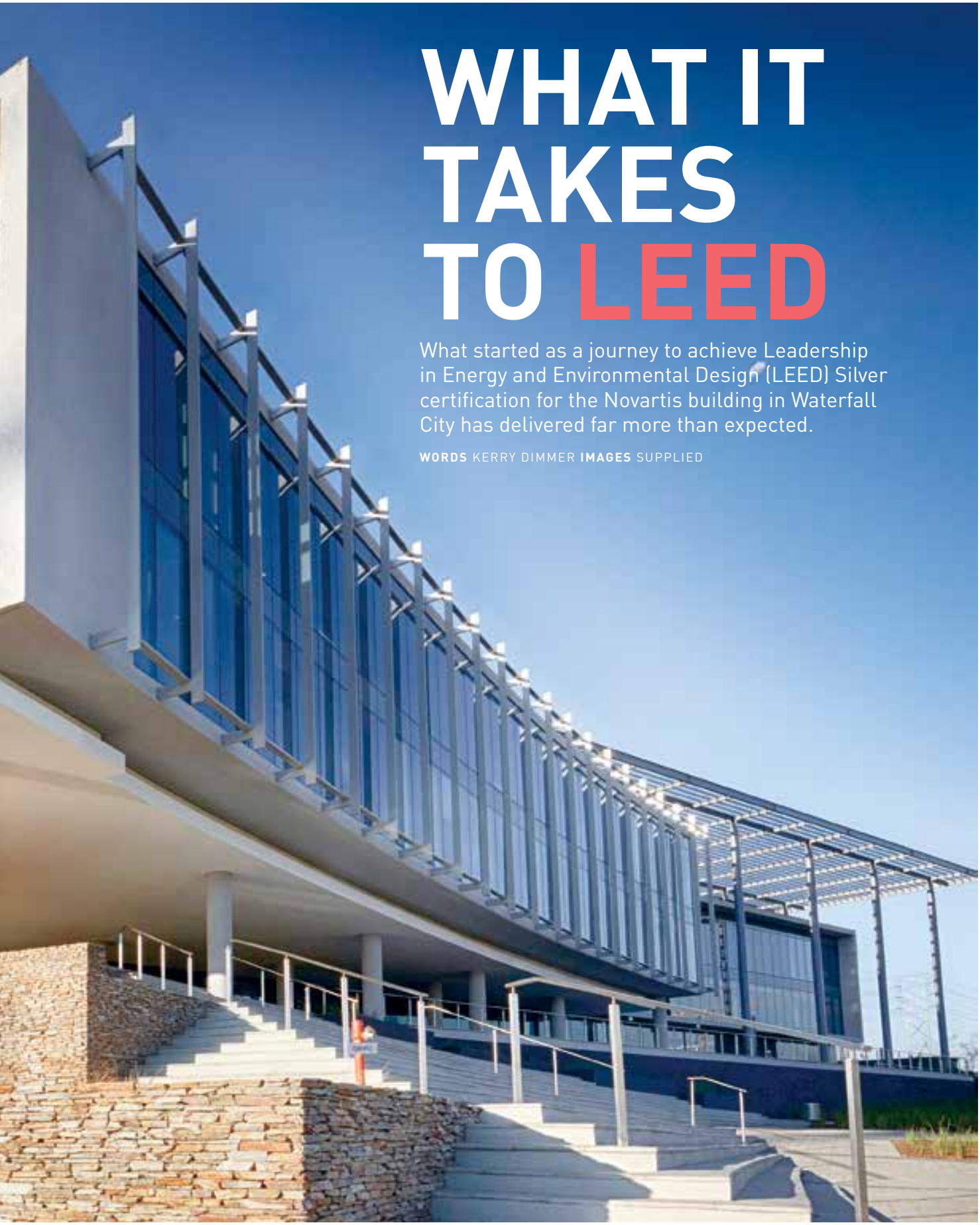

WHAT IT TAKES TO LEED

What started as a journey to achieve Leadership in Energy and Environmental Design (LEED) Silver certification for the Novartis building in Waterfall City has delivered far more than expected.

