replicating in future projects. Treasury is on board with our funding models which can serve as a blueprint for other student accommodation construction projects.

## Bird Street Campus Felsted refurbishment

The Bird Street Campus' three-storey Felsted building is an ongoing project, started in 2016, with completion in three phases and a budget of R5.4-million. It is older than 60 years and therefore rated as a heritage building.

"In approximately 2017, the Bird Street Campus was converted into a 24/7 hot office spacing, with computers for 50 students and the SALTO system to access the computer lab," said Nelson Mandela University's Gerrit Smit who is trained in value engineering and managed the contract and all the consultancy work, including the full bill of quantities and procurement, specifications, methods and materials, in collaboration with the Chairperson of Transformation, Professor Andre Keet, and all the user departments in the venues, including 80 staff members.

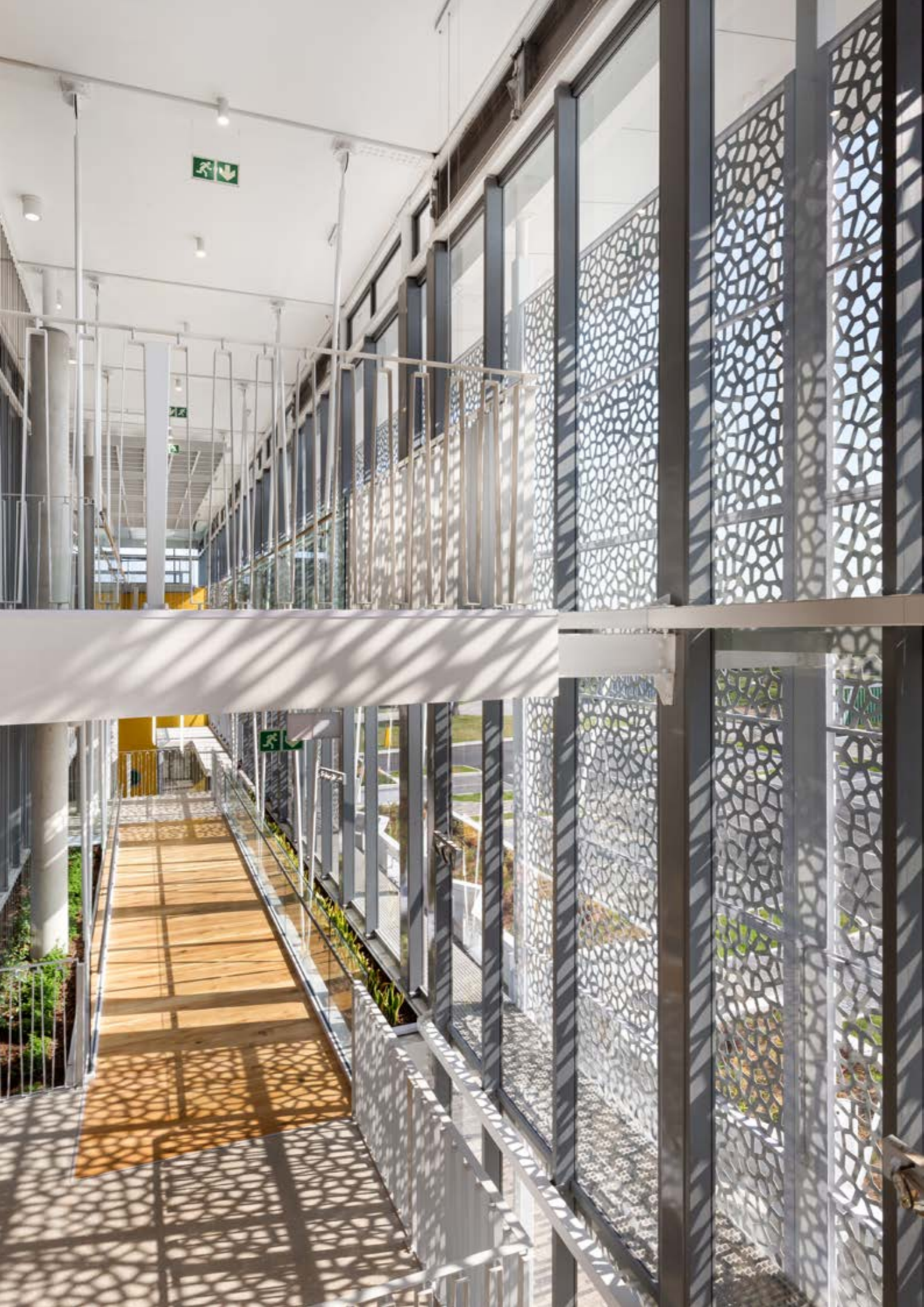
The refurbishment also included:

