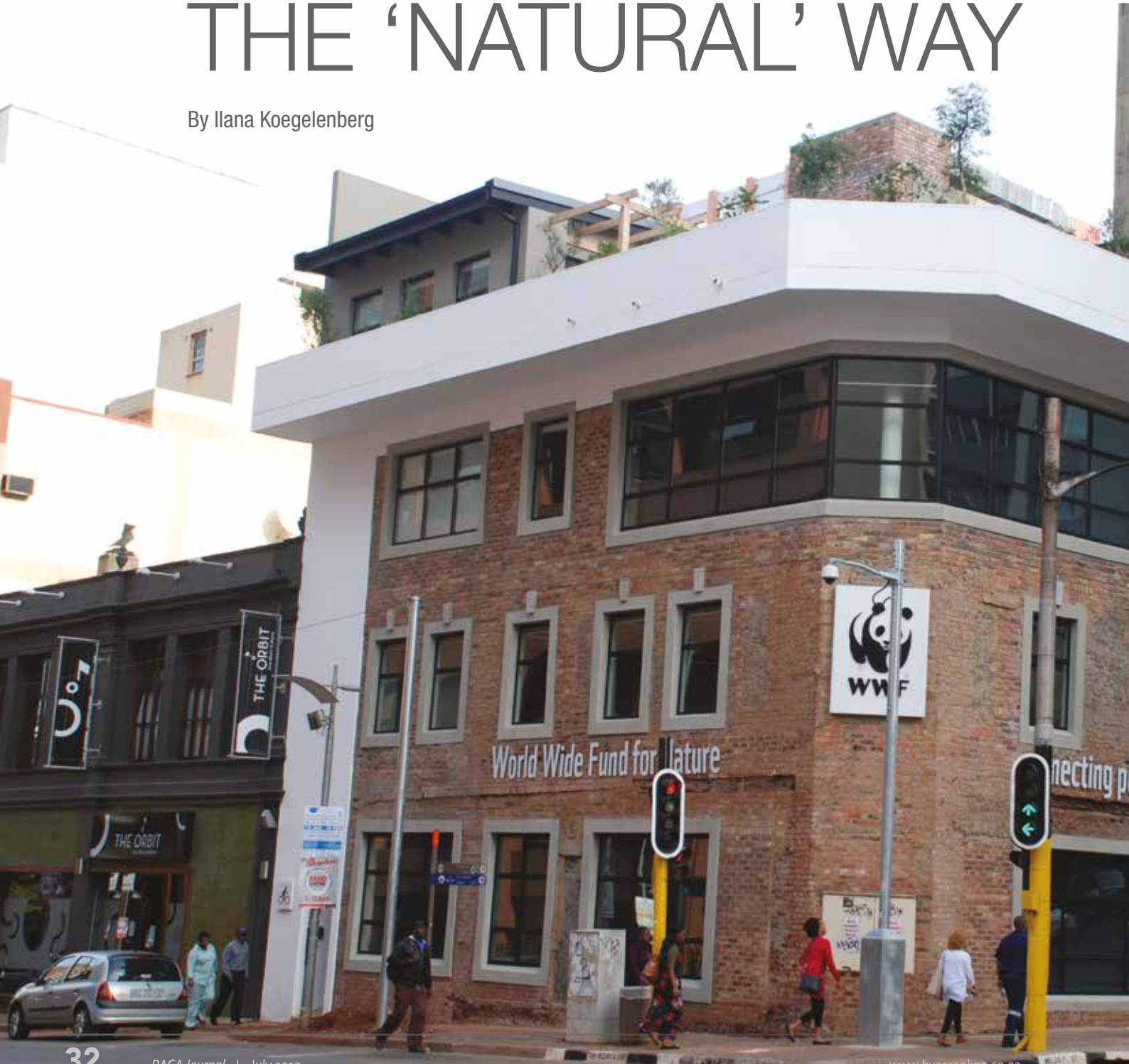
WWF-SA – 6 STARS, THE 'NATURAL' WAY

By Ilana Koegelenberg



Sometimes you do not need to spend millions for an efficient and effective HVAC system: the Johannesburg head office of the WWF boasts an impressive mechanical ventilation system that takes care of all its cooling needs.

The modest four-storey World Wildlife Fund (WWF) building includes a roof garden and sits on a tight 248m² corner site in the Johannesburg CBD. It stands as a physical representation of the organisation's values and attitude towards environmental responsibility and conservation of natural resources.

The building was handed over to the client at the end of January 2015, and it demonstrates that a green building does not have to include expensive sustainable technologies to achieve recognition.

The building is an office refurbishment with one basement level and four office levels orientated to the east

The ducting that distributes the ventilation throughout the building.

The WWF site before its renovation.

A work in progress.

and the south, and is predominantly overshadowed by larger high-rise residential units in the immediate vicinity.

The historical facade was retained, but stripped of plaster and exposed to contrast the old structure (floors zero and one) with the new second and third floors.

The project scored an outstanding 76 points, earning it an impressive 6 Stars from the Green Building Council of South Africa (GBCSA) in the 'Green Star SA – Office Design v1' category, achieved in November 2015.