WORDS KERRY DIMMER **IMAGES** SUPPLIED

Even though developer Atterbury Property and building owner Attacq knew the Novartis property in Waterfall City, the new business district just north of Johannesburg in Waterfall Estate, ticked all the boxes, they were thrilled when it achieved a LEED Gold certification. Sustainability consultant Aurecon initially aimed for Silver but realised LEED Gold – a first in the Attacq property portfolio and Atterbury's development history.

The internationally recognised LEED certification by the US Green Building Council (USGBC) is a well-known standard for international corporates that endeavour to have green buildings. Novartis' LEED Gold was achieved in April, almost a year after the building was occupied, and has set the bar high for other buildings at Waterfall City since it is the first to achieve LEED recognition.

Werner Mulder, responsible for environmental sustainability at Attacq, comments: "The Novartis project has given us a better understanding of the effort, cost and value involved in LEED certification and that makes it easier to plan a project more accurately to environmental standards for tenants, particularly those that demand a high level."

Many Waterfall City tenants seek sustainability and environmental sensitivity, like PwC whose new PwC Tower headquarters, also in the Waterfall City CBD, is aiming for LEED Silver certification in 2018. "In fact, all the buildings in Waterfall City will be applying for LEED accreditation," says Mulder. "Whether they will be silver, gold or better will in part be determined by the tenant."

But why LEED and not Green Star SA? Marni Punt and Meghan Ward from Aurecon say initially Atterbury appointed their organisation in pursuit of a Green Star SA Office rating for Novartis, but when it became evident the project was not eligible given the proximity of Egoli Granite Grassland, which occurs only in Gauteng and is considered endangered, the decision to pursue an LEED rating was made. This of course set the precedent for all other Waterfall City buildings that wish to be environmentally rated on the ecologically sensitive site.

"Some very quick changes had to be made to our initial presentations in the move from Green Star to LEED," says Punt. "And it was a commendable effort by the entire team to acquaint themselves with LEED and ASHRAE (American Society of Heating, Refrigeration and Air-Conditioning Engineers) requirements."

In explaining how LEED works, Ward says it is a split review on the sustainability attributes targeted in a building project, in both the design and post-construction phases.

"Given that LEED is an American set of standards developed by the USGBC, we had to ensure we complied with its federal, state and local environmental laws. This was tough but not impossible. There was also the difficulty of applying the US ASHRAE standards. In SA most engineers design to comply to SANS so we had to make a number of adjustments to the designs and budget."

One compliance that immediately presented a challenge, says Punt, was that LEED demands the project must be a "complete" building or space. "Novartis was in effect complete but for one space that had been put aside for future tenant installation. Creatively working around this, we developed Tenant Design and Construction Guidelines that outline how future tenant layouts will be able to comply to LEED."

"We also had to evaluate each credit to include compliancy with an incomplete space, such as looking at a calculation on occupancy numbers, and energy and water consumption," adds Ward. It was the compliance to the former, energy, which really pushed the certification into the realm of gold.

"Including a solar PV installation boosted our energy points and also gave us an additional point under the on-site renewable energy credit. We were awarded additional exemplary performance points for innovative wastewater technologies, water use reduction and construction waste management," says Punt. "And another point for innovation was awarded for helping the tenant develop a green cleaning policy."

In the design phase, the team targeted credits under sustainable sites, water efficiency, energy and atmosphere, material and resources, indoor environmental quality and innovation. For construction review compliance, the team also targeted a number of credits under the categories of energy and atmosphere, material and resources, and indoor environmental quality.

Salient scoring points were achieved in many areas. Bicycle storage and shower facilities are provided for full-time occupants, while preferred parking spaces for low-emitting and fuel-efficient vehicles account for 5.1% of total parking capacity. With 77% of the base building's on-site parking located in the basement, a reduction in heat island effect was achieved for the non-roof heat island effect credit. The same was true for the roof heat island effect credit given that 110% of the weighted building roof surface has a solar reflectance index (SRI) of 104.44 – the SRI requirement should be 78 or above – which was achieved for more than 75% of the exposed roof area being painted.