- Replacing the old steel windows with aluminium at a cost of R800 000 and repainting the building.
- Upgrading the ground and first floor - completed in 2020 with a budget of R4.4-million.

"We created expansive open plan offices from a lot of smaller offices and smaller storage rooms," Smit said. "We installed switchgear and data cabling for all the IT, computers and telephone systems in the building, as it is over 50 years old and needed to upgrade to the latest technology. This was delayed during the pandemic as it is all imported."

The building is now fitted throughout with LED lights, upgraded computer, mechanical and electrical reticulation, the latest Euro plugs for charging, docking stations in all open-plan spaces, and three additional seminar spaces where the blinds were removed and the windows covered with translucent film to keep the building on the northern side warm in winter and cool in summer. The toilets were fitted with the water-efficient Flushmaster system, and water tanks have been installed, as well as a back-up generator.





## Ocean Sciences Campus





The Ocean Sciences Campus (OSC) is Nelson Mandela University's newest campus, reimagined from the old CSIR campus that Nelson Mandela University purchased a few years ago. The OSC has unique additions like the new Science Centre currently being built, and extensions to the monotonous old buildings that give it an inviting 21st-century aesthetic.

The first phase of renovations was completed in September 2017. The second phase will be completed by the end of 2022.

The project brief called for the creation of a new 'entrance' building and visual identity for the Ocean Sciences Campus, while also providing a number of different spaces within the specialised research environment.

The building is conceptualised as a large veranda space, articulated as a triple-volume, multi-layered foyer space which links the main circulation spine with more private spaces within. The internal planning contains a number of dedicated research spaces, offices and meeting areas, as well as an eight-metre-deep diving tank used for training purposes, forming an integral part of the western façade.

#### **Multi-use transdisciplinary postgraduate campus**

"It's becoming an exciting campus, and once the renovations are completed, outdated structures will be transformed into contemporary architecture, and serve their purpose as (part of) an appealing, multi-use transdisciplinary postgraduate campus," said Graham Gouws, Deputy Director: Infrastructure Projects at Mandela, who is managing the Ocean Sciences Campus project.

All tenders are done according to a supply chain management process and all contracts have a 30% value allocated to local SMMEs.

Work started in 2016 with the construction of the gateway entrance and the reconfiguration of A block. E and H blocks were then modified and modernised to house postgraduate labs, offices, a growth chamber, technical workshops and a large open-plan area for the hyperbaric chamber, storage for research equipment, and equipment maintenance.

A commons and conference area, consisting of a 100-seater seminar room, three smaller boardrooms and a coffee shop area, were completed in B block at the beginning of this year.

The E and C block extensions and renovations are currently underway and are scheduled to be completed by the end of 2022. The work includes multi-purpose spaces utilised by





postgraduates and visiting academics, labs, research offices, hot offices, boardroom spaces, and an eight-metre-deep diver training tank.

There are connecting bridges between E and C, flanked by a three-storey vertical green wall. Elana Storm from the University's horticulture department is assisting with the choice of indigenous plants to populate the green wall, which will look beautiful and have low water requirements.

A three-dimensional sun-screen layer further defines the main building façade, and was designed by the Ocean Science Campus architects, SVA International. "The system reduces heat gain, and at the same time, gives visual identity to the Ocean Sciences campus," said Tony Danev of SVA International, who graduated cum laude from Nelson Mandela University with a Master of Architecture in 2007.