SUSTAINABLE FEATURES

Sustainable building features of the WWF include the following:

- On-site treatment of black water for reuse within the building to flush toilets, as well as landscape irrigation.
- On-site storm water attenuation as well as rainwater harvesting to supplement non-potable water supplies.
- Water efficiency is achieved through low flow sanitaryware, as well as a drip irrigation system that reduces water consumption by more than 90%.
- Low volatile organic compounds used in urinals, thus negating the two largest water demands.
- Located within the heart of the CBD, building occupants have excellent proximity to local amenities as well as world-class public transport systems.
- No on-site parking has been provided; building occupants are encouraged to use the public mass transport infrastructure and/or cycle to work. Secure bicycle storage and showers are provided on site to encourage alternative forms of transport to work.
- The location within the CBD promotes the reuse of structures and reduces the need for urban sprawl.
- Although ecological improvement within the built-up environment was hard to achieve, a rooftop garden and entertainment area provide a welcome relief for building occupants.
- Sustainable material selection was carefully considered, together with the reuse of materials from the deconstruction phase of the project.

GETTING STARTED

The project go underway in November 2013, but a long period of planning preceded this.

Initially, the team looked at a displacement ventilation system running off a tri-generation gas plant in the basement, as piped gas was available on site. However, due to budget constraints, they opted for a more 'natural' design with virtually no HVAC equipment. This system would have set the project back R1.4-million!

1. *Extract air.*
2. *Ducting was built on site by Metflex Industries.*

1. *The project under construction.*
2. *The BMS controls.*
3. *The gas heaters used throughout the building.*

SYSTEM DESCRIPTION

The impressive building complies with all natural ventilation criteria, with additional mechanical ventilation included to ensure that the building remains cool.

The mechanical ventilation system pulls air from the roof via a ducted fresh air delivery system with axial fans. It pumps air into the building with a minimum of 12ℓ per person, with two air changes per hour (at least). Axial fans are in the basement to ensure adequate ventilation rates at all times.

But this is all control dependent, as carbon monoxide censors in the ceiling send signals to the building management system (BMS) when the CO_2 levels get too high in any of the floors. If the levels get above 800ppm, the BMS kicks in to up the fresh air levels.

All the windows can open and are double-glazed to keep the heat load down. However, it is difficult to find a balance between the noise from outside the busy city and the thermal comfort, as the air temperature cannot be controlled exactly.

1. *Ducting in the suspended ceiling.*
2. *Fresh air coming in the natural way.*
3. *Air diffuser*
4. *The Samsung digital inverter mid-wall split unit in the server room.*

1. *Carbon monoxide censor.*
2. *The building has an open-plan layout throughout.*

The building is purged at night and has no humidity control on the system.

The mechanical ventilation system runs between 2:00 and 4:00 every morning to pre-cool the structure, which, on most days, is sufficient to keep the building comfortable. It only happens a few times each year — when it gets really hot in summer — that the building could possibly become a bit hot. But, after a brief chat with some of the occupants, they say they have never experienced it to be too hot.

The entire HVAC installation only set them back about R450 000.

> *The impressive building complies with all natural ventilation criteria, with additional mechanical ventilation included to ensure that the building remains cool.*

The system is incredibly efficient as there is virtually no HVAC equipment in the building, just a single 9 000btu Samsung mid-wall split unit in the server room.

CHALLENGES

The biggest challenge on this project from an HVAC perspective was obviously the tight budget.

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Yet, the control side also gave the team headaches, as it was quite complicated, explains Richard Duckitt from Bornman & Associates, who were the sustainable building consultants on the job. It was quite tricky to integrate the control system of each of the axial fans with the BMS, as these controls are not very user-friendly.

Another issue was that a strike in the steel industry was taking place at the time of this project, bringing it to a complete standstill at one point and adding an entire month to the contract.

The fact that there was no space around the construction site was also a challenge, especially in the busy Johannesburg CBD.

Nonetheless, despite all the challenges, everything came together in the end.

HEATING

Heating is not a problem in the building as it is equipped with portable gas heaters throughout. The team was only restricted on the cooling side — not heating. Moreover, as the building is situated in Braamfontein, piped gas was readily available as mentioned.

The various Rinnai Paloma gas heaters are all linked to the BMS as well. The office has been equipped with quick release coupling points throughout so the heaters can also be moved around as required.

This adequately takes care of all the HVAC needs. RACA

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1. *In the boardroom on the top floor.*
2. *Censor in the boardroom.*

Professionals list continued on page 40

The rooftop entertainment area.

ABOUT THE WWF

The WWF is one of the world's largest and most respected independent conservation organisations, with almost six million supporters and a global network active in over 100 countries. WWF South Africa (WWF-SA) is a national office that is part of the WWF network. They are a local NGO that, for more than 40 years, has worked towards the aim of inspiring all South Africans to live in harmony with nature, for the benefit of our country and the well-being of all our people.

LIST OF PROFESSIONALS		
Owner		WWF South Africa
Developer		WWF South Africa
Architect / Designer		Alive Architecture
Project manager		Bornman & Associates
Consulting engineers	Electrical	Onezero Consulting
	Mechanical	~~Bornman & Associates~~
	Wet services	Solar Power Installations
	Fire	Building Code Consultants
	Structural and civil	TG Harrison
	Sustainable building	Bornman & Associates
Quantity surveyors		Russell Irons & Associates
Contractors	Main building	Giuricich Brothers Construction
	HVAC & R	Kenred Air
Product suppliers	Gas heaters	Rinnai Paloma gas heaters
	BMS and CO censors	Greenwave Automation
	Axial fans	Air Movement Supplies
	Basement extraction fans	Air Movement Supplies
	Server room mid-wall split	Samsung
	Ducting	Metflex Industries