For optimised energy performance, the Novartis building achieved an energy cost savings of 39%, with a predicted annual energy consumption of the total project being 1 102 805 kW/year of electricity. This is through the use of performance glazing on facades, solar shading, energy-efficient lighting with occupancy sensors and the solar PV panels.

NUTSHELL

Location • Novartis South Africa, Waterfall City, Waterfall Estate
Gross floor area • 8737m^2
Number of floors • six floors: three below grade, three above grade
Parking bays • 309
Cost • Undisclosed

Not specifically for energy savings, although some are realised, is the fitment of thermal ice-storage – a system that creates ice during the off-peak night hours for use the next day in cooling the building's occupants through the air-conditioning units. This ensures cooling remains possible even when electricity is not available. It remains that priority is given to the normal two HVAC chillers, while loads above 700kW will be served by the thermal storage system.

As there are no CFC-based refrigerants in the building, the HVAC systems minimise or eliminate emissions that contribute to ozone depletion and global climate change. The fire suppression systems are also not dependent on ozone-depleting substances.

All the building's mechanical ventilation systems meet the minimum requirements for outdoor air delivery in compliance with ASHRAE and the system delivers at least 30% above the minimum ASHRAE outdoor air rates.

SUSTAINABILITY FEATURES

- Preferred parking for fuel-efficient vehicles and bicycles
- Performance glazing on facade and solar shading
- Energy-efficient lighting
- Solar PV panels
- Thermal ice storage
- Energy-efficient HVAC system
- Rainwater harvesting through filtered and non-filtered tanks
- Recycled building materials
- Outdoor air flushes

COMMISSIONING KEY

The fundamental commissioning of the building energy systems required the appointment of an independent commissioning agent, in this case SMEC South Africa, to ensure the installed systems operated as intended by the designers. Wally Nell, section manager: urban development: mechanical at SMEC says in terms of energy efficiency the use of PV cells to supplement the power supply to the building and the implementation of the energy-efficient air-conditioning system, contributed to the building's excellent energy performance.

"Generally for any LEED project, the challenge is the commitment to the commissioning process and incorporation of the same into the building programme, which is more often than not reasonably fast-tracked," says Nell. "In this instance the successful certification of Novartis is a testament to

the commitment of all parties involved. Today it is expected energy efficiency aspects of green buildings will fast become the norm for building design.

"If all buildings, big or small, are developed as if the developer or institution funding the project was also responsible for the building's energy consumption bill, there could be a new wave of fresh and innovative designs on the building construction horizon," Nell adds.

> "The Novartis project has given us a better understanding of the effort, cost and value involved in LEED certification."
>
> WERNER MULDER, ATTACQ

GO FOR GREEN

In terms of water use reduction, Ward says alongside water saving fittings, a rainwater-harvesting system achieves water use reduction at 72.3%. Water-efficient fixtures include lavatories and showers using water-saving aerators for low flows, low dual-flush toilets and low-flush urinals. In addition, the building also uses rainwater harvesting solely for toilet flushing from five rainwater storage tanks and four filtered rainwater tanks, with a domestic water supply provided during dry periods.

In total, the team projects these measures will reduce water consumption by approximately 2 016 829.54ℓ per year.

During construction the Novartis project diverted 95% of on-site generated construction waste from landfill and proved that 13.4% of the total building materials value content had been manufactured using recycled materials: for example, the reinforced steel has a post-consumer recycled content of 92%; and 36.3% of the total building materials value included products that had been locally manufactured and extracted within 805km of the project site.

An indoor air quality management plan was also developed and implemented during construction, where a flush out was included and performed prior to occupancy. A volume of outdoor air flushes the building to ensure clean and improved indoor air quality for the occupants during their occupation.

Ultimately the dynamic between Attacq and Aurecon was a good culture fit and Mulder, Punt and Ward agree this was a crucial aspect to achieving LEED Gold status. It has elevated both organisations' profiles as specialists in green buildings and while it may have been a project of "firsts" for all involved, it is the first of many to come.

Footnote: Novartis declined requests to compare "actual with predicted outcomes" as it does not promote its campuses or facilities.

SOURCEBOOK

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