

# GIM

CONSTRUCTION INSIGHT MAGAZINE

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**ENGINEERING 4.0**  
THE NEW FUTURE TRANSPORTATION HUB

**NEW CAPITEC HQ**  
STELLENBOSCH ON TRACK

**16 ON BREE**  
THE TALLEST RESIDENTIAL BUILDING  
IN CAPE TOWN

**JEWEL CITY DEVELOPMENT**  
TO CHANGE THE FACE OF  
JOHANNESBURG CBD





# One giant leap forward for Civil Engineering Training at the University of Pretoria.

The transportation engineering sector in South Africa faces many challenges at present. Limited training to bridge the current knowledge gap combined with a shortage of training facilities and testing laboratories count amongst these challenges. A collaborative effort between SANRAL, the University of Pretoria and CSIR was initiated to establish an Integrated Education, National Certification, National Reference and Research Laboratories Facility. This collaboration projects to improve the quality of training and avoid costly and unnecessary duplication of laboratory facilities.

**ARC Architects**, whom have an established footprint in educational design, were appointed by the University of Pretoria to facilitate the design process and construction of this exclusive facility with a team of best of breed consultants. This development will consist of a Reference Laboratory, Training Laboratory, Accelerated Pavement Testing Facility and an Active Traffic Track, as well as a Concrete Research Laboratory. As this is the 1st Phase of the larger Master-plan, the reception area will boast collaborative areas, offices, open teaching spaces and an auditorium. Expansion of the laboratory to other Civil Engineering disciplines will form part of future Phases.

Due to the many advantages of Tilt-Up construction, this was considered as the most preferred building method. All walls are cast on site and lifted into their final position thus maximising many of the unique and sustainable benefits of concrete for a cost-effective building technique and efficient construction method. All the components to be tilted up are formed on a temporary concrete casting bed near the building footprint. After the concrete has cured, the sections are tilted from horizontal to vertical by cranes and braced into position until all the structural components are secured.

Tilt-Up construction is known to be cost-effective, low maintenance, fire resistant and allows for shorter building times - all vital aspects that had to be considered during the planning stages. This building approach allows for a functional, durable and aesthetically pleasing end-product.



Expected completion of Phase 1 will be by February 2020.



Photos by André Broekman & Rick Vandoorne at UP



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# NEW FUTURE TRANSPORTATION HUB

(ENGINEERING 4.0) UNDERWAY AT UNIVERSITY OF PRETORIA

The University of Pretoria's Faculty of Engineering, Built Environment and Information Technology, the SA National Roads Agency Limited (SANRAL) and the Council for Scientific and Industrial Research (CSIR) have embarked on a major partnership to establish an Integrated Education, National Certification, National Reference and Research Laboratories Facility to the value of R280 million in the area of transportation. The partnership is part of UP's Future Transportation and Smart Cities research focus to lead South Africa into the Fourth Industrial Revolution (4IR).

"This is going to be a unique project, in the sense that for the first time in Africa, UP will have an accredited national reference laboratory, accredited in terms of meeting international standards, and the reference laboratory to reference for testing purposes

for industry at large. Our alumni and other engineers in the industry will benefit a lot from this project," said Prof Sunil Maharaj, Dean of Engineering, Built Environment and Information Technology at UP.

The future transportation hub will be housed in the new Engineering 4.0 facility on the Hillcrest campus, on the doorstep of the N1/N4 Proefplaas Interchange. The sod-turning ceremony took place on 4 December 2018, and the completion of the facility is planned for November 2019. This facility will consist of the accredited SANRAL National Roads Materials Reference Laboratory, training laboratory, an Accelerated Pavement Testing facility, an active traffic track for real traffic testing, and an upgraded concrete research laboratory. The facility also provides future expansion of the laboratory, and experimental and testing facilities related to interdisciplinary and transdisciplinary research. The vision is to have a research hub where industry, academia, government and research students across the world can develop future innovation to make South Africa and Africa a smart country and continent.

“This three-way partnership demonstrates the ability to align individual priorities to create a bigger impact jointly. While the university stands to gain futuristic engineering and research facilities, the CSIR stands to benefit from the body of research that will be pursued at UP and gain valuable postgraduate research skills, and SANRAL and the rest of the road sector stands to benefit from the material testing, quality assurance and research output for road application purposes. The space planning and designs that have been produced for this facility promise a vibrant interactive and state-of-the-art facility that will hold its own among the best in the world, while exposing both students and the industry to cutting-edge research, training and material testing,” noted Skhumbuzo Macozoma, CEO of SANRAL.

The aim of the facility is to provide an internationally renowned platform for academic and vocational training support in transportation infrastructure materials testing; a national transportation materials reference testing platform for SANRAL; and high-quality research facilities and skilled staff for the continent.

“The significance of this project is that this is truly a partnership. We have UP, CSIR and SANRAL working together and being responsible for the roads in our country. Three institutions will come together to discuss priorities and specifically how each—with our own distinctive mandates—can pull our expertise and our resources to make an impact that will shape the future of transportation in South Africa, and beyond our borders in Southern Africa,” said Prof Cheryl de la Rey, Vice chancellor and Principal of UP.

According to the Infrastructure Report Card, South Africa needs to address current challenges in the transportation-engineering sector, and there is a need to train the required number of engineers, technologists, technicians and artisans in order to address the current skills gap.

In the long run the facility is expected to provide, among other things, top-of-the-range laboratories to provide a platform for

quality training, reference testing and research in transportation engineering; a unified effort to train engineers, technologists, technicians and materials testers for the skills needed in future transport engineering—as well as postgraduate research output; and a pipeline of transport engineers that have been exposed to the latest technologies and methods.

The objective of this agreement is to consolidate resources to ensure maximum cooperation between the parties, in order to create a critical mass in laboratory facilities and skilled human resources to address challenges—including the lack of highly skilled personnel throughout the transport sector—efficiency, and avoiding the further erosion of the current remaining skills. With the Fourth Industrial Revolution upon us, and the importance of smart infrastructure and big data science in driving job creation and economic growth, South Africa needs to prepare its graduates for the future world of work. This Future Transportation Hub and Smart Cities Hub is the vehicle that UP is using, in partnership with SANRAL and others, to take South Africa and Africa into this new, exciting and, at times, ambiguous future.

“The importance of this project agreement is that South Africa is currently facing a shortage of engineers—as well as transport engineers—and a shortage of quality controls systems when building our roads. SANRAL, CSIR and UP decided that if we have a national reference laboratory for people building roads, that means they will have a third-party independent laboratory where materials can be tested. For our postgraduates needing space, facilities and equipment, this facility will offer them an opportunity of working in a world-class facility. We are also delighted that the Minister of Transport Blade Nzimande is looking forward to this project,” concluded Prof Wynand Steyn, HOD of Civil Engineering at UP.