The sun-screen layer also provides a unique aesthetic inside the buildings, with ever-changing shadow patterns throughout the day, effectively creating an animated space internally.





## The Science Centre and digital dome

## Mandela University's Digital Dome a multi-purpose gift for all

The addition of a large dome to the skyline at Nelson Mandela University signals another leap forward in the transformation journey of this institution in the service of society.

The iconic new Digital Dome on the Ocean Science Campus, completed in July 2023, will not only serve the University's academic project but also the wider Gqeberha and Eastern Cape community. Its multi-purpose, immersive functions will be a major boost to everyone's understanding of science and other areas of study.

"Our Digital Dome or Science Centre as it is also called, will be an exciting intermediary between our university, our partners and the public ... It will be a dream to see it serving as a platform for our scientists and researchers to share their work, explain complex concepts, and foster dialogue and knowledge sharing with visitors," said Deputy Vice-Chancellor: Research, Innovation and Internationalisation Dr Thandi Mgwebi.

The Digital Dome is the most sophisticated in the country to date, with only two other comparable counterparts at Iziko South African Museum in Cape Town and on Naval Hill in Bloemfontein.

### Capabilities

The Digital Dome was funded by the Department of Higher Education's (DHET) Infrastructure Efficiency Grant, and offers capabilities beyond that of a planetarium.

"Apart from the astronomy aspect, the Digital Dome offers technology that allows the viewer to be immersed in other worlds, such as the marine environment, thanks to the 360-degree screening techniques on the dome of the building," explained the head of infrastructure planning, Graham Gouws. The dome screen is suspended inside a concrete outer shell.

The two-storey, 138-seater Digital Dome building has an extensive open-plan exhibition space, a 100-seater interactive teaching laboratory with moveable desks, a 60-seater digital space, a small boardroom and a number of offices, including for VIP guests, presenters and the facility manager.





## What's on at the Dome?

Film footage can be bought, hired, or produced, including everything from astronomy to the ocean depths. The University intends to produce its own screening material and will also have access to shared material as part of the SkySkan group.

The screened content will be controlled by the presenter, who will have different presentation options. It ranges from interactive engagement by the presenter or online narrator to the conventional screening of movies.

### Digital dome in numbers

- Two-storey high
- Six weeks to pre-manufacture the dome screen components
- Four weeks to reach South Africa by ship
- Five weeks to put the dome screen in place
- Internal dome diameter of 15 metres
- 136 seats
- 2 places for wheelchairs

### Dome builders

1 American and 2 Indian experts along with a team of 10 Mandela University staff, reduced to five once the dome superstructure was completed.

### How does the screening work?

Six projectors are positioned in a circle around the dome seating area. These projectors are all linked to the control area at the rear of the dome space.

Each projector will project a portion of the footage (roughly a quarter), with special software stitching the images together so that the footage can be projected onto a spherical screen that immerses the audience in the presentation.

The software is specifically designed for digital domes and is called Dark Matter.

The projectors are all 4K Sony projectors that offer ultra-high-definition (UHD) viewing, especially when combined in an 8K projection system.

"This one-of-a-kind building will offer an immersive experience with three-dimensional images projected onto the dome, and completely surrounding the viewer. It will be a bit like the IMAX theatre – but bigger," enthused Gouws, referring to the 15-metre high-resolution images.

In addition, the 3 2752m<sup>2</sup> facility (1 699m<sup>2</sup> ground floor, 1 576m<sup>2</sup> first floor) will also be home to the University Shop and a coffee shop that will open onto a large forecourt overlooking University Way.

### Transformation of spaces

The Digital Dome and its neighbour - the iconic engineering building across the road on University Way, named 'Newtonian' - will both face onto what will become a pedestrian boulevard for the institution. It will provide a safe walking passage for staff and students, lined with indigenous trees and seating to create a social meeting node.

There is currently a road here, used by vehicles to access South Campus, which will be downscaled to a narrower internal road.

An attractive pedestrian walkway will link the campuses. Fences between North Campus and the Ocean Sciences Campus will be removed once the new entrance to North Campus is completed as part of the ongoing physical transformation of Nelson Mandela University. The timeline for the latter is dependent upon funding.

### Making science accessible

Dr Thandi Mgwebi said "the time is now" in terms of providing equitable access to science education and in

striving to create welcoming and inclusive environments for all visitors.

"By design, science centres provide a dynamic platform for universities to engage with the public, enhance science education, foster scientific curiosity, and bridge the gap between academia and society. They provide a platform for promoting an inclusive and informed scientific community. Interaction with the public enhances science communication and builds trust between researchers and the public."

Dr Mgwebi added that a management plan towards ensuring these objectives are achieved was in place, and staff had been appointed to drive this.

### Community engagement benefits

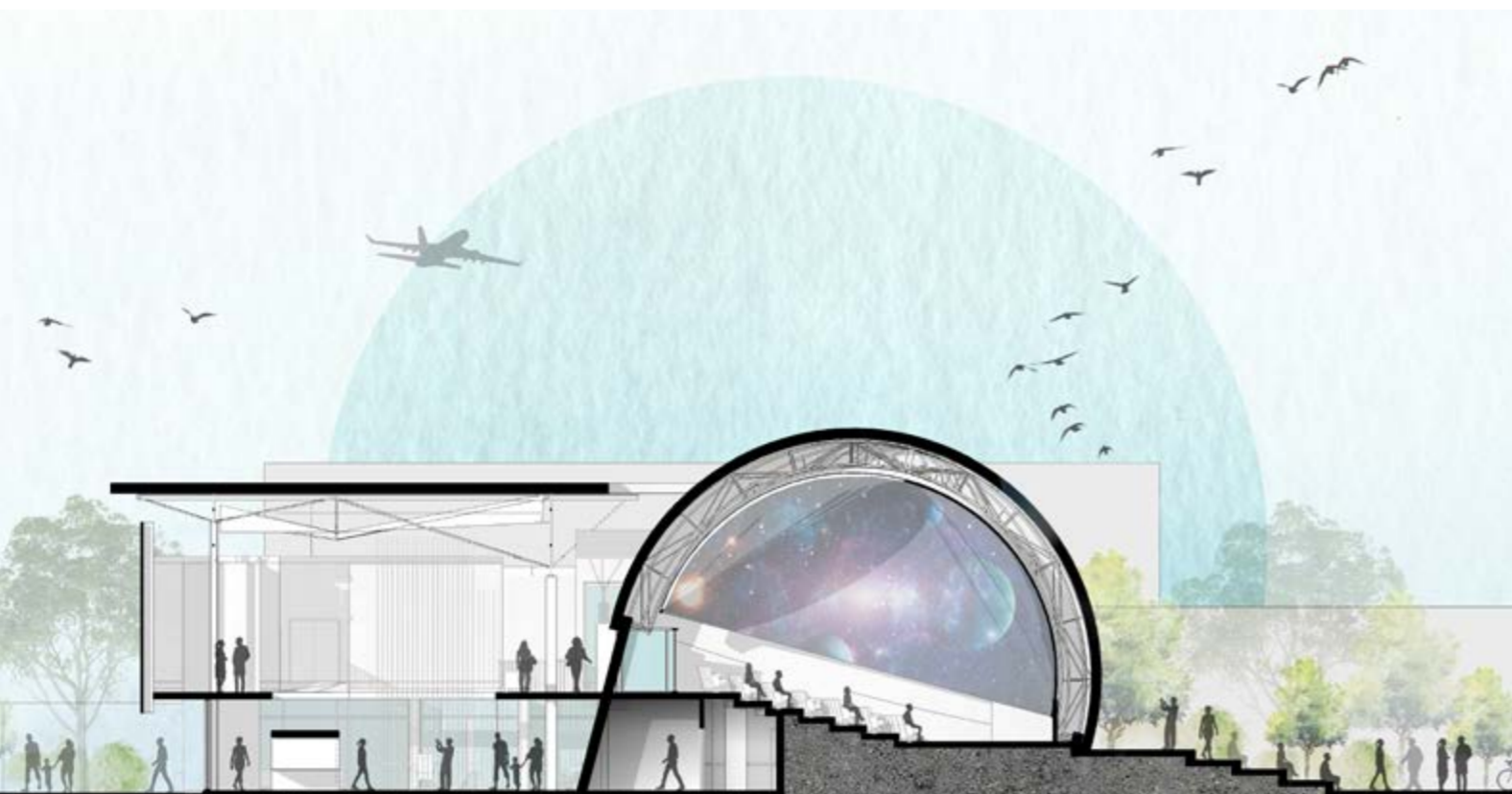
The Digital Dome will benefit the institution in terms of additional teaching spaces across all disciplines, as well as the Nelson Mandela Metro and Eastern Cape more broadly.

"This facility is for the wider community, especially teachers and school children to learn about any range of things. The Digital Dome is a facility from which we can all benefit," says the head of infrastructure planning, Graham Gouws.

"School children who visit will enjoy a tour, inclusive of a 3D show, and are unlikely to forget the experience. They can be exposed to everything from life under water to the possibility of life in outer space. The learning opportunities are endless."

Guest lectures, conferences, exhibitions, and transdisciplinary gatherings will also be hosted at the Digital Dome.

## Infrastructure builds 2010–2016



### **New Astroturf**

**Campus:** Summerstrand South Campus  
**Total Project Cost:** R8-million  
**Completion:** January 2016  
**Description/Purpose:** Astroturf for hockey.

### **InnoVenton extensions**

**Campus:** InnoVenton  
**Total Project Cost:** R9-million  
**Completion:** April 2016  
**Description/Purpose:** Expansion of InnoVenton's current operations; lecture facilities and offices.

### **New bitumen laboratory**

**Campus:** Summerstrand North  
**Total Project Cost:** R8.5-million  
**Completion:** March 2015  
**Description/Purpose:** Laboratory for bitumen testing (for Civil Engineering students).

### **Upgrading and expansion of disability facilities and assistive technologies**

**Campus:** Across all campuses  
**Total Project Cost:** R8.3-million  
**Completion:** March 2015  
**Description/Purpose:** New lifts, ramps and ablutions  
**Special facilities:** Lifts, ramps and ablutions for disabled people.

### **Nelson Mandela University Art Gallery**

**Campus:** Bird Street  
**Total Project Cost:** R3-million  
**Completion:** August 2015.

### **George Gym**

**Campus:** George  
**Total Project Cost:** R3-million  
**Completion:** 2015.

### **High Performance Centre**

**Campus:** Summerstrand South Campus  
**Total Project Cost:** R40-million  
**Completion:** 2014  
**Description/Purpose:** Facilities for students studying Human Movement Science, biokinetics and dietetics.  
**Special facilities:** Includes a state-of-the-art indoor track and field facility that will assist top athletes to reach their full potential. It is described as the first complex of its kind in the country.

### **Residences: 312 beds**

**Campus:** Summerstrand North  
**Total Project Cost:** R119-million  
**Completion:** 2014  
**Description/Purpose:** Accommodation for students.

### **Residences: 74 beds**

**Campus:** George  
**Total Project Cost:** R3-million  
**Completion:** 2014.

### **Lecture facility**

**Campus:** 2nd Avenue  
**Total Project Cost:** R10-million  
**Completion:** 2014.

### **Fitness & Aquatics Centre**

**Campus:** South  
**Total Project Cost:** R8.2-million  
**Completion:** 2013.

### **The Centre for High Resolution Transmission Electron Microscopy (HRTEM)**

**Campus:** South  
**Total Project Cost:** R30-million  
**Completion:** 2011  
**Description/Purpose:** The HRTEM Centre is a facility for advanced electron microscopy. This is the most sophisticated building of its kind in the Southern hemisphere, housing state-of-the-art electron microscopes. A first for South Africa and Africa is the double aberration corrected transmission electron microscope, microscope specimen holders and electron detector technology (the DENS solutions wildfire holder and the Merlin for EM Hybrid Pixel Detector).

### **Missionvale Library**



**Campus:** Missionvale  
**Total Project Cost:** R39-million  
**Completion:** 2010  
**Description/Purpose:** Library  
**Special facilities:** The library has won awards for its eco-friendly infrastructure, including the introduction of outside air into the building, controlled by sensors monitoring internal CO<sub>2</sub> levels, and eliminating unnecessary heating or cooling. The library is among the first buildings in the country to incorporate the Digital Addressable Lighting Interface system (DALI) with a KNX control system, which automatically controls internal lighting levels via daylight harvesting sensors and occupancy sensors. Maintaining a stable environmental condition is crucial, as light can be damaging to books.

## **Naming and renaming project**

Phase 2 (2022)



The Naming and Renaming programme of Nelson Mandela University symbolically signals the University's commitment to transformation in naming places, spaces and buildings that enhance the Mandela name while entrenching the institution's ever-growing intellectual identity. Below is a list of buildings renamed in 2022.

## Gqeberha Campuses

	NEW NAME	MEANING	FORMER NAME
<b>Faculty of Business and Economic Sciences</b>			
	<b>Vulindlela</b>	The isiXhosa word <i>vulindlela</i> means pioneering. This building on Second Avenue Campus is a lecture venue.	The Oval Building
	<b>Heshima</b>	<i>Heshima</i> is a word originating from KiSwahili that means respect. This building on Second Avenue Campus is a lecture venue.	MMM Loubser Auditorium
	<b>Ulwazi</b>	<i>Ulwazi</i> means knowledge in both isiXhosa and isiZulu. This South Campus building contains lecture halls for the Faculty of Business and Economic Sciences and the venues, until now unofficially unnamed, will now bear a name which reflect this.	Building 123
<b>Faculty of Education</b>			
	<b>Isivuno</b>	The isiXhosa word <i>Isivuno</i> means crop or harvest, and holds a similar meaning in isiZulu.	Building 6
	<b>Masakhane</b>	The Foundation Phase building on Missionvale Campus is named <i>Masakhane</i> , the isiXhosa word meaning "let's build each other up" and in this context alludes to curiosity, willingness and hunger for knowledge. It is also a political slogan of solidarity.	Foundation Phase Building
	<b>Imbewu</b>	The word <i>imbewu</i> means seed in isiXhosa and isiZulu. This centre on South Campus nurtures the seed of learning for students and staff.	Resource Centre

	NEW NAME	MEANING	FORMER NAME
<b>Faculty of Engineering, the Built Environment and Technology</b>			
	<b>Mapungubwe</b>	The ancient city of Mapungubwe in Limpopo is an Iron Age archaeological site rich in biodiversity and cultural importance. Before it was abandoned in the 14th Century, it developed into the largest kingdom on the sub-continent. Mapungubwe is thought to have traded gold and ivory with China, India and Egypt and today it is a UNESCO World Heritage Site.	New Engineering Building
	<b>Newtonian</b>	Named after the physicist and mathematician, Sir Isaac Newton, this South Campus building was formerly known as the new new engineering building. Newton was a major figure in the Scientific Revolution of the 17th Century. Perhaps best known today for his work in the field of mechanics, his three laws of motion are the basic principles of modern physics and led to the formulation of the law of gravity.	New New Engineering Building
<b>Faculty of Humanities</b>			
	<b>Ingoma</b>	The Rwanda-Rundi origin of the word <i>ingoma</i> means drum reign or kingship. Ingoma is a Department of Music lecture venue.	Building 10
	<b>Nomhle Nkonyeni</b>	Renowned actress Nomhle Nkonyeni (1942-2019) was born in New Brighton, Gqeberha. She was a pioneering black stage actress who formed part of the renowned Serpent Players, founded by Athol Fugard. Nkonyeni gave herself entirely towards developing and preserving the arts in South Africa, and has had a significant influence on the younger generation of artists.	Building 35


	NEW NAME	MEANING	FORMER NAME
<b>Faculty of Law</b>			
	<b>Dulcie September</b>	Dulcie September (1935-1988) was an anti-apartheid activist born in Athlone in the Western Cape. Her work with various resistance groups throughout her life, particularly the ANC, was incredibly influential in the fight against apartheid. September was assassinated in 1988 and naming this Cuyler Street building in her honour celebrates her contribution to human rights.	Law Services Building
	<b>Pius Langa</b>	Former Chief Justice and head of the Constitutional Court Pius Langa (1939-2013) was born in Bushbuckridge in Mpumalanga (formerly known as the Eastern Transvaal). He was dedicated to improving the quality of life of his fellow South Africans through a colourful legal career spent largely in service of the disadvantaged and oppressed. It is therefore appropriate to name the newest building in the Faculty of Law after this legend in the legal profession.	New Law Building
<b>Faculty of Science</b>			
	<b>Mvezo</b>	The village of our namesake's birth, Mvezo is on the banks of the Mbashe River, not far from Mthatha in the Eastern Cape. This South Campus building is a lecture venue	Building 12
	<b>Katherine Johnson</b>	African-American mathematician Katherine Johnson (1918-2020) was a NASA employee who was critical to the success of the first and subsequent US-crewed space flights. She is considered an American hero and pioneer. Among other pioneering space missions, she developed calculations that helped the US launch its first astronaut into space in 1961 and safely land Apollo 11 on the moon in 1969, among other pioneering space missions. The Physics and Chemistry departments use this building on South Campus as a lecture venue.	Building 13

	NEW NAME	MEANING	FORMER NAME
	<b>Inkanyezi</b>	This South Campus building is an administration and lecture venue, and draws its new name from the isiZulu word for star, <i>inkanyezi</i> .	Building 127
<b>Ocean Sciences</b>			
	<b>Eleanor Xiniwe</b>	Eleanor Xiniwe (1863–1919) was a pioneer of business in South Africa who was also actively engaged in politics and striving for social change. Born Eleanor Ndwanya at Annshaw Mission near Middledrift in the Eastern Cape, she married Paul Xiniwe in 1885. They opened the first hotel for Africans in 1894 in Qonce (formerly King William's Town) and established several other business interests. After Paul's death in 1902, Eleanor continued to successfully run her various business enterprises in Qonce and East London. She was a talented musician and the Temperance Hotel became renowned for its musical evenings. The couple were members of the African choir, which toured England between 1891 and 1892 to raise funds for a technical high school in Kimberley.	Strategic Resource Mobilisation and Advancement (SRMA) Building



# George Campuses

	NEW NAME	MEANING	FORMER NAME
	<b>Athenkosi Mbangatha</b>	Former Nelson Mandela University student Athenkosi Mbangatha (1992-2020) was born in Flagstaff in the Eastern Cape village of Thaweni. While studying nature conservation on George Campus in 2018, Mbangatha was voted onto the SRC and, from there, her political passion took her forward to become secretary of the ANC Youth League in Ward 27, Flagstaff. Those who knew Athenkosi remember her as a peacemaker, teller of jokes and leader.	Stinkwood
	<b>Bavelile Hlongwa</b>	but also a chemical engineer. Born in KwaZulu-Natal, Hlongwa was an aspiring and energetic leader	Akkerdraai
	<b>David Webster</b>	Academic, anti-apartheid activist and anthropologist David Webster (1944-1989) was a founding member of the Five Freedoms Forum and a committed comrade in the United Democratic Front. He was assassinated by apartheid security forces outside his home in Johannesburg in 1989, nine months before Nelson Mandela was released from prison	Ystermartins
	<b>Denis Goldberg</b>	Professor Denis Goldberg (1933-2020) was a South African political activist and freedom fighter in the struggle against apartheid. Goldberg was accused No 3 in the Rivonia Trial, where Nelson Mandela was No 1 and Walter Sisulu No 2. He was also the youngest of the 11 defendants, and spent 22 years in jail after being convicted of sabotage.	Akkerdraai flats

	NEW NAME	MEANING	FORMER NAME
	<b>Emlanjeni</b>	The isiXhosa word <i>emlanjeni</i> means "at the riverside", and also a place of joy, tranquillity and harmony.	Laundry
	<b>Fatima Meer</b>	Activist, educator and author Fatima Meer (1928-2010) was a founding member of the Federation of South African Women (Fedsaw). The federation organised the anti-pass march on the Union Buildings in 1956. Durban-born Meer was the first black woman to be appointed as a lecturer at a white South African University, the University of Natal, and the only banned person ever granted permission to teach at an educational institution. Meer worked tirelessly to improve race relations and promote justice, reconciliation and non-violent action.	Pampoenkraal
	<b>Indlovukazi</b>	Although in isiZulu the word <i>indlovukazi</i> means a female elephant, in the SiSwati language it is the title for a female monarch of Eswatini.	Outeniqua Residences
	<b>Iziko</b>	The literal translation of <i>iziko</i> from the original isiXhosa is "at the fireplace".	Dining Hall
	<b>Johnny Clegg</b>	Singer-songwriter Johnny Clegg (1953-2019) is known for his vibrant blend of Western pop and African Zulu rhythms. This South Africa musician, born in England, became not only a musician but also an anti-apartheid activist known internationally for breaking through cultural and racial barriers.	Phoenix

	NEW NAME	MEANING	FORMER NAME
	<b>Kaunda Ntunja</b>	An award-winning rugby commentator and Currie Cup winner, Kaunda Ntunja (1982-2020) was a true rugby pioneer. The East London-born sportsman was the first black South African schools rugby captain and then moved on to become a passionate isiXhosa language rugby commentator for SuperSport.	Tierkop
	<b>Mieta Nontinam Leholo</b>	George struggle veteran Mieta Nontinam Leholo was a leader in the ANC and the ANC Women's League until her death in 2019 (DOB unknown). She played a significant role in ensuring the provision of education for black children in the George area.	Windheuwel Flats
	<b>Nadine Gordimer</b>	Nadine Gordimer (1923-2014) was a South African writer and political activist who was awarded the 1991 Nobel Prize in Literature. The judges recognised Gordimer as a writer "who through her magnificent epic writing has ... been of very great benefit to humanity". Exile and alienation were major themes in her writing which often focussed on the effect of apartheid on the lives of South Africans.	Kamasi
	<b>Nathaniel Julies</b>	Nathaniel, who had Down Syndrome, was just 16 years old when he was killed as an innocent bystander, allegedly by police officers. The young victim had grown up in tough socio-economic conditions.	Furntech/De Hoek

	NEW NAME	MEANING	FORMER NAME
	<b>Reeva Steenkamp</b>	South African model and paralegal Reeva Steenkamp (1983-2013) was a victim of intimate partner violence. As Steenkamp was a Nelson Mandela University alumnus, students felt it was important to commemorate the life of this well-known face of gender-based violence.	Kalander
	<b>Richard Maponya</b>	South African entrepreneur Richard Maponya (1920-2020) was a property developer and black business pioneer. He was best known for building a business empire despite the restrictions of apartheid, and for his determination to see the Gauteng township of Soweto develop economically.	Windheuwel Houses
	<b>Sindiso Magaqa Heights</b>	A former Secretary General of the African National Congress Youth League, Sindiso Magaqa (1982-2017), fought tirelessly towards the vision of economic freedom. As a principled social facilitator and a serious lobbyist, Magaqa placed himself on the front line of the struggle for freedom.	New Residence
	<b>Sophiatown</b>	Sophiatown is one of South Africa's most famous and oldest black townships, known predominantly for its political legacy and rich heritage of jazz and blues.	Rec centre
	<b>SRC Chambers</b>	The Student Representative Council Chambers are a hub where student leadership plans and initiates student activism and a vibrant student life.	Marula

